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# Successful Backyard Poultry Keeping

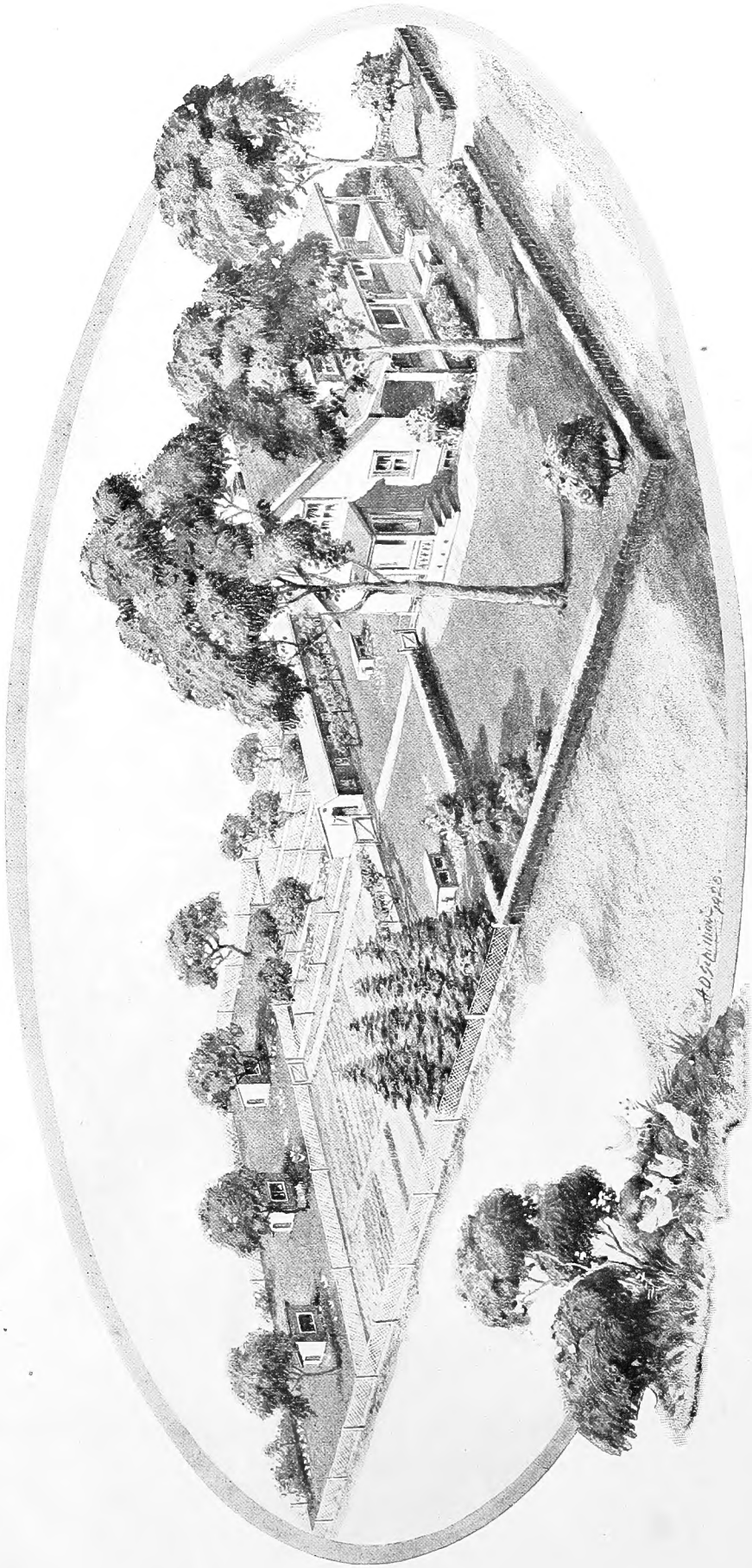


*A. G. Phillips*  
1922

Published By  
**Reliable Poultry Journal Publishing Co.**  
Quincy, Ill. U.S.A.







AN ATTRACTIVE, WELL-MANAGED BACK-YARD POULTRY PLANT MAY BE MADE AN IMPORTANT SOURCE OF PROFIT AND PLEASURE

# Successful Back-Yard Poultry Keeping

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An Authoritative Guide to Success in Poultry Keeping by Intensive  
Methods--Practical Details of Management for Those Who  
Are Keeping Fowls in Limited Space, Whether to Sup-  
ply Eggs and Poultry for the Family Table  
or As a Source of Income

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Compiled by  
HOMER W. JACKSON

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Over 100 Illustrations

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## INTRODUCTION



**B**ACK-YARD poultry keeping in the United States has come to be a truly great industry. It is to be regretted that there are no reliable census reports in regard to the number of fowls so kept, but the totals reported in local surveys that have been made in different sections of the country indicate that in the aggregate the number so kept must be enormous. In the state of Minnesota, for example, a few years ago, it was found that 40 per cent of the persons living in small towns had back-yard flocks and about 25 per cent of those in small cities. It is not probable that this proportion of poultry keepers to the entire town population is duplicated in all sections of the country, but there are few communities where the possibilities of small flocks of fowls are not generally appreciated and utilized.

Back-yard poultry keeping probably is affected less by changing economic conditions than any other productive industry. In high-price times like the present, great numbers of persons keep fowls as a means of reducing the cost of living; in times of depression the back-yard flock becomes a valued source of livelihood, or at least plays an important part in the struggle to keep going on reduced income. Those who are interested in pets or in breeding standard fowls find poultry a never-failing source of pleasure. So whatever may be the relative prosperity of the country, back-yard flocks may be said to have a permanent place in the domestic economy of the town dweller who is in position to keep fowls at all. It is truly fortunate in this connection that recent developments in poultry keeping have in many ways simplified the details of daily care and have made success readily attainable. The methods that lately have come into general use make it practicable for anyone to keep fowls in the most limited space, so that on almost any town or city lot there is opportunity for a poultry flock large enough at any rate to supply the home table.

Fowls are the most adaptable of all our domestic animals, and for that reason may be successfully kept under a wide range of conditions. The farmer with unlimited range, the poultry specialist with hundreds of fowls on an acre of land, and the back-yard poultry keeper with little or no yardroom at all, each finds that he can get good results with fowls, either young or adult, provided he adapts his methods to his particular conditions.

The farmer wisely utilizes the range to the fullest practical extent. In the summer he depends upon it for green feed; worms and insects take the place of meat; gleanings from fields and feed lots, weed seeds, etc., form an important part of the ration, while little or no land is devoted exclusively to fowls, and even houseroom is reduced to the minimum. As a result of these advantages, nowhere can fowls be raised or eggs produced with as little labor or as low feed cost as on the farm.

The broad acres of the farm, however, are not the only place where fowls can be successfully and profitably

kept. It is true that just in proportion as range is restricted and methods intensified the feed and labor cost per fowl is increased. That, however, is not necessarily a handicap nor a practical objection to intensive methods, since experience has abundantly proved that while farmers produce poultry and eggs at lowest cost they do not necessarily make the largest net profit, either on their fowls or on their labor. The commercial poultry keeper, in spite of his greater investment and labor cost, usually has a larger net profit per fowl and a greater labor income than the farmer, because from a given number of fowls he gets better average production, as a rule, and also realizes better prices for what he has to sell.

The back-yard poultry keeper, owing to his lack of room, often goes to the practical limit in intensive methods, but he finds that by meeting certain conditions he not only can get as good results in growth and production as the commercial poultry keeper or the farmer, but that he also has some important advantages that neither of the others has, and that go a long way toward compensating him for the additional labor involved in intensive poultry keeping. As a matter of fact, this disadvantage (extra labor cost) often is more theoretical than actual, since the small-scale poultryman usually has some regular employment and simply utilizes spare time in caring for his fowls—time which otherwise would have no earning value.

Back-yard poultry keepers are naturally divided into the following classes: Those who keep fowls simply to supply the family table with eggs and possibly with a limited number of table fowls; those who keep larger flocks with a view to producing a surplus for sale, and those who keep poultry primarily as a source of pleasure, including most persons who breed standard fowls. All of these lines of production are practical under average back-yard conditions, and no industrious person who wants to engage in either need have any hesitancy about doing so through fear that his restricted quarters will prevent his success.

The economic status of back-yard poultry keeping is definitely established and is not in question in the mind of any well-informed person. That fowls may be kept successfully in the smallest of back yards and that flocks so kept will produce eggs at an average cost of half or less than half the usual retail price are facts for which illustrative proof may be found in every village, town and city in this country. There often are personal reasons for not keeping fowls in town, and in some communities there are local ordinances prohibiting it, but there are few places indeed that are fit for human habitation where there is any real practical difficulty about keeping fowls successfully.

The low feed cost of eggs produced by the back-yard flock is by no means conditioned upon the utilization of waste from the kitchen and the home garden, though these are truly important factors in keeping down expense. Even where the poultry keeper buys practically all feed,

as is usually the case where flocks of good size are kept, he finds that the cost of producing eggs still need not much if any exceed one-half of the retail price. This is because the farmer and the commercial egg producer who are making a practical success of the poultry business must get not only a sufficient price for their eggs to pay for the feed consumed in producing them, but this price must also cover labor cost, interest on investment, and a reasonable profit to the producer. To these must be added, as a rule, transportation charges and a varying number of middlemen's profits.

The back-yard poultry keeper however, does not take labor cost into consideration, because the work of caring for his fowls is done outside of regular hours when his time otherwise would have no earning power. His investment also is negligible, and he pays no tribute to the middleman. In counting the cash price of production, therefore, he has nothing to consider except the feed bill, and even at present high prices for grain this represents but a part of the average retail price of eggs—as is abundantly proved by records of practical back-yard poultry keepers presented in detail elsewhere in this book.

We wish to direct special emphasis to the fact that back-yard poultry keeping is not necessarily limited to the small flock that will supply the home table, but is a practical industry for those who wish to add materially to their regular incomes or who have the desire sometime to have a poultry plant large enough to supply the entire livelihood, thus making it possible to escape from the drudgery of factory or office. Those who are interested can secure direct evidence of this near almost any large city where there will be found men and women who have actually achieved this ambition and who have found the change most satisfactory.

Poultry keeping on either a large or small scale is not an extremely difficult undertaking in the sense that it calls for much technical knowledge or long experience. Instances without number could be cited in which persons have undertaken the work with neither of the qualifications just mentioned but who have been highly successful from the start. There are, of course, degrees of success, and it is not to be expected that any person having no previous experience or knowledge of poultry keeping will secure as good results as those who have been keeping fowls for years. However, the essentials of poultry keeping are few in number and comparatively simple, and those who have familiarized themselves with these can take up the work with entire confidence—with prac-

tical certainty of good returns from the start, knowing that as their experience increases their degree of success also will increase.

The chief, if not the sole cause for such failures as occur in poultry keeping can be traced directly either to neglect in mastering the few truly important details of the work or to a false sense of independence which leads great numbers of persons every year to adopt methods which every practical poultry keeper knows are unsafe. There is little hope for those who will not be guided by the experience of others, or who are not willing to meet the few simple conditions that are universally acknowledged to be essential. They may be able to "get by" for the time being, but sooner or later disaster will overtake them.

"Successful Back-Yard Poultry Keeping" has the double aim of serving not only as a practical guide to the beginner who is starting with poultry on the smallest scale, but also of showing how the back-yard flock can gradually be developed to any size within the limits of the space available. It is hoped that it will increase the percentage of successful beginners by putting before them the elementary principles of poultry keeping, doing this in the simplest possible manner. But, having pointed out the essentials of success and the simplest means of attaining it, this book aims also to give as complete information along the various lines of intensive poultry keeping as is necessary to enable the beginner to perfect his methods, increase his profits and insure his permanent well-being.

"Successful Back-Yard Poultry Keeping" deals entirely with chickens, intentionally ignoring all other classes of poultry. While there is evidence that ducks, geese, turkeys, etc., can be successfully kept in back yards, the advantages of doing so are limited and the practical difficulties great. Unquestionably, it is much better for the beginner to limit his efforts to chickens, leaving other kinds of poultry to the few who have some special reason for being interested in them.

In the preparation of this book we have had the assistance of numerous persons, including in particular heads of poultry departments in a number of our state agricultural experiment stations, who have furnished valuable data and have made it possible for us to get in touch with many successful back-yard poultry keepers in their respective states. To all of these we wish to acknowledge here our obligation and to express our sincere thanks and appreciation.

## CHAPTER I

# Advantages in Back-Yard Poultry Keeping and How to Start

Back-Yard Poultry Keepers Produce Eggs at a Cost of Half or Less Than Half the Average Retail Price and There Is Room for a Small Flock on Practically Any Town Lot—Any Earnest Person Can Keep Fowls Successfully and the Start Can Be Made at Small Expense



AM paying 60c a dozen now for eggs and can see where I shall be paying a dollar before long, if I get any. Besides, genuinely good eggs are almost unobtainable in this market at any price in the winter. Tell me how to start with a back-yard flock."

### HUNGRY CITIZEN.

The foregoing letter recently received states in a nutshell the argument for the small back-yard flock. There are great numbers of persons in town and city who are deprived of fresh eggs for six months in every year, either because these are not obtainable or because they do not feel that they can afford to pay the price. It is from the ranks of these "hungry citizens" that back-yard poultry keepers are largely recruited, it being necessary only to call the attention of earnest persons to the comparative ease and certainty with which they can supply the table with eggs of superior quality and unquestionable freshness, doing this at a fraction of the cost of market eggs by utilizing the waste from the kitchen, also from the home garden, and by employing spare time that otherwise would have no productive value.

The saving in the cost of eggs used on the home table that may be realized through the possession of a small, well-managed back-yard flock hardly need be discussed here in detail. Those who wish to be fully reassured on this point will find ample evidence on it in the reports of successful back-yard poultry keepers presented elsewhere in this book. However, it may safely be said

that even at present prices for grain there is scarcely any condition under which the feed cost per dozen eggs need exceed 25c per dozen where all feed is purchased, and when kitchen scraps are utilized in feeding the hens it may be much less.

For example, Professor H. R. Lewis' estimate of returns from a city flock of 15 Leghorn pullets in New Jersey (see page 10) shows a feed cost of 16.7c per dozen. Professor H. L. Kempster of University of Missouri found that the feed cost with his own back-yard flock was 13.9c per dozen. Extension Bulletin 49, University of Nebraska, gives the average feed cost of producing a dozen eggs in a Nebraska back-yard flock from June, 1917 to June, 1918, at approximately 13.6c per dozen. In a recent publication of the California Experiment Station, Professor Dougherty, head of the Poultry Department, estimates the feed cost at 13c per dozen on the assumption that kitchen waste will provide half the living for the fowls. The housewife who rarely is able to get eggs under 35c per dozen and whose average price for the year is well above 50c, even though she uses storage eggs all through the high-price season, should find "food for thought" in the foregoing!

A practical reason for advocating a more general resort to back-yard poultry keeping is the fact that the general high level of prices at which eggs now sell operates automatically to bring about limited consumption, and in the case of the average family this is a real misfortune. Few persons realize how large a part eggs may



LOW-COST BACK-YARD POULTRY PLANT WITH OUTDOOR BROODERS FOR RAISING CHICKS  
Photo from United States Department of Agriculture.

play in economical housekeeping when they are available at reasonable cost. The per capita consumption of eggs in this country cannot be stated with certainty but such data as are available indicate that the general average



A POULTRY PLANT ON A HOTEL ROOF

In this unique poultry plant, located on the roof of a hotel in Boston, Mass., the owner secured an average production of 188 2-3 eggs in one year from 12 pullets. Fowls can be successfully kept almost wherever there is room for them.

is in the neighborhood of 15 dozens a year. Where eggs are obtainable at low cost, also under exceptional conditions, almost double this rate of consumption often is realized. In many homes where eggs are not only used freely on the table but also employed in cooking and in the preparation of desserts, consumption may exceed an egg a day for each member of the family.

The importance of a freer use of eggs, particularly in homes where there are growing children, should receive greater emphasis. Eggs form one of the most palatable sources of food and on account of their nutritiousness and high digestibility are indispensable in cases of sickness and in the diet of practically all who, while not sick, are below their normal strength. Moreover, recent investigations have shown that they possess a special nutritive value owing to their high percentage of the important, though but vaguely understood class of nutrients called "vitamines." These are regarded as absolutely essential to growth in young of any kind and to proper nutrition in adults, and they are found in greater proportion in eggs and milk than in any other classes of foodstuffs—either animal or vegetable. Even at comparatively high cost, therefore, a proper regard for the health of the family should lead to a liberal use of eggs. Where high prices would make this a serious burden, the advantage of having a home flock as a constant source of supply should be obvious.

In this connection it may be well to call attention to the mistaken economy of many housewives in trying to reduce expenses through the use of "egg substitutes." Doubtless, the leavening and thickening power of eggs can be imitated by such substitutes, but not their food value. The nature of such substitutes and the undesirability of their use is thus explained in a News Bulletin issued recently by the University of Illinois:

"Analyses of samples of the various substitutes by Charles H. La Wall, chemist of the Pennsylvania Department of Agriculture, have proved that 'they are wicked frauds which add to the already high cost of living by making people pay an excessive price for a little cornstarch and casein under the impression that they are saving money.' Tests of ten kinds of substitutes on the markets show that they contain a small per cent of casein, a

large per cent of starch, and are colored with a permitted coal-tar color. They do not represent egg contents, containing starch which is foreign to eggs, and being devoid of fat which eggs contain. The coloration used is a permitted coal-tar coloring, but it imparts a color indicating the presence of an abundance of eggs, and articles baked with it could not legally be sold for that reason.

"These substitutes are misbranded in several particulars. In one case the package states 'containing the nutriment of eggs,' and 'for all cooking and baking purposes gives results equal to fresh eggs.' There were only three ounces of dry material present, which are supposed to be equal to two dozen fresh eggs, an untrue claim, for two dozen fresh eggs contain over one-half pound dry nutritive substance.

"In another case the label claimed that each package of the substitute would serve the purpose of four dozen of eggs except in nutrition, and would save the cost of over \$1 worth of eggs; also that it gave that rich 'eggy' look and saved the stomach much work in digesting heavy food. The fraud in this case lies in the fact that eggs alone will sustain life, while on a diet of this article alone an individual would quickly starve to death. The idea that a small package of cornstarch with only minor additions could take the place of four dozen eggs, equivalent to more than one pound of dried eggs, is ridiculous. The public is warned to beware of all so-called substitutes."

Under favorable conditions what has been said in regard to the practical economy to be effected by keeping back-yard flocks applies to the production of table fowls as well as eggs. Where space is limited it often is not practical to attempt to raise fowls, or at the most only enough to insure a supply of pullets with which to renew the laying flock each year or every other year as the case may be. Those who have the room however, will find that they can produce table fowls to fairly good advantage, and if they are willing to go to a little trouble in special fattening, as described elsewhere in this book, can provide poultry meat of a quality practically unobtainable in the ordinary market, often at no greater cost than market poultry of ordinary grades.

#### Who Should Not Keep Fowls

In the face of the foregoing facts it should be plain that the economic status of the back-yard flock cannot be in question in the mind of any well-informed person.



THE MOST SUCCESSFUL POULTRY KEEPERS ARE THOSE WHO LOVE PETS

That fowls may be kept successfully in about every back-yard in this country and that such fowls will produce eggs at an average cost of half or less than half the usual retail price—these are ESTABLISHED FACTS. More-

over, those who take an interest in breeding superior-quality birds or who enjoy pets will find a small flock of fowls a source of keen enjoyment, quite regardless of the profits that they may realize.

We do not say that every one who has a back yard SHOULD keep fowls. There often are good reasons why some will not find it convenient or practicable to do so. Those whose other duties are such that they cannot or will not give the fowls proper attention, those who are not prepared to pay the price of success by looking after the simple needs of the fowls regularly day after day, **THOSE WHO DO NOT LIKE PETS**—all these, doubtless, will be better off if they continue to buy their eggs and poultry meat. Fowls are highly adaptable to conditions, and many liberties may be taken with them, but they will not stand the neglect that a great many persons are guilty of. It is useless to attempt poultry keeping unless there is a disposition to give the birds a fair chance.

With these qualifications in mind it may be said that no one who wants to keep fowls need hesitate through fear that he cannot properly meet the requirements of success. It does not matter greatly where the prospective poultryman lives, what his surroundings are, what his

in close quarters calls for a relatively greater amount of labor and closer attention than would be required with birds having more liberty. For this reason extremely intensive methods of poultry keeping have never been regarded as truly practical where fowls have been kept in large numbers and where the labor cost of caring for them must be taken into consideration. With small flocks, however, where the time element may be disregarded, such objections to intensive poultry keeping may be ignored.

A comparatively small house will meet the requirements of a flock large enough to supply the family table and it is not really necessary to provide any yardroom whatever. Most poultry keepers prefer to have at least a small outdoor yard for the birds when possible, particularly if they are to be kept the year round, because fowls with yards generally will give better results than those that are kept constantly confined; also because of the simpler methods and lower labor costs where fowls have a reasonable amount of yardroom. Nevertheless, there are thousands of flocks kept indoors throughout the entire year, and with good success (see Chapter X).

In some cities local ordinances have been passed that impose restrictions upon poultry keeping, and where there is any question in regard to this it is well to be certain



WITH PROPER CARE STURDY, VIGOROUS CHICKS CAN BE RAISED IN THE BACK YARD

hours of work may be, or whether there is some one else in the family able to lend a helping hand. There are practical ways by which the common methods of feeding and general care can be adapted to individual conditions, whatever they may be. Reasonable care the fowls must have; but wide variations as to details are permissible. It may be well to explain that maximum production in any flock is secured only through painstaking attention to comparatively slight details in feeding and general management; but fair returns, such as will satisfy the average poultry keeper and represent a good round profit on the investment and the time employed may be secured through most unexact methods.

#### How Much Room Is Needed

Attention has already been called to the adaptability of fowls to varying conditions, and experience has shown that it is scarcely possible to confine them so closely that they will not remain productive for an indefinite time if properly cared for. Various "systems" of highly intensive poultry keeping have come before the public from time to time and while, as a rule, they have demanded careful attention and a relatively great amount of labor, the fact that fowls can be brought to a high degree of productivity under such conditions has never been disputed. It should be borne in mind that to keep fowls successfully

what attitude the authorities are likely to take. However, under the pressure of war-time conditions and the even greater needs that have followed the close of the war, many such restrictions have been annulled or suspended. Few persons whose houses and yards are kept in a sanitary condition and who dispense with males—an entirely unnecessary expense in any flock kept exclusively for the production of table eggs—will meet with serious objection to their keeping a small flock.

#### Capital Required

The amount of capital required for the back-yard flock depends upon many conditions, and no statement can be given that will be applicable to all. Speaking generally, a comfortable house can be built, even at present prices of lumber, for \$1.50 to \$2.00 for each hen accommodated, and if a little foresight is exercised in the purchase of materials, utilizing second-hand lumber, store boxes, etc., and doing the work oneself, the cost can be greatly reduced. So far as the small back-yard flock is concerned the question of capital really is not a factor; anybody who WANTS to keep fowls can find a way to finance the undertaking.

The investment required to provide completely for a flock of 15 layers, approximate cost of keeping such a flock for one year (figured on the basis of 1918 prices for

materials, stock and feed) and the return that may reasonably be expected, has been estimated by Prof. H. R. Lewis of the New Jersey Experiment Station, as follows:

**FINANCIAL RETURNS TO BE ANTICIPATED FROM A FLOCK OF 15 PULLETS**

<b>Estimated Cost of Building House and Stocking With a City Flock</b>	
Poultry house, 8x10 feet.....	\$ 40.00
Fencing and posts.....	9.00
Equipment, including pails, hoes, hoppers, etc.....	4.60
Stock, 15 maturing Leghorn pullets.....	30.00
<b>Total cost.....</b>	<b>\$ 83.60</b>
<b>Expenses</b>	
Feed purchased (in addition to garbage).....	\$ 30.00
Supplies and incidentals.....	8.00
Interest on investment.....	4.18
Depreciation, repairs and insurance.....	6.00
<b>Total expenses.....</b>	<b>\$ 48.18</b>
To buy new pullets each year to take the place of old ones which are killed and eaten by the family after they have stopped laying for the summer.....	30.00
<b>Total yearly outlay.....</b>	<b>\$ 78.18</b>
<b>Returns</b>	
180 dozen eggs at the rate of 12 dozen per bird, figured at 50 cents per dozen.....	\$ 90.00
28 fowls eaten by the family (2 being allowed for normal mortality in the flock), 112 pounds at 35 cents.....	39.20
<b>Total returns.....</b>	<b>\$129.20</b>
<b>Summary</b>	
Returns.....	\$129.20
Expenses.....	78.18
<b>Difference (commonly called labor income or profit).....</b>	<b>\$ 51.02</b>

Analyzed on the basis of the cost of one dozen eggs, if the profit or labor income is credited to the cost of producing eggs, we find that under these conditions the family will have secured their eggs at an average price during the year of 22 cents per dozen, and the poultry meat at a price of 35 cents per pound.

From "Hints to Poultrymen," Vol. 6, No. 11, N. J. Exp. Station.

**Time and Attention Required**

The amount of time consumed in caring for the flock is quite largely under the control of the caretaker. Fowls are quickly responsive to special attention, but where necessary the details of the work, even the daily feeding, can be adjusted to meet individual requirements without much regard to what these may be. Many successful back-yard poultry keepers do not see their fowls by daylight for weeks at a time, with the exception of Sunday, doing their feeding, watering, cleaning, etc., by lantern light. Maximum production may not be secured under such methods but fairly good results certainly should.

To meet special conditions, numerous practices have been devised. However, for those who find it convenient to do so it is doubtful whether there is a better way than

to follow the old familiar plan of feeding the birds regularly two or three times a day, one of these feeds to be a moist mash. Only a few minutes a day are required for this and there are few instances where there is not some member of the family who can give the birds this slight attention. Cleaning, spraying for lice, spading the yard, etc., are duties that can be cared for largely at the convenience of the "man of the house."

**Which Breed to Keep**

This subject, always one in which the beginner takes the keenest interest, is fully treated in Chapter XII.

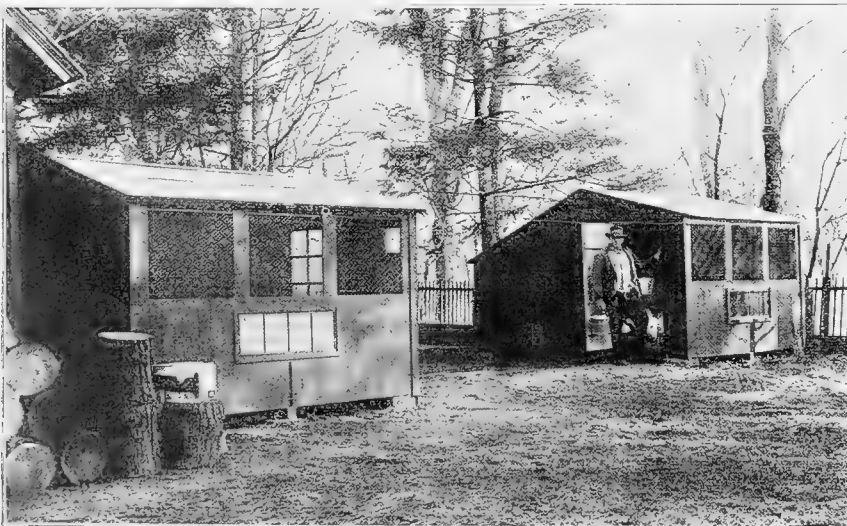
**How Many Hens to Keep**

The back-yard flock that is kept simply as a source of supply of eggs for the home table naturally will vary in size with family requirements. Egg production depends upon a number of considerations, and average results are bound to vary widely. "Bad luck" or bad management (two names for pretty much the same thing) may result in yields much below reasonable expectations, and with skillful handling they may go much above. As a basis for making plans, it is fair to expect that pullets hatched at the proper time in the spring, so that they are ready to begin laying shortly after the first of October, should average to lay 120 eggs, or 10 dozens each, during the following twelve months. With good management this average may readily be increased to 150 eggs or better, particularly if the fowls are of good breeding.

It is more difficult to estimate the number of eggs that will be used by the average family. Tastes differ and, moreover, the consumption of eggs of the ordinary grades commonly available is not much of a guide to the number that will be required when best-quality eggs can be secured at all times and at a cost so low that they can be economically substituted for butcher's meat. As stated elsewhere in this chapter, per capita consumption of eggs probably runs from 15 to 25 dozens per year, the latter figure being reached only under special conditions. However, those who produce their own supply may exceed even the highest estimate. For example, the writer happens to have a partial record of egg consumption in his own family for the months of February to May inclusive which

shows an average of one egg a day for each member of the family. As this covered the period when eggs were high in price and when there was a constant temptation to skimp a little so as to have more to sell, it is probable that the average for the year is above rather than below that rate. If it is the intention to make the most of the possibilities of the flock, therefore, an estimate of 30 dozens for each person does not seem too high.

To provide this average there must be at least three good hens for each member of the family. As there will be no difficulty in disposing of any surplus that may accumulate, and as there are certain seasons when production is comparatively low, it would be safer to allow an average of four layers, which should supply all the eggs that one person will require, except during the period from Septem-



BACK-YARD POULTRY PLANT USED IN DEVELOPING A FAMOUS HEAVY-LAYING STRAIN OF LEGHORNS

Two inexpensive poultry houses used by Professor Harry R. Lewis of N. J. Experiment Station in the moderate-sized back yard of his home in New Brunswick. Here he is carrying on highly valuable experiments in breeding for egg production and has already developed a highly productive strain of Single Comb White Leghorns.

ber to November when production always is quite low and for which provision must be made by storing some of the surplus of the spring months.

#### When and How to Start

Probably more persons take up poultry keeping in the fall than at any other time. This is because they get quicker returns then, or at least expect them. In the last few years however, many who would have started at this time have found it difficult or impossible to do so owing to their inability to secure laying pullets, or even to get good yearling hens, except possibly at extreme prices. For this reason many now are starting in the spring and find this much more convenient and economical, since they rarely have any trouble in securing the desired number of eggs for hatching or day-old chicks—and at comparatively slight cost.

Where there is sufficient room for raising them, pullets can be brought to maturity in the fall at half or less than half what they would cost if purchased at usual prices. Moreover, this plan insures having a liberal supply of delicious broilers or fryers throughout the summer, utilizing for this purpose the surplus cockerels and the less promising pullets. At the New Jersey Experiment Station, in 1918, it was found that the entire cost of raising a large flock of pullets to maturity, where all feed was purchased at high prices, averaged 70 cents for Leghorns and 80 cents for Plymouth Rocks, Reds, etc., after deducting the value of the cockerels which were sold as they reached broiler age.

When to start is not so much a question of season as of decision. The best time is when interest is aroused; when the possibilities for profit and pleasure in the small poultry flock are realized; when the necessity for adding to the income becomes acute. Adapt the method of beginning to conditions as they exist at the time, **BUT BY ALL MEANS BEGIN.**

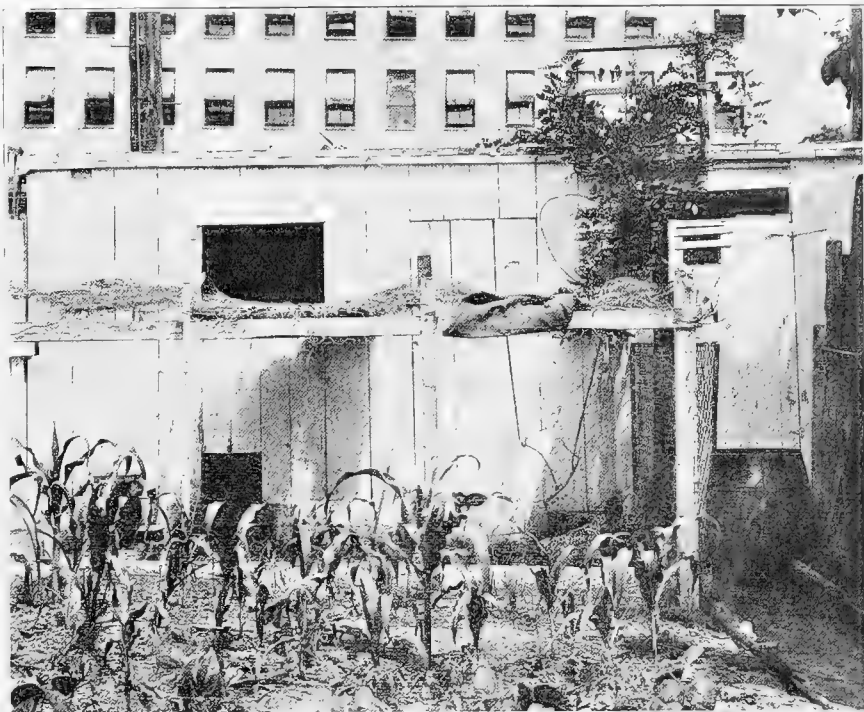
#### What to Buy in the Fall

As a rule, October is the best fall month in which to start, as this gives opportunity to get the fowls well acquainted with their new quarters and started laying before cold weather sets in. November is not too late, but do not delay a single day longer than necessary after October first. If obtainable, by all means get well-matured ready-to-lay pullets. It may do no harm to get those that have already begun, if anyone foolish enough to sell such birds can be found, but they will have to be handled with great care or the change will stop their laying. The beginner should bear in mind that early-hatched pullets that lay well during October can be thrown into molt by any mishandling that stops production. To get the maximum egg yield from such pullets during the fall, and to keep them laying regularly through the winter, it is important that they be carefully managed. Feed regularly on a well-selected ration, and do not disturb them unnecessarily. If for any reason it

is necessary to make an important change in rations or methods of care it should be done by easy stages so that the fowls will have a chance to become accustomed to it gradually.

#### Hens as Winter Layers

On account of the general high prices demanded for ready-to-lay pullets in the fall, many are buying one and two-year-old hens. The beginner in many instances is not able to secure anything else, unless he decides to buy immature pullets. So far as winter production is concerned, there is not much to choose between the latter and one-year-old hens, as neither can be expected to become



HOUSE OF A SUCCESSFUL SMALL FLOCK IN THE HEART OF A CITY  
Photo from United States Department of Agriculture

profitably productive until the first of the year or after. Hens of the larger breeds, however, are harder to handle in close confinement than pullets, and for that reason the beginner probably will get better results from immature pullets, provided they are not too young.

With good care pullets should come into laying at a given age without much regard to season. For example, Plymouth Rocks may be expected to begin laying at about seven to eight months of age if they are properly fed, regardless of whether they reach this age on the first of October or on the first of January. An exception perhaps should be noted in the case of Leghorns, which in cold climates are apt to be slow about coming into laying when they reach maturity in midwinter. With the larger breeds however, pullets that are known to be four to four and one-half months old about the first of October can reasonably be expected to begin laying by the first of January or shortly thereafter.

In buying old hens the back-yard poultry keeper will find it necessary to proceed with a good deal more caution than was necessary a few years ago. The advantages of culling are now so widely understood and the practice has been so generally adopted that any person

buying hens in the fall needs to understand culling methods quite thoroughly to avoid getting stocked up with culls from which he will secure but poor production, no matter how well they are cared for and fed. Before going into the market to buy old hens, carefully read the chapter on culling (Chapter XV) so as to be able to select hens that will be reasonably certain to give a profitable egg yield. If first-class one-year-old hens are secured

difficulty in getting winter eggs, especially if he is able to secure only old hens or late-hatched pullets. Almost any hen or pullet will lay well in the spring, however, and within the following four or five months should produce in the neighborhood of fifty to seventy-five eggs each. As they become broody and stop laying, they should be killed for table use, and by the latter part of the summer should all have been disposed of in this way, affording many delicious Sunday dinners at comparatively low cost, while the eggs produced will represent a substantial profit.

It will be necessary to use a little care in the purchase of such fowls, seeing to it that one does not stock up with pullets that laid all winter long and whose productiveness during the spring may be quite low. If hens are used, watch for culls. Since these birds are not to be used as breeders nor to be kept over to another year, it will do no harm to feed a rather forcing ration.

**One Hundred Per Cent in Three Months**

To show what may be realized from a flock of hens purchased in the spring, the following February-April record of a back-yard flock is given by Professor Horace Atwood of the West Virginia Experiment Station:

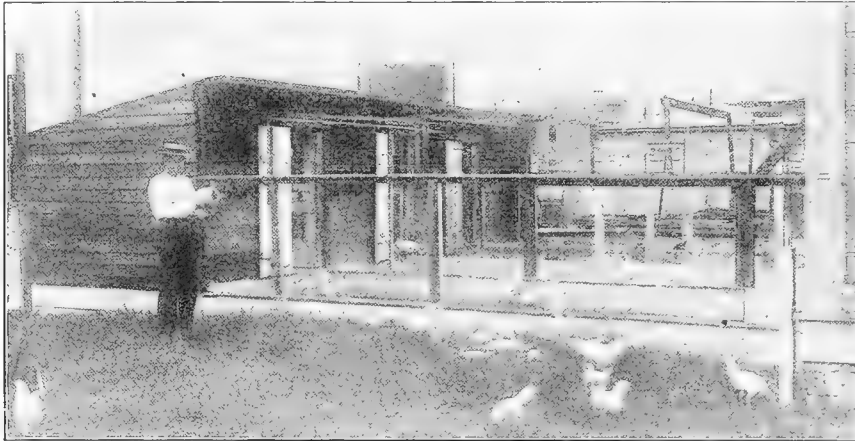
"On February 1, 1919, I purchased for \$65 a back-yard flock of sixty fowls consisting of six White Wyandotte cockerels, five White Wyandotte pullets, four White Leghorn cockerels and forty-five White Leghorn hens, mostly two years old. The price paid was perhaps somewhat low as the boy who owned them was very anxious to sell as he desired money with which to purchase a bicycle. Yet, as he had owned the flock only about one year and already had made them pay for themselves, he had made a reasonable profit.

"Within about one month all of the Wyandottes were sold at a good price, through an advertisement inserted in the 'West Virginia Weekly Market Bulletin,' a state publication which advertises West Virginia farm products free of all direct expense to West Virginia citizens. A few of the White Leghorn hens and cockerels were killed for the table. They were hopper fed on a well-known brand of dry mash, the scratch feed consisting of a mixture of corn and oats. They were compelled to eat at least as much mash as scratch feed. The Leghorn hens were just beginning to lay after the winter's rest and under the influence of liberal feeding and sanitary conditions their production was satisfactory. The following schedule shows the receipts and expenditures of February, March and April:

**Statement of Returns From Small Flock for Three Months**

Date	ITEMS	Dr.	Cr.
Feb. 1	To 60 fowls.....	\$ 65.00	
Feb. 1	To 600 lbs. feed.....	24.75	
Feb. 8	By 27 lbs. mash sold a neighbor.....		\$ 1.08
Feb. 9	By 2 W. Leghorn cocks for table.....		3.00
Feb. 10	By 2 W. Wyandotte clds. sold for breeders.....		6.00
Feb. 11	By 3 W. Wyandotte clds. sold for breeders.....		11.00
Feb. 15	By 1 W. Wyandotte ckl. and 5 pullets.....		15.00
Mar. 1	By 65 doz. eggs in Feb. at 50 cents.....		32.50
Mar. 6	To 490 lbs. corn.....	16.63	
Mar. 6	To 142 lbs. oats.....	3.84	
Apr. 1	By 70 doz. eggs in March at 48 cents.....		33.60
Apr. 1	By 2 hens for table.....		1.50
Apr. 1	By feed sold a neighbor.....		5.08
Apr. 15	To 660 lbs. feed.....	23.50	
May 1	By 77 doz. eggs at 45 cents in April.....		34.05
	Total.....	\$ 133.72	\$ 142.81

"The receipts for the three months from eggs and fowls sold exceeded cost of fowls and feed by \$9.09. Also some feed was on hand May 1 but unfortunately no record



POULTRY PLANT OF A BACK-YARD BREEDER

Great numbers of standard fowls are successfully bred in small plants. The house illustrated above is 28 by 32 feet, is divided into four pens and will accommodate 64 breeding birds without crowding. Owner of this plant states that "success in raising poultry in small yards depends upon cleanliness and healthy stock."

and then are given good feeding and care, they should prove profitable layers after January 1 to 15. The eggs from such hens will be much larger than those of young pullets, but more attention must be given to their feeding and exercise than would be required with the latter.

With the possible exception of Leghorns, few hens are profitable layers after their second year, hence it is never advisable to buy two-year-old hens. Unfortunately, the beginner finds it practically impossible to distinguish yearling hens and those that are older, and for the most part must simply take his chances. A little can be determined by general appearance, but not much. If buying in October, select those that have not begun to molt or are only partially feathered out, as they are almost invariably the best layers in the flock, bearing in mind, however, that late molting sometimes is caused by weakness. Avoid the early molters that will be completely feathered out at this date, also those that are extremely poor or lame from any cause, and all with scaly legs, spurs, or other obvious defects. If the fowls are of the larger breeds, watch for individuals having enlarged abdomens or such as feel hard or "bag down" behind. In buying Leghorns it is necessary to watch for extra-early pullets that have already laid themselves out and are going through a molt. Some poultry keepers make a practice of getting out a lot of pullets to keep up their supply of eggs in late summer and early fall, selling them off about the time they begin to molt, since after that they are of little value as layers until the winter is well over.

**Starting in the Spring With Adult Fowls**

If laying hens or pullets can be purchased in the spring at fair prices, it will pay anyone who has room for them to get a dozen or two just for the production of spring and summer eggs. The beginner may have some



was made as to the amount. Of the sixty fowls purchased, forty-three remained, fifteen having been sold or eaten and two having died. Adding the market value of the fowls on hand at the end of this period it will be seen that the enterprise returned about one hundred per cent on the investment in three months' time."

#### Starting With Day-Old Chicks

A good many persons make their start in poultry keeping with day-old chicks or with one or more sittings of eggs, and in many respects this is an excellent way to do. The cost of the pullets at maturity is much less than the price that would have to be paid for them at this time, and, what is still more important, the owner may be certain that he will have a supply of first-class pullets, matured and ready to begin laying by the first of October, or shortly thereafter. Whether it will be advisable for any given person to attempt to raise his own flock of pullets depends upon conditions, and particularly upon the amount of ground that is available for the purpose. It is not generally wise to try to do so if the chicks must be confined to extremely small, bare yards, where they suffer from lack of natural exercise and consequently fail to make good growth. With a good-sized yard, however, or if the chicks can run at large the greater part of the time, there is no reason why any one should not be entirely successful in raising them.

Bear in mind, however, that the handicap of limited yardroom, or none at all, can be overcome to a great extent by proper feeding and by providing ample exercise for the chicks through the use of deep litter in their pens. The chief reason why farm-raised fowls generally are superior to those grown in close confinement is that they have abundant exercise.

#### Buying Day-Old Chicks

Those who propose to start in this way should not fail to make a reservation in advance of the time they will want the chicks, and should be willing to pay a fair price, buying directly from some one with an established reputation, thus making sure of getting stock of truly good breeding—the kind that always gives best results.

Another important matter to which the back-yard poultry keeper needs to pay especial attention is the provision of suitable brooding equipment for raising his chicks after he gets them. It is simply a waste of money to buy them at all if this is not done. It is possible to raise good chicks in fireless brooders, but only at a great

deal of expense in time and attention. It is always easier and cheaper to use a first-class heated brooder, and in nearly all instances chicks so brooded will be better and stronger in every respect.

There are various styles of brooders adapted to the requirements of back-yard use. Electric and lamp-heated brooders for indoors or outdoors can be secured that afford almost ideal brooding conditions; for large flocks coal- or oil-burning colony hovers are almost invariably preferred. Get the kind of brooder that best meets individual requirements and is adapted to the size of the flock that is to be raised, but do not fail to get some kind.

#### Starting With Hatching Eggs

Many breeders of high-quality fowls do not sell baby chicks, and in order to get a start in their particular strains at moderate cost it is necessary to buy eggs and provide means of hatching them. Practically all that has been said with respect to starting with chicks applies with equal force to starting with hatching eggs. Many prefer to do this and, if reasonably skillful in the operation of incubators, good results will be secured.

#### How Many Chicks or Eggs to Buy

Starting with day-old chicks it is wise to get about three times the number of pullets wanted. This will allow for reasonable loss during the growing period, also will admit of culling out the less desirable members of the flock as their deficiencies become obvious. Even in the best bred stock there will always be some individuals that will be slow in maturing, or that will develop defects of one kind or another that make them undesirable for the laying pen. The poultry keeper who has accommodations for a certain number of birds usually is inclined to keep the full number even though, in order to do so, he must retain many from which good production cannot reasonably be expected. It is much better, therefore, to raise a small surplus so that the flock can be kept at the desired size without retaining in it any that ought to be discarded. If the start is made with eggs for hatching, there should be at least four times as many eggs as the number fixed for the proposed laying flock. Observing these proportions, the beginner should have no difficulty in determining just how many eggs or chicks to buy, also what incubator or brooder capacity he should have in order to take care of them.



WOMEN OFTEN ARE ESPECIALLY SUCCESSFUL AS POULTRY KEEPERS

## Reports From Successful Small-Flock Owners

Persons Who Have Been Successful in Poultry on a Small Scale Tell, in Their Own Words, How They Started, How They Manage Their Fowls, and What Returns They Are Able to Realize From Them—Success With Fowls Is Not Limited to Any Particular Section of the Country



EVERYONE who is considering the advisability of keeping a small flock of fowls naturally is interested in learning what he may reasonably expect in the way of returns. The best way to get at this is to find out what others are doing, along with as complete details as possible of the conditions under which they are working. For this reason we present in this chapter a number of interesting and instructive reports from persons who are keeping fowls primarily to supply the home table. These reports should be genuinely helpful to all beginners. They are fairly indicative of what anyone else can do with similarly well-managed flocks. It will be noted that widely separated sections of the country are represented in the reports here presented, also in Chapter IV, these having been selected in part to show that opportunities for back-yard poultry keeping are not limited to any particular section of the country but that it can be successfully practiced independent of location or climatic conditions.

### A Profitable Winter Laying Flock

Owner of One of the Leading Town Flocks in the Missouri Farm Laying Contest Tells of Methods Adopted and Results Secured—Over \$4 Gross Income per Hen in Five Months

By MRS. FRANK LEE, Missouri

EDITORIAL NOTE: The Division of Agricultural Extension Service in Missouri is conducting a "Farm Laying Contest" under the direction of T. S. Townsley, in which contest are represented entire flocks belonging to farmers and back-yard poultry keepers who are working under the direction of the Division and making monthly reports on production. The results secured are interesting and of decided practical value. One of the most successful of those engaged in this contest is Mrs. Frank Lee, a back-yard poultry keeper who writes as follows in reply to our request for details in regard to results secured and methods followed:

IN MARCH, 1919, I bought 50 White Wyandotte eggs from a breeder of a widely advertised egg-laying strain. April 10 I had 44 fluffy, stocky little chicks. I killed two weak ones and one that was deformed, leaving 41 strong, healthy chicks. My equipment for chicken raising is very primitive. I have no brooder and a woodshed serves as a chicken house. So I got a box and covered it loosely with an old blanket, allowing it to bag in center. I used jugs of hot water for heat, covering the jugs with a cloth.

I was very careful that the chicks did not get chilled and so gave them a good start. More chicks are lost by allowing them to get damp or chilled than from any other cause. After 58 hours I gave water and buttermilk, with rolled oats and corn bread. After a week I fed commercial chick feed. I watched them closely, attending to every detail in feeding and care, and in October I had

26 fine-looking pullets and one handsome cockerel, the others having been eaten.

The first pullet laid in October, and in November several were laying. Then I culled the flock, eliminating all but eighteen pullets and the cockerel. In November I got 168 eggs, and in December 347 eggs. In January the 18 pullets laid 354 eggs which was the Missouri State record for town flocks. In February I got 310 eggs and in March 358, a total of 1,537 eggs in five months, or an average of 85 per hen. The total cost of feed, new stock and equipment for the five months was \$34.92 and the gross sales of eggs amounted to \$85.40; besides, at the end of March I had 64 young chicks worth \$16. So the net income from my flock for the five months amounted to \$64.48, or \$3.58 per hen.

I keep deep litter in the shed and the hens scratch for the grain. The roosts and drop boards are cleaned regularly and sprayed with coal oil and a good disinfectant. I feed wheat screenings and corn or chops, and a dry mash composed of wheat bran, ship stuff, corn meal and commercial meat scrap, with plenty of clean water. I had a small patch of rye for winter pasture and now have a patch of rape, which I find is the best summer pasture for chickens.

My chicken house (or shed) is partly open in the south with an east door, with the north perfectly tight. In winter, during the cool south winds, I closed the opening on south and opened the east door, giving them the benefit of the sunlight. Lots of trouble and work? Yes, but it's worth it—from the double standpoint of pleasure and profit.

### Back-Yard Flock Makes Good Record

Pullets From Bred-to-Lay Stock Averaged to Produce 196 Eggs Each in Twelve Months—Were Kept Confined to House Constantly Throughout This Period

By PROF. H. L. KEMPSTER, University of Missouri

PHIL ROBYN from Augusta, Missouri, is responsible for the following story of a back-yard flock. It is hoped that his experience will prompt others to follow his example and do their bit toward producing more food. In March, 1917, Mr. Robyn purchased 32 eggs from the University. These eggs hatched March 28 and from them he raised 12 pullets, one of which died and another proved to be nonproductive and was killed. On August 11 a second bird died. On that date the average number of eggs per hen was 175. Up to October 1 the remaining 9 laid 190 eggs, making the average number of eggs per hen for the year 196. In writing concerning them Mr. Robyn says: "For three weeks in July I was unable to obtain mash and they dropped off about 60 eggs during the time and picked right up to normal again in August when they had the mash." The following is his report.

Feed includes scratch feed, mash, oyster shell for layers and for all chicks raised. Every grain was bought.

The pullets were housed in a well-ventilated house measuring 5 by 6 feet, from September 1, 1917, and kept absolutely confined throughout the year, except a few hours in the afternoons on the hottest days in August when they were permitted to run in the yard.

**Record of Ten S. C. W. Leghorn Pullets from Oct. 1, 1917, to Sept. 30, 1918**

1,935 eggs valued at.....	\$60.00
Cockerels sold and for table.....	9.04
21 pullets raised at \$1.50 each.....	35.22
Total.....	\$104.26
Feed for one year.....	35.22
Net profit.....	\$69.01

**Record of Bred-To-Lay Flock\***

**A Net Profit of Over \$10 Per Hen Is the Record of This Small Back-Yard Flock**

By MR. WM. F. GERHARDT, Pennsylvania

I HAVE 30 S. C. White Leghorn pullets of three-fourths English blood, that were hatched May 19, 1918. The first egg was laid November 5, 1918, and from that date to October 31, 1919, they laid 4,924 eggs. These pullets were confined from the day they were hatched until they were disposed of, and I feel that under the circumstances I have done quite well with them. There is nothing about the returns realized, either in productions or in sales, that any other earnest person cannot readily duplicate. A net profit of nearly \$300, however, goes a long way toward meeting the increased living expenses of the average family or affords a substantial addition to the savings account.

I did not have 30 pullets all the time, but started with that number, and they laid 2,254 eggs up to April 1, when I disposed of four. The remaining 26 laid 1,203 eggs up to July 1, when I reduced the flock to 15. These laid 967 eggs then to October 31. Following is a complete

\*Reprinted from January, 1920, issue of Reliable Poultry Journal.

statement of receipts and expenses from November 1, 1918, to October 31, 1919:

**Statement of Receipts and Expenses  
Nov. 1, 1918--Oct. 31, 1919**

Amount invested and stock on hand, November 1, 1918:	
Poultry house.....	\$ 100.00
30 pullets.....	90.00
2 cockerels.....	10.00
Total.....	\$ 200.00
Total stock on hand, Oct. 31, 1919:	
15 hens.....	\$ 30.00
45 pullets.....	135.00
4 cockerels.....	20.00
Total.....	\$ 185.00
Expenses for feed, straw, etc.....	\$ 191.24
Interest on investment.....	12.00
Total.....	\$ 203.24
Receipts:	
Table eggs.....	\$ 138.60
Hatching eggs.....	7.70
Day-old chicks.....	169.85
Stock.....	31.00
Market poultry.....	67.39
Increase in value of stock on hand.....	85.00
Total.....	\$ 499.54
Total expenses.....	\$ 203.24
Net profit.....	296.30

**Record of a Back-Yard Flock Under Prewar Conditions**

**At the Lower Prices Secured for Eggs Some Years Ago the Net Income per Fowl Was Much Less than Would Be Realized Now with Similarly Good Production, but Whether Prices Are High or Low the Back-Yard Flock Is Profitable**

By W. J. WHITE, West Virginia

THE following schedule shows the cost of 24 White Leghorn pullets and two cockerels on the first day of October, 1910, together with the cost of feed, the number and value of eggs produced, and the net profit resulting from keeping the fowls for one year. Also there is included a table showing the daily egg production of



BACK-YARD EQUIPPED FOR ADULT STOCK AND GROWING CHICKS

Coops and houses are elevated to prevent rats from harboring underneath them. The trays on the foreground are covered with wire netting and are used in sprouting oats for green feed. Photo from United States Department of Agriculture.

these fowls for the year, from which it will be seen there was not a day in the year without at least one egg. This means a good deal to the back-yard poultry keeper who is much more interested in having production spread out over the year than in having it bunched in a few months with a longer or shorter period in the fall and early winter when no eggs at all are secured.

**Poultry Account, October 1, 1910, to September, 30, 1911**

Date	Item	No. Eggs	Dr.	Cr.
1910				
Oct. 1--To	2 cockerels and 2 pullets.....		\$15.00	
Oct. 1--To	2 bushels wheat.....		2.50	
Oct. 1--To	2 bushels corn.....		1.69	
Oct. 1--To	2 bushels oats.....		1.00	
Nov. 1--By	4 11-12 doz. eggs at 35 cents.....	39		\$ 1.72
Nov. 9--To	2 bushels wheat.....		2.50	
Nov. 9--To	2 bushels corn.....		1.49	
Nov. 9--To	2 bushels oats.....		.90	
Nov. 9--To	85 lbs. oat straw.....		.48	
Nov. 9--To	100 lbs. oyster shell.....		.75	
Dec. 1--By	7 5-12 doz. eggs at 45 cents.....	89		3.34
Dec. 8--To	2 bushels wheat.....		2.50	
Dec. 8--To	2 bushels oats.....		.90	
Dec. 8--To	2 bushels corn.....		1.40	
1911				
Jan. 1--By	15 5-12 doz. eggs at 45 cents.....	185		6.94
Jan. 21--To	1 1/2 bushels wheat.....		1.70	
Jan. 21--To	2 bushels corn.....		1.20	
Jan. 21--To	2 bushels oats.....		.90	
Feb. 1--By	24 1/2 dozen eggs at 32 cents.....	291		7.71
Feb. 17--To	Armours Beef scrap, 25 lbs.....		.75	
Mar. 1--By	29 1-12 doz. eggs at 22 1/2 cents.....	349		6.52
Mar. 4--To	3 bushels wheat.....		3.75	
Mar. 1--To	3 bushels corn.....		1.80	
Mar. 4--To	3 bushels oats.....		1.35	
Apr. 1--By	15 7-12 doz. eggs at 20 cents.....	427		7.12
May 1--By	8 1-6 doz. eggs at 20 cents.....	458		7.63
May 13--To	50 lbs. scratch feed.....		1.65	
May 13--To	3 bushels wheat.....		3.75	
May 13--To	3 bushels corn.....		2.10	
May 13--To	3 bushels oats.....		1.35	
June 1--By	39 1-6 doz. eggs at 20 cents.....	470		7.83
July 1--By	29 1/2 doz. eggs at 22 1/2 cents.....	357		6.69
Aug. 1--By	28 5-12 doz. eggs at 22 cents.....	341		6.26
Aug. 3--To	100 lbs. scratch feed.....		2.00	
Aug. 22--To	1 bushel wheat.....		1.25	
Aug. 22--To	1 bushel corn.....		.80	
Aug. 22--To	1 bushel oats.....		.55	
Sept. 1--By	23 1/2 doz. eggs at 25 cents.....	285		5.93
Sept. 30--By	8 1-6 doz. eggs at 26 cents.....	98		2.05
Sept. 30--By	weight of chicken 91 lbs. at 14 cts.....			12.74
	Receipts over expenditures.....		26.68	
		3,409	\$82.51	\$82.51

During the year the pullets averaged to lay 142 1-24 eggs each and the flock consumed 2,367 lbs. of grain and meat scrap, or an average of 90.6 lbs. The cost of feed, straw and oyster shell was \$40.83, or an average of \$1.57 per bird. The eggs sold for \$69.77 or at an average of 24.5 cents per dozen.

An average selling price of 24.3c per dozen looks decidedly small these days, but a net profit of over one dollar on each hen was considered "not so bad" in 1910.

The total number of eggs produced during the year was 3,409, the average per hen being 142.5.

**DAILY RECORD OF EGGS FROM OCTOBER 1, 1910 TO SEPTEMBER 30, 1911--24 HENS "Not a Day in the Year without an Egg"**

Day	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.
1	1	3	4	7	10	13	17	19	10	12	11	6
2	1	1	6	6	12	16	13	16	18	12	10	3
3	1	3	3	8	13	17	12	17	12	12	9	4
4	2	4	8	7	11	10	14	15	10	14	11	7
5	1	1	4	8	14	16	16	18	14	11	7	4
6	1	2	8	9	11	14	14	17	15	19	15	5
7	2	5	4	9	12	12	11	12	14	13	9	1
8	1	1	8	9	13	15	16	12	14	7	11	4
9	2	3	8	10	11	15	15	18	15	11	13	3
10	2	2	4	8	13	16	12	13	9	10	9	4
11	1	4	10	10	11	10	13	13	16	10	10	5
12	1	4	4	6	12	14	16	13	13	11	9	3
13	1	3	6	4	12	14	16	16	9	11	8	5
14	2	1	7	10	9	12	16	15	14	9	9	4
15	2	3	5	9	13	13	14	14	7	10	9	3
16	1	5	4	10	9	10	16	17	12	11	7	4
17	2	1	6	9	15	16	17	17	14	10	6	3
18	2	4	7	14	12	12	13	13	12	14	12	3
19	2	3	4	8	13	15	16	15	11	13	9	3
20	3	2	7	10	13	15	16	14	11	9	6	4
21	2	6	5	10	11	9	14	14	13	12	11	1
22	2	2	6	13	16	16	19	18	10	11	9	4
23	3	4	8	9	11	14	18	15	11	12	7	3
24	2	3	6	9	18	12	15	13	10	12	13	2
25	2	6	5	13	10	15	14	15	10	14	6	2
26	3	3	8	11	13	14	18	19	11	12	11	2
27	2	2	6	10	17	16	14	14	10	10	9	1
28	2	2	5	12	14	12	20	19	11	10	8	1
29	3	3	7	9		17	12	18	9	11	5	1
30	4	3	4	14		16	21	14	12	11	7	3
31	3		8	10		11		17		7	9	

59 89 185 291 349 427 458 480 357 341 285 598

EDITORIAL NOTE: The following report is given partly to contrast conditions before the war with the present, also to show how, with careful management, the flock can be kept productive the year around. This is especially desirable to the back-yard poultry keeper who often attaches fully as much importance to having a constant supply of fresh eggs as to economy in cost. The second table presented by Mr. White shows that there was not a single day in the year when he did not secure at least one egg—a truly remarkable performance.

**Made the Start Twelve Years Ago**

**This New Jersey Back-Yard Flock Pays All Expenses and Returns a Substantial Cash Profit, in Addition to Supplying the Home Table with All Eggs Used at no Cost Whatever**

By G. CHRIS HUBNER, New Jersey

**I** MADE my start in poultry keeping about twelve years ago, when, in the late fall, my mother disposed of her back-yard flock, and left me with eight or ten half-grown chickens that the butcher would not take—some chickens! After various ups and downs I discontinued poultry keeping for a time but made another start in midsummer of 1917, when I got in touch with a farmer, who, as he thought, was unloading some laid-out S. C. W. Leghorns. They looked good to me and I bought 15 hens for one dollar apiece. I got quite a few eggs from them but made no records. I held 13 of these hens, sold the other two and bought a cockerel for one dollar and he proved to be a very good one.

From January, 1918, to December of the same year, with 13 White Leghorns, I received 183 dozens of eggs; sold 93 dozens for \$61.30 and received \$19.55 for poultry sold during the year, making a total of receipts of \$80.85. My expense for feed, etc., was \$62.41, leaving me a cash profit of \$18.44 besides 90 dozens of eggs for the home table. In January,



PLENTY OF SHADE FOR THE BACK-YARD FLOCK HERE

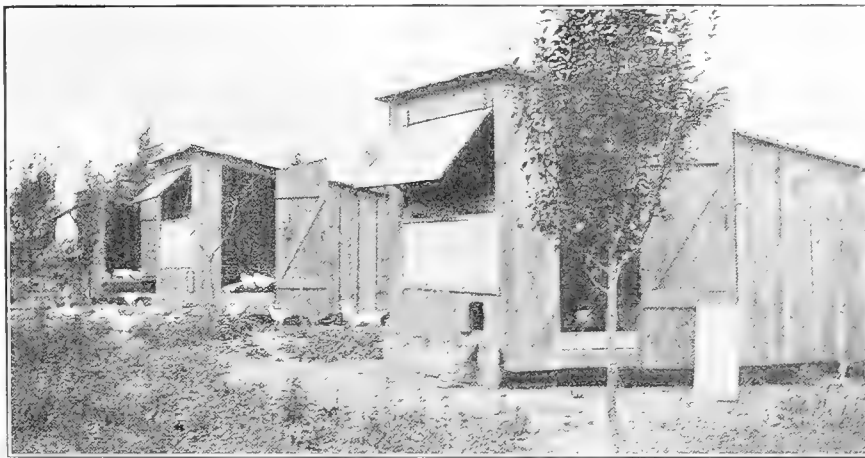
Rows of sweet corn along the side of the back lawn protect the fowls from summer heat. It pays to consider the comfort of the fowls.

1919, I started with 21 hens and received 2,236 eggs to December; sold 98½ dozens for \$67.80; received for poultry sold \$122; making total receipts of \$189.80. My expense for maintenance was \$137.45, making a profit of \$52.35, and I had 88½ dozens of eggs for the home.

I now have a henhouse 16 by 14 feet and expect to carry about 30 birds this coming winter. House has an open front with curtains to let down at night, droppings boards, with plenty of ashes on them so the droppings do not freeze fast, a good spray pump at my right hand for pests, roosts that lift out and are easily sprayed, plenty of good cool, fresh water in summer, and just a little bit warmed in winter, with a homemade heater. I have plenty of litter on the floor, which I work up with a hay fork when feeding, also a dust bath in a sunny corner which they seem to enjoy very much, charcoal, grit and oyster shell before them at all times, also a good laying mash.

This year I bought a 150-egg incubator and have had two good hatches. The first one was 99 chicks out of 119 fertile eggs and no cripples. April 8 I still had 92 good lively chicks. The second hatch I ran for a friend, getting 104 chicks out of 115 fertile eggs with one cripple. I have now an order for 25 pullets which I will sell and expect to make a nice profit from them, which will help pay expenses for maintaining the rest of the flock and the broilers are always good to eat, and can sell all I have at all times.

ture in the fall before cold weather, so that they would lay during that time, and by using in the ration an animal protein, which included either meat scrap or tankage. The house on the Wiggins' place is just an ordinary shed-roof affair and one which anyone in town who has a back



PRACTICAL LOW-COST HOUSES FOR GROWING STOCK OR LAYERS

These houses are quite inexpensive, being built of rough boards covered with narrow strips. Double-muslin shutters are used and no glass, thus further reducing cost. Are well adapted to colony-hover brooding and to the use of growing stock and will accommodate good-sized laying flock. These houses are built on runners for easy moving.

yard may have. The grain is fed in straw litter so that the chickens get plenty of exercise scratching for it.

## A Good Egg Yield Every Month in the Year\*

Another Small Flock That Is Profitably Productive the Year Around—Average Production 182 Eggs Per Hen

By C. W. BARTELLS, Illinois

I AM a back-yard poultry keeper, and aim to keep about 20 hens and 20 pullets. Each summer or fall I replace the two-year-old hens with pullets as I keep them through only two laying seasons. During the first six months of 1919 I had 42 hens and pullets. I then sold 18 hens and for the next three months had 24. The latter part of September I added 20, making 44 hens and pullets for the last three months of the calendar year. My flock-average during the year was 38. The total production of the flock was 6,932 eggs or an average of 182 per hen and the feed cost of the eggs produced averaged about 20 cents per dozen.

My birds are English-American White Leghorns of a good laying strain, but not show birds. They laid quite heavily during the period of high-priced eggs, my average price for the year being 50 cents per dozen. Living in town, we of course have to keep the hens penned up except an hour or so in the evening in the summer when I let them out on the lawn. My house is a cheap affair, open front facing south and tight on the other three sides. They have plenty of fresh air but no drafts. I keep the floor heavily covered with litter so that the birds have to scratch for all they get. In the evening after they have gone to roost, I scatter wheat or oats in the litter so they can get busy just as soon as they come off the perches in the morning. I keep a hopper of commercial mash, and another of grit and oyster shell, before them

\*Reprinted from March, 1920, issue of Reliable Poultry Journal.

## Back-Yard Poultry Flock Nets Woman \$4.36 Per Hen

Back-Yard Poultry Keeping Pays the City Dweller Well, if Proper Methods Are Used in Handling the Flock and a Good System of Management Is Followed

By C. W. CARRICK, Purdue University

LAST spring Mrs. E. G. Wiggins of Evansville set 290 eggs and hatched 223 chicks. She sold 110 of the chicks and of the 103 remaining lost only one, a phenomenal record which indicated excellent care in handling the baby chicks. She kept the pullets raised for a laying flock, the average number of which for the year was 47. The total number of eggs laid was 7,272, or an average of 155 per hen. Hatching eggs sold brought \$63.20 and those consumed at home or sold brought \$263.98. Poultry sold brought \$36.55, which represented the surplus from the flock, and baby chicks brought \$18. The gain on the inventory of the stock showed \$56, making a total cash return during the year of \$453.88. Total expenses, including cost of feed (\$206.05), value of stock purchases, interest on the investment of \$285 at six per cent and depreciation of stock were \$248.90, leaving a net profit of \$204.98, or an average of \$4.36 per hen.

Mrs. Wiggins was able to make this excellent record by hatching her chicks (which were Single Comb Mottled Anconas) in March, thus having pullets that would ma-

at all times, and at night I feed them corn. Following is my record for the year:

January.....	556 eggs
February.....	759 eggs
March.....	970 eggs
April.....	966 eggs
May.....	864 eggs
June.....	711 eggs
July.....	393 eggs
August.....	406 eggs
September.....	300 eggs
October.....	369 eggs
November.....	480 eggs
December.....	158 eggs

Total.....	6932 eggs
Average per hen.....	182 eggs

6,932, or 578 dozens at 50 cents per dozen	\$ 289.00
Feed, aside from table scraps, etc., .....	120.00

Profit.....	\$ 169.00
Per Hen.....	4.45

Naturally I am very well pleased with the results, and feel that when it comes to economical egg production the White Leghorn beats them all.

### Back-Yard Poultry Keeping Yields Good Profits\*

With Good-Quality Stock, Etc., Sales of Eggs for Hatching and Breeding Fowls Add Materially to the Profits That Can Be Realized From a Small Flock

By IRVIN A. BRINKMAN, Pennsylvania

I HAVE been keeping chickens for the last six years, most of the time Single Comb White Leghorns, but for the last two years I have had Barred Rocks. I am enclosing a photo of my house, 8 by 20 feet, fitted with removable fixtures, and I wish to say that it is the most convenient poultry house I ever saw. I have it furnished with metal hoppers and two-gallon water cans that are made in two parts so that they can be taken apart and thoroughly cleaned.

I also have a hundred-egg Prairie State incubator and a hundred-chick size Prairie State hover. All this equipment, including house and yards, incubator, hover, fixtures for interior of house and fixtures for the young chicks HAVE BEEN PAID FOR BY THE CHICKENS.

Now for what I have done this spring. My chickens were hatched the first week of April and the pullets and cockerels mentioned in my account herewith rendered were sold at four months of age. These chicks were all raised on a city lot. My Leghorn pullets, now four and one-half months old, are developing rapidly and several I feel sure will be laying at five months old, which is not unusual with Leghorns.

In the general account of the year's receipts are included hatching eggs and some year-old Barred Rock hens and one Barred Rock cock sold as breeders, as well as eggs we sold for table use, for which I received as high as 80c a dozen last winter.

These prices for stock, as given above, are conservative. The same grade of stock could not be purchased from any large breeder at anywhere near the same prices.

\*Reprinted from October, 1918, issue of Reliable Poultry Journal.

#### Receipts, Expenses and Net Gains

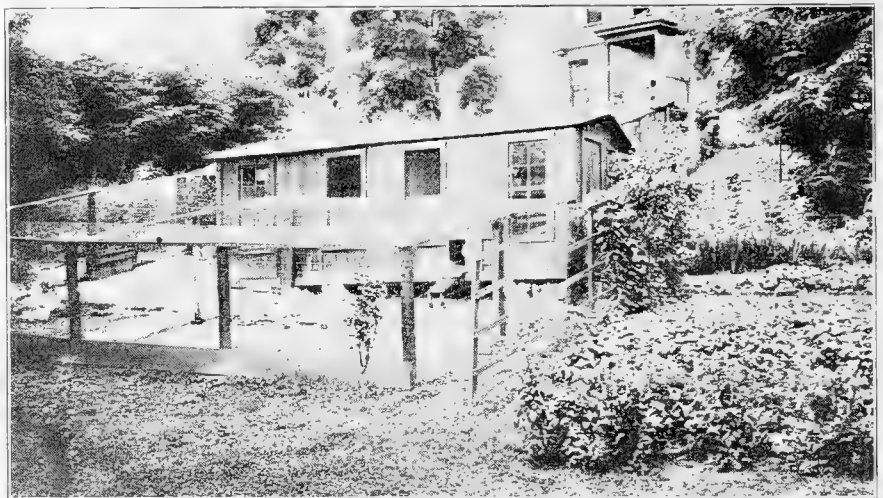
Receipts from July 1, 1917, to August 17, 1918.....	\$ 334 10
Young stock on hand:	
14 Single Comb White Leghorn hens at \$1.50 each .....	21 00
11 Single Comb White Leghorn pullets at \$2.00 each .....	22 00
6 Barred Rock pullets at \$2.00 each .....	12 00
1 Barred Rock cockerel at \$2.50 .....	2 50
5 White Leghorn cockerels at \$2.50 each .....	12 50
17 cockerels, Barred Rock for eating at \$1.25 each .....	21 25
Grain on hand:	
200 lbs. Purina Mash at \$4.50 .....	9 00
400 lbs. Purina Mash at \$4.50 .....	18 00
Total.....	\$ 422 35
Feed and other expenses from July 1, 1917, to Aug. 17, 1918 .....	259 25
Net Gain .....	\$ 163 10

Now the 70 young chicks (total that I raised) cost me \$43.15 to raise to the age of four months, as the price of feed is high and I use only the best grades. I sold the pullets and cockerels, mentioned below, at four months of age, as follows:

23 Barred Rock pullets at \$1.50 each.....	\$ 34.50
2 Barred Rock cockerels at \$1.25 (3 months old).....	2 50
5 Barred Rock cockerels at \$2.00 each.....	10 00
30 chickens.....	Total..... \$ 47.00
Cost of raising same.....	43.15
Net cash gain.....	\$ 3.85

Besides I have left for my own use, as inventoried above in statement with receipts:

6 Barred Rock pullets at \$2.00 each.....	\$ 12.00
11 S. C. White Leghorn pullets at \$2.00 each.....	22 00
1 Barred Rock cockerel at \$2.50.....	2 50
5 S. C. White Leghorn cockerels at \$2.50 each.....	12 50
17 Barred Rock cockerels (for eating) at \$1.25 each.....	21 25
Plus cash gain .....	\$ 70.25
Total profit on stock raised above mentioned.....	\$ 74.10



POULTRY YARD OF A SUCCESSFUL BACK-LOTTER

Illustration shows the attractive little poultry plant of Irvin A. Brinkman. It has proved to be truly profitable, also the source of real enjoyment. See interesting report herewith.

#### My egg records are given below:

1917.....	Eggs.....	1918.....	Eggs.....
July.....	183	January.....	280
August.....	146	February.....	426
September.....	113	March.....	550
October.....	27	April.....	537
November.....	62	May.....	490
December.....	232	June.....	417
		July.....	315
		August 17 days.....	145
			3,970 eggs

330 5-6 days

The hens are all still laying well. I have just given the above records up to date.

I also would add that I have only lost one hen in six years from sickness. The past season I lost only 10 chicks from 80 hatched and they were lost the first week, due to extremely cold and wet weather.

## CHAPTER III

# The Back-Yard Poultry Plant as a Source of Profit

Success in Poultry Keeping for Profit Is Largely an Individual Matter—It Is Well Adapted to the Requirements of a Side-Line Occupation—Can Be Started on a Small Scale, With Limited Capital, Increasing as Experience Warrants—With Reasonable Industry Success Is Assured



THOSE who have sufficient room and time to care for fowls in numbers greater than are needed to meet the requirements of the home table find that with proper management they can make their flocks an important source of income. Owing to restricted space the methods adopted necessarily are intensive, often highly so, and to this there are certain well-known objections, such as greater labor cost, danger of soil contamination, etc., but there also are some compensating advantages. However, there is not a great deal of difference between the methods practiced by the back-yard poultry keeper and those regularly followed by many successful commercial egg farmers, aside from the fact that the former often is seriously handicapped in raising young stock. It is possible to raise chicks in confinement with excellent results, but the difficulties sometimes are serious and many find it desirable to limit their efforts to egg production, purchasing a supply of pullets in the fall and killing or selling most or all of these at the end of their first laying season.

As regards the advisability of going into any branch of poultry keeping on either a small or a large scale, each person must make his own decision. This book could be filled with reports of those who have taken up the work with entire success. On the other hand, many pages could be filled with the lamentations of those who through illy considered ventures, personal misfortunes, or plain unfitness, have failed. With but few exceptions the profits in poultry keeping, whether it is a small back-yard enterprise or on a scale so large as to demand all of one's time, rest solely with the individual. Those who have access to good markets, who adopt correct methods, and who industriously apply themselves to the work are practically assured of reasonable returns. Unfortunately there are many who have little idea of what will be required of them in the way of effort, who do not understand the importance of being well and accurately informed, and who have greatly exaggerated expectations. Among these disappointment and failure are common—but not any more so than is the case in other lines of work attempted under similarly unfavorable conditions.

Poultry keeping as a means of livelihood appeals to many men and women who, for one reason or another, want an outdoor occupation that does not place too severe a tax upon physical strength. Others look favorably upon it because it is supposed to require little capital. The work is comparatively light, if well planned, and it is probable that those who are physically weak are less handicapped in this industry than in most others coming under the head of manual labor. In the matter of capital, however, the expectations of many are misleading. It is true that poultry keeping can be started on an extremely limited investment and in a term of years a substantial business may be developed from such a small beginning. But in one way or another a poultry plant accommodating several hundred fowls calls for the investment of a good deal

of capital and it is unwise to start on a small scale with the expectation of building up by the process of natural growth, without some definite means of earning a livelihood during the growing period. The attempt to make the small poultry plant finance important improvements and extensions and support the owner at the same time is apt to result in privation or extremely slow growth, or both.

Strictly speaking, all lines of poultry keeping are open to the small-plant operator. He can successfully produce anything that the poultry farmer or the general farmer finds profitable. But all lines are not equally practical under his conditions, and profits and personal satisfaction in the work (the latter a truly important consideration) will depend quite largely upon the wisdom of the choice made. In deciding this point much will depend upon the individual's other employment. The local market also should be carefully studied since the small-scale operator does not, as a rule, ship his products but must rely upon the neighbors to take all surplus. The nature of the soil also must be considered, as some things are practical on sandy, well-drained soil that it would be unwise to attempt on clay soil.

The various lines of production open to the back-yard poultry keeper may be listed as follows:

Eggs for table use.

Broilers.

Table fowls.

Day-old chicks and eggs for hatching.

Breeding and exhibition stock.

### Eggs for Table Use

One of the safest and most easily mastered, as well as most profitable branches of the industry, is the production of eggs for table use. Starting on a small scale, the flock can be developed rapidly, as experience and demand justify. The majority of small-plant operators find at their doors a fine retail market for their products, often one that will pay a premium for eggs of superior quality such as may be produced on any small plant with proper methods and prompt marketing. The opportunity to sell at retail prices, without expense for transportation, commissions, etc., often more than overcomes the handicap that the small-plant producer is under on account of his somewhat higher feed and labor costs.

The small-plant operator need not feel any concern about the possibility of realizing a good profit in market egg production with well-managed flocks. He should, however, clearly understand that his margin of profit per dozen eggs depends quite largely upon the average production of the fowls. A low average means little or no profit in every instance. Stock of good breeding, early-hatched pullets, correct feeding and proper methods of care, INSURE high average egg yields; and with reasonably good management, high averages mean good profits to the poultry keeper, ALWAYS.

**Raising Broilers for Profit**

There are a number of reasons why broiler raising appeals to the poultry keeper who has to conduct his operations within limited space. During the "broiler season" prices are high and demand is good. Chicks that are sold at 1 to 2 pounds weight require little yardroom, and quite a large number can be produced within the limits of an



EARLY-HATCHED CHICKS A SOURCE OF INCOME TO THE SMALL-PLANT PRODUCER

Above illustration shows a flock of 80 Rhode Island Red chicks averaging to weigh 1½ lbs. at time photo was taken—May 17. Cockerels in such a flock can be sold for broilers at top prices for the season, and the pullets should be laying early in the fall

ordinary back yard. Broiler raising, however, is not one of the simplest branches of the industry and should never be undertaken on a large scale by the inexperienced. Under average conditions the period during which they can be profitably raised is short. In winter, the high price of eggs, coupled with low fertility and the extra expense of brooding, makes the cost of production extremely high. Late in the season when low-cost farm-raised broilers flood the market, prices drop to levels that afford no profit whatever to the poultry specialist. For these reasons the average person finds that profitable broiler raising is practically limited to those that can be sold from April to July, though under especially favorable market conditions production can profitably be extended over a wider period of time.

Early in the season there is a fairly good market for what are known as "squab broilers"—chicks that weigh from 1 to 1¼ pounds live weight. As the season advances the market requires larger size and, except under special conditions, the bulk of the small-plant broiler product, where the larger breeds are kept, will usually be sold as regular broilers or when 1½ to 2 pounds each, live weight. Chicks can be brought to squab-broiler size in a comparatively short time and it is not unusual for experienced poultry keepers to place their surplus cockerels on the market at eight weeks of age, or even less. Three months should be the limit of time required to produce 2-pound broilers in the larger breeds. If the chicks are of Leghorn breeding it is much better to sell them by the time they have reached this age, even though they may not be full size. As a matter of fact, the average Leghorn breeder aims to sell his surplus cockerels as quickly as he can find someone to take them off his hands, regardless of their weight or age.

The high point in the broiler market usually is reached in April or May. Earlier than that the demand is comparatively limited, and after that date prices begin to fall off. The broiler grower, therefore, will aim to

have just as many chicks as possible to market about this time. If he has suitable equipment for brooding at this season (a highly important "if"), his first hatches may be brought off by the first of February.

At the Western Washington Experiment Station an experiment was recently carried out to learn the exact cost of raising broilers, the results of which will interest many. The following condensed report of the test is from a monthly bulletin from that institution:

"In order to secure definite costs on the broiler question 100 cockerels were selected from a room brooder flock of 4-week-old chicks. These were not selected for size, as would be normal handling for marketing, but were taken as they came, the endeavor being to secure the same chicks that we would otherwise kill. As a consequence, these cockerels were not very uniform and some males weighed much more than others. The 100 chicks weighed at this period 39½ pounds, or 6.32 ounces each.

"The consumption of the various feeds for each succeeding week until the birds were marketed is here given, and it is also explained that the oats fed were germinated to about 1-8 inch sprouts, so that the 3 1-2 pounds dry oats charged in the first week's ration were really about 8 pounds of sprouted oats. There was also a scarcity of milk on the farm and the amount given was rather less than they could consume. The tenth week milk was used in a sloppy mash fed in the fattening crate. At the end of the fifth week 2 cockerels died and three more died at the end of the sixth week. Ninety-five birds were carried through the feeding test, but only the 90 males were marketed."

**STATEMENT OF COST OF FEED**

**Used in Producing Broilers at W. Washington Exp. Station**

5th week.....	\$ 1.51
6th week.....	2.19
7th week.....	2.19
8th week.....	2.68
9th week.....	3.65
10 days fattening crate.....	4.33
Total.....	\$16.55
90 birds, shipping weight 107 lbs., weight at market 96 lbs., at 30 c.....	\$ 23.80
Less express.....	.76
Total.....	\$23.04
Cost of feed, 90 cockerels and 5 pullets.....	16.55
Balance.....	\$ 11.49
The average price paid for day-old chicks this year was about 15 cents each, and the average cost of raising till four weeks old, including feed, heat, and brooder deaths as determined from reports of some twenty-five local raisers, was 15 cents each. The actual cash cost to the poultryman of each 1-pound cockerel raised to market age, according to the above records, is as follows:	
Cost of chick.....	.15
Raising to four weeks.....	.15
Fourth week to market age.....	.175
Market weight, 1 pound—Cost.....	\$ .475

The foregoing figures show that it would be unwise for the intensive poultry keeper to attempt raising broilers during the low-price season unless especially favorable arrangements can be made for marketing them.

Any of the popular breeds may be employed successfully in the production of broilers. Chickens with white or buff feathers present a much more attractive appearance than those having dark-colored pinfeathers and particularly where the broilers are to be dressed and a special trade catered to, it pays to avoid dark-colored breeds. Some markets have no prejudice against white-skinned birds but the average consumer demands yellow-skinned chickens, and it is poor policy to go contrary to a definite preference along this line.

**Production of Table Fowls**

The production of table fowls, by which is meant roasters, capons, etc., is one of the least desirable branches of the industry for the specialist. The margin of profit is comparatively low and the successful, economical raising of fowls to adult size calls for more range than the average small-plant operator can provide. There is, in



some sections, a good market for fowls of special quality, but few markets pay enough for table poultry to make it profitable to undertake their production extensively, except on farms where they can be raised at minimum cost.

As has already been stated, those who are operating in close quarters usually will find it to their advantage to dispose of their surplus young stock as broilers. Particularly where the pullets are to be raised to maturity, these need all the room that can be given them. One of the small-plant operator's most serious mistakes is in attempting to keep more fowls than he has sufficient room for, and this is particularly objectionable where pullets are raised to replace the laying flock. These, if crowded in their houses or yards and subjected to the annoyance of maturing cockerels, will make much slower growth and will require several weeks more time in which to reach laying maturity than when raised under more favorable conditions.

#### Day-Old Chicks for Profit

The production of day-old chicks, using hatching eggs from near-by breeders or fanciers, requires practically no space aside from that occupied by the incubators, and persons living in towns have found the industry highly profitable. Since the chicks are sold right from the incubator, little brooding equipment is needed except whatever provision may be made for emergencies. The ordinary house cellar will accommodate quite a number of lamp-heated machines, or even a small mammoth, and thousands of chicks can be produced there in a season. There is a market for day-old chicks in every community and, as a rule, sales are limited only by the number of good strong chicks that the operator is able to bring out. Because there is no outdoor work or heavy labor involved, hatching day-old chicks is well suited to women.

What has been said in regard to limited space required is based on the assumption that the eggs used are to be bought from near-by breeders or farmers having standard-bred fowls. Farm flocks, if of good breeding, are especially desirable as a source of supply. They usually have open range and are rarely pushed for heavy production, so that their eggs are highly fertile, and the chicks are strong and will live and grow if given half a chance.

Where good stock is kept, the sale of eggs for hatching may always be made an important source of profit. Given strong, vigorous, well-developed birds for the breeding pens, the small-plant operator can secure as good fertility as any, and the chicks hatched from his matings will be strong and vigorous, IF DUE CARE IS TAKEN TO OFFSET A LACK OF ROOM BY PROVIDING COMPULSORY EXERCISE.

In planning to produce either eggs for hatching or day-old chicks it is important clearly to understand the preference of the local market as to breeds. It is not advisable to attempt to develop a trade in chicks or hatching eggs of fancy breeds or those that are little known in the locality where sales are to be made. Plymouth Rocks, Wyandottes, Rhode

Island Reds and Leghorns are always in demand, and in some localities Anconas, Orpingtons, Brahmans, Langshans, etc., are also salable in good numbers. But before venturing much with the latter breeds be sure there is a market. It is not advisable to undertake chick hatching on too large a scale at first. Start with a few lamp-heated machines and GET GOOD ONES. When the beginner is certain that he knows how to operate them successfully and can bring off strong, vigorous chicks, he then can safely increase his hatching capacity to any desired extent, and will find a ready market, as a rule.

#### Breeding Exhibition Stock

This subject is considered last, not because it is least profitable, but because fewer persons are apt to succeed in this line of the industry than in the production of market poultry products. Thousands of back-yard breeders have demonstrated that fowls of superior exhibition quality can be produced within the most restricted quarters, but it must be admitted that not all are adapted to this branch of the industry. Every person who keeps fowls at all should keep standard-bred stock of good quality, but only those should attempt to breed exhibition stock who take real interest in the work.

The chief practical difficulty in raising exhibition stock lies in the fact that the birds, both young and adult, need more room than the average small-plant operator has available. It should be appreciated that the quality of the stock produced depends quite largely upon the conditions under which it is raised. Birds that have free range and that are not crowded will grow into much finer specimens than would be the case if they were raised under ordinary small-plant conditions. There are, of course, various ways in which the difficulties peculiar to a lack of room can be met and overcome. Breeding pens can be successfully kept in even the most limited space and small numbers of chicks of the best quality raised if they receive proper attention. This is not likely to be given, however, unless the owner finds genuine interest and pleasure in the work.



INTENSIVE BACK-YARD PLANT WITH COVERED YARDS

Houses have board floors, and earth in covered runs is renewed four times a year. Hens in one flock averaged to lay 166 eggs each. About 70 hens are kept here—and are an important source of income. Photo from United States Department of Agriculture.

## CHAPTER IV

# Helpful Reports From Money-Making Flocks

Complete Data Are Here Given in Regard to Receipts and Expenses in Commercial Egg Production Under Present Conditions—Several Detailed Reports Are Presented, Describing the Success of Persons Operating on Limited Acreage and Employing Intensive Methods, Such as Are Applicable to Town-Lot Conditions Generally



IN THIS CHAPTER are presented a number of interesting accounts of persons who have made poultry keeping a more or less important source of income under back-yard conditions or with quite limited acreage. These should prove helpful and encouraging to others who are interested in learning the possibilities of poultry keeping as a source of additional income or who look forward to developing a small back-yard flock to the point where it can be depended upon as the sole means of livelihood. Many of these reports are based upon prewar conditions, when net profits were lower than at present, but they perhaps afford a fairer indication of the results that may reasonably be expected from intelligent and industrious effort. By way of showing what poultry keepers are actually accomplishing at present we give herewith the following data from "Hints to Poultrymen," a monthly publication of the Poultry Department of the New Jersey Experiment Station. This department has access to the complete 1918 records of a number of New Jersey commercial egg farms keeping from 50 to 800 hens, and through the compilation of these records it is possible to present a fair average of their returns for that year.

"At the present time this table presents averages which may be taken as standards to be referred to by commercial egg farmers for comparison from time to time with their own egg production, feed consumption and other details. Some plants of course did better than the average while others did not do as well. These averages are based on a number of plants in different parts of the state and represent what one might expect from a one-man egg farm. This table also presents a comparison of the year's report of the average farm with a report from the farm that made the greatest total return, as well as the best return per bird. On a careful study of this comparison one will note several interesting facts. First and most significant is the difference in the egg production per bird. Although the proprietor of this farm received 4.6 cents less per dozen than the average, and paid 34 cents per hundred more for his feed, and although his birds consumed more feed per bird by six pounds than did the average, his increased egg production was enough to more than offset this. His feed cost per dozen eggs was actually 3.2 cents less than the feed cost per dozen eggs on the average farm, and his net returns per bird were \$2.01 more than the average.

"This detailed summary of costs will be of especial interest to those who contemplate going into the production of eggs in a commercial way and want to know what it costs to feed hens and what revenue they return in the way of market eggs at current prices. Never before to our knowledge has so much accurate inside information on production costs been made available."

With reference to the following table it is fair to add that the profits there shown probably are greater than have ever before been realized in commercial egg pro-

duction. Whether similarly good results can be secured indefinitely in the future no one can say with certainty, but if the reports given in this chapter, showing results secured before prices reached their present extraordinary high levels, are taken into consideration along with the New Jersey data, there would appear to be little excuse for the beginner being misled as to what he may reasonably expect under fairly normal conditions.

### RECORDS OF THE BEST FARM COMPARED WITH THOSE OF AVERAGE FARM\*

	Best Project Farm	Average Project Farm
Number of Birds.....	992	970
Number of Eggs.....	172985	115268
Per cent Production.....	48	34.4
Feed per Dozen Eggs (lbs.).....	6	7.5
Feed Cost per Dozen Eggs.....	22.8c	26c
Total Cost per Dozen Eggs.....	29c	36c
Price per Dozen Eggs.....	57.3c	61.9c
Returns on Eggs.....	\$ 7788.98	\$ 5571.85
Mash Consumed (lbs.).....	53450	37384
Cost of Mash.....	\$ 2033.89	\$ 1303.84
Cost of Mash per cwt.....	\$ 3.80	\$ 3.48
Scratch Consumed (lbs.).....	33100	34861
Cost of Scratch.....	\$ 1256.43	\$ 1198.17
Cost of Scratch per cwt.....	\$ 3.80	\$ 3.45
Total Feed (lbs.).....	86550	72245
Total Cost of Feed.....	\$ 3290.32	\$ 2502.01
Total Cost of Feed per cwt.....	\$ 3.80	\$ 3.46
Return over Feed.....	\$ 4198.66	\$ 2915.54
Table Poultry Sold.....	\$ 31.63	\$ 426.20
Hatching Eggs Sold.....	\$ 472.64	\$ 265.24
Baby Chicks Sold.....	\$ 275.92	\$ 275.92
Stock Sold.....	\$ 1224.11	\$ 605.81
Return on Manure.....	\$ 402.90	\$ 84.39
Miscellaneous Returns.....	\$ 192.15	\$ 422.52
Extra Labor.....	\$ 317.30	\$ 247.00
Freight and Express.....	\$ 146.69	\$ 69.96
Stock Bought.....	\$ 60.00	\$ 35.34
Miscellaneous Expenses.....	\$ 376.91	\$ 568.38
Total Returns.....	\$ 10112.31	\$ 7651.93
Total Expenses.....	\$ 4191.22	\$ 3422.69
Net Return (exclusive of interest and depreciation).....	\$ 5921.99	\$ 4229.24
Per cent Mortality.....	2.5	12.3

### AVERAGES PER BIRD

Number of Eggs.....	174	126
Return on Eggs.....	\$ 7.85	\$ 6.08
Mash Consumed (lbs.).....	53.9	41.5
Cost of Mash.....	\$ 2.05	\$ 1.44
Scratch Consumed (lbs.).....	33.3	37.3
Cost of Scratch.....	\$ 1.26	\$ 1.25
Total Feed (lbs.).....	87.2	78.8
Total Cost of Feed.....	\$ 3.31	\$ 2.69
Returns over Feed.....	\$ 4.54	\$ 3.39
Miscellaneous Returns.....	\$ 0.20	\$ 0.97
Extra Labor Cost.....	\$ 0.32	\$ 0.28
Total Receipts.....	\$ 10.20	\$ 8.62
Total Expenses.....	\$ 4.22	\$ 3.90
Net Return (exclusive of interest and depreciation).....	\$ 5.98	\$ 4.68

### BEST FARM BALANCE SHEET Inventory as of November 1, 1918

Land, 5 acres.....	\$ 1000.00	
Buildings.....	3335.00	
Equipment.....	535.00	
Implements and Machinery.....	163.00	
Incubators and Brooders.....	350.00	
Stock (1075 birds).....	2700.00	
Inventory as of November 1, 1919, (Increased Number of Birds, 286, improvements installed and extra feed).....		\$ 8803.00
Total Operating Expenses (exclusive of interest and depreciation).....	4191.22	
Interest on Investment at 4 per cent.....	319.32	
Depreciation at 5 per cent.....	399.15	
Total Income (exclusive of invested income).....		10112.31
	\$ 12992.69	
Labor Income (1075 birds).....	5922.62	
	\$ 18915.31	\$ 18915.31
Labor Income per Bird.....	\$ 5.51	

\*Reprinted from "Hints to Poultrymen," Vol. 8, No. 4, N. J. Exp. Station.

**AVERAGE PROJECT FARM BALANCE SHEET**  
Inventory as of November 1, 1915

Land, 32 Acres.....	\$ 3466.67	
Buildings.....	5923.00	
Equipment.....	675.00	
Implements and Machinery.....	125.00	
Incubators and Brooders.....	406.50	
Stock (970 birds).....	2271.00	
Inventory as of November 1, 1919 (Increased number of birds, 80 improvements installed and extra feed).....		\$13438.97
Total Operating Expenses (exclusive of interest and depreciation).....	3401.55	
Interest on Investment at 4 per cent.....	510.68	
Depreciation at 5 per cent.....	643.35	
Total Income (exclusive of invested income).....		7373.74
	\$17422.75	
Labor Income (970 birds).....	3389.96	
	\$20812.71	\$20812.71
Labor Income per Bird.....	\$ 3.50	

**Making a Living From Poultry\***

**Three Hundred Head of Layers and Seven to Eight Hundred Chicks per Year Yield a Comfortable Living and Some Money to Bank for a Rainy Day**

By A. F. HUNTER

**T**HERE is no question more insistent than, "can I make a living from poultry?" Now and then we meet with a concrete illustration which so completely answers the question that it is a pleasure to describe what the poultry keeper is doing and how he is doing it. Such a case is that of a Mr. Clark, living in a town some twenty miles south of Boston, who makes a good living from poultry on a little two-acre "farm!"

Some captious critics might claim that "the living" was not all made from poultry because the liberal supply of vegetables from a well-cultivated garden and quantities of fruit from the trees and bushes on the place are considerable aids to the table supply for the family of three, but a garden and fruit for home use are always considered as parts of the country-home good things. One of the decided advantages of a home in the country is that we can have those things, and when we are talking about making a living from poultry we always have in mind the delicious fresh vegetables and fruits from the garden as part of the living. Mr. Clark, however, makes more clean cash from his poultry work alone than the majority of workmen can command.

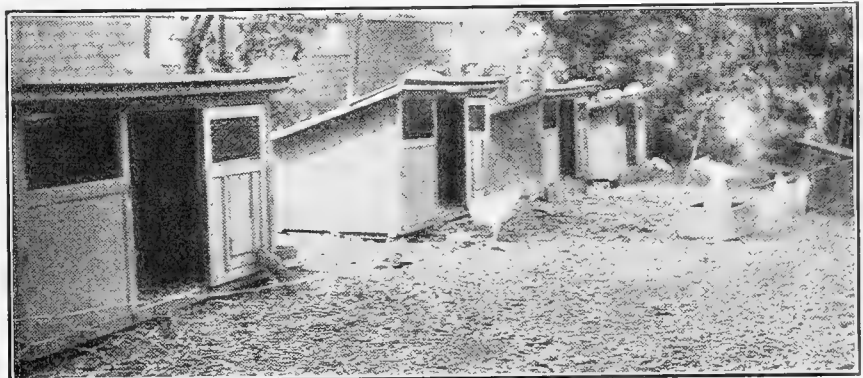
Mr. Clark told us he worked for many years in a machine shop in southern New Hampshire. Being naturally "thrifty" he had saved a portion of his wages and owned his home. Some poultry had been kept while living in New Hampshire, but a better location was desired and so, after looking about and studying locations, this little farm was found and bought, and it seems about as desirable a place for a small poultry plant as we have ever visited. The advantage of choosing a good location is well illustrated by the fact that Mr. Clark can sell his place today for substantially more than he paid for it.

To have one's place steadily increasing in value is a decided advantage; it gives one a comfortable feeling about the pocket. Mr. Clark is past middle age and will not be inclined to quarrel over our speaking of him as

"elderly," and his success at this age clearly points the way for others to escape from the confinement and worries of life in a city.

Another advantage of Mr. Clark's location is that he does not have to keep a horse. The trolley line to town passes his door and the country store and local post office are directly across the street. His plot of ground is long and narrow, being but little more than a hundred feet along the street, but widening out somewhat at the rear; away back the land gradually slopes down into the meadow of a little stream which flows north. Mr. Clark said that when the water was high in the spring of the year the low land was under water, and at such times he doubted if he had two acres, but when the water has subsided again, he is inclined to believe there is some more than the prescribed "two acres." This low ground, however, makes splendid range for growing pullets in summer, as such ground is always blessed with many worms and insects for the chicks to capture.

Mr. Clark winters about 300 head of layers and grows each season some 700 to 800 head of chicks. White Plymouth Rocks and R. I. Reds are the varieties kept, as he has found these two to be the best for both eggs and soft roasters. Of soft roasters he sells about five hundred in a season. One of the advantages of his location is that everything can be sold alive, at the door, and at good prices. With the close competition that exists between soft roaster buyers, the prices they pay for the product are all that



COLONY HOUSES FOR GROWING STOCK ON THE CLARK POULTRY PLANT

Note the stones that are laid on top of the coops to prevent their blowing over. See accompanying interesting article for details regarding this money-making little poultry "farm."

can be paid with safety. In late summer and fall, also, there is a good demand for hatching eggs from which to grow soft roasters, and for these 50c a dozen is paid at the door. There is a very fair profit from eggs sold for this purpose.

Mr. Clark's poultry buildings are mostly set along a line extending from the rear of the dwelling house straight back to the west. There is a brooder house 50 by 12 feet, in which are five Cyphers' brooders, accommodating 500 chicks. There is a coal stove near the middle of this house for keeping out the extreme cold in winter. There is a laying house 72 by 10 feet, divided into four pens 18 by 10 feet in size, and yards 85 by 18 feet with apple trees for shade. This long house is extended by having added to it several small houses which have been bought of the shoe factory workers of that section. These shoe men, as they are called, are frequently changing from one locality to another, and there are quite a few opportunities to buy these small henhouses from them.

\*Reprinted from April, 1915, issue of Reliable Poultry Journal.

As would be expected, the greater part of Mr. Clark's "farm" is given over to poultry yards and chick range, the consequence being that outside of the garden and the coarse grass meadow near the little brook, the ground is entirely bare of green stuff, and it is necessary to obtain a supply of green feed. To supply this Mr. Clark sows



FEED ROOM AND BROODER HOUSE ON POULTRY PLANT OF MRS. HOBELL

On this small poultry plant Mrs. Hobell has realized from \$500 to \$600 annually, thus adding materially to the family income.

a bit of ground four rods square with winter rye, and when he begins to use this, another small patch is sown to oats to follow the rye as a green food, and another small patch is sown with fodder corn to follow the oats. These green crops carry the birds through the spring, summer and early fall, the green stuff being cut fine in a cutter and fed as a regular ration. Cabbages are grown in parts of the garden where early peas, etc., have been harvested, and these are supplemented by turnips, which, with kitchen waste, specked fruit, etc., carry the layers through the winter.

The apple trees, well loaded with attractive looking fruit, and the thrifty looking plum, peach and cherry trees, indicated that the combination of poultry keeping with fruit growing was quite satisfactory. The primary object of the fruit trees, however, is shade for the laying stock confined to the houses and yards, and shade is absolutely essential for the comfort of the birds.

This little farm gives Mr. Clark and his family a good living. We did not ask him just how many dollars he could get out of his products in a twelve-month, but we do know, from information given us by friends living in the town and a poultry buyer of the section, that the annual cash income is substantially larger than Mr. Clark ever took out of his pay envelopes! There is ample evidence in and about the home of a comfortable condition of the pocketbook, and there is a safe balance in the bank in case it should come on to rain one of these days.

## A Comfortable Living on Two Acres\*

This Colorado Poultryman Has Been Keeping Poultry Successfully for Fourteen Years—Fifteen Hundred Chickens Raised Last Year With a Loss of Less than Four Per Cent

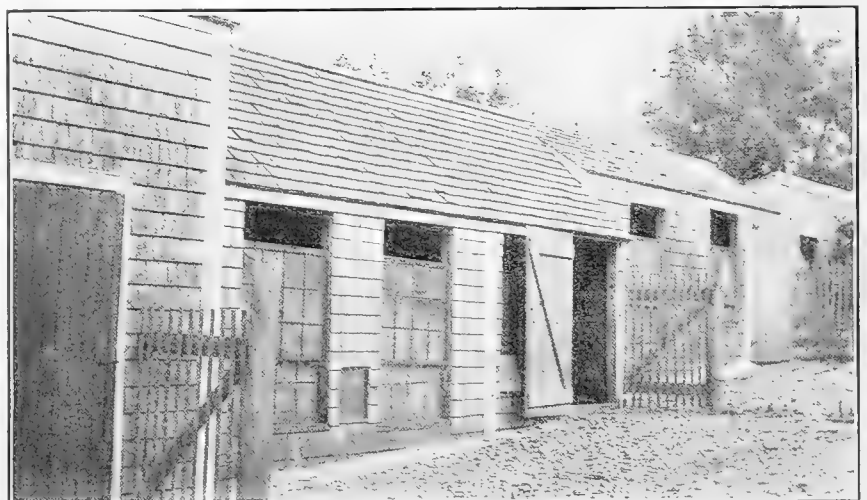
By CHAS. H. BARTLETT, Colorado

EDITORIAL NOTE: Mr. Bartlett is a successful poultryman of long experience and what he states in his report can be relied on, both as to statement of fact and advice given. For years he has made a good living by the sale of eggs produced from 1,000 to 1,200 Leghorn layers. His entire output of market eggs is taken by one hotel. He uses less than two acres of ground for his fowls, including the land used for the house in which are located his outdoor brooders. What Mr. Bartlett is doing thousands of other persons can do, provided they are as favorably located, use the same intelligence and give close personal attention to the work in hand.

OUR poultry plant occupies two acres of ground, about eighteen blocks from the business district. We have all the accommodations of the city and none of its disadvantages. On this piece of ground we keep from 1,000 to 1,200 S. C. White Leghorns the year round. We decided to turn our attention to egg production rather than show birds, so chose the White Leghorns, as we consider them the best year-around layers. We have a good local market and sell all our market eggs at good prices.

We built our houses of drop siding and have them lathed and plastered, with good matched floors. They are about 4 feet high at the rear, 8 feet in the center and 5½ feet in the front. These proportions give plenty of room, without having much waste space to heat. We do not supply any artificial heat, as the hens do the heating. The particular house just described is 100 feet long, and is divided (by wire partition only) into eight pens, each accommodating 65 hens. This house faces east and has a scratch pen 8 feet wide built the entire length, with windows and drop doors to use in summer. Each pen has a yard measuring 12 by 70 feet. We keep our hens confined in these yards, as they lay much better than when allowed to range about. Our other coops are built after this general plan, some facing south, however. We never build coops facing north or west.

\*Reprinted from "Reports of Successful Poultry Growers."



LAYING HOUSE ON MR. CLARK'S TWO-ACRE POULTRY FARM

This two-acre poultry plant yields a comfortable living to the owner and his family. His success can be duplicated almost anywhere in this country.

We use one 360- and one 240-egg incubator and during our 14 years of work in the chicken business we have yet to take off the first poor hatch on account of the machine. As an egg room and hatching room we have a cement cellar built about 2 feet under ground and 4 to 6 feet above. This insures a uniform temperature and there is no possible chance to have the eggs get jarred. This care has much to do with successful hatching, we believe.



TYPE OF LAYING HOUSE POPULAR IN NEW ENGLAND

House here illustrated is on Mrs. Hobell's poultry plant—see article on this page. Gable roof and shingled walls add considerably to cost but make the house more comfortable, both winter and summer.

We never feed our small chicks under 48 hours of age, and many times not before 60 hours. We take them directly from the incubator to the brooders, which are already heated and have a covering of alfalfa leaves on the nursery floor, well mixed with chick feed. This feed, with plenty of good, clean water, is all they have until they are five weeks old, when we gradually change to coarser grains.

We have hatched over 1,500 little chicks this past summer and have not lost one from bowel trouble. We lost perhaps fifty of this number, most of which were drowned in the water dishes. The pullets were laying at four and a half months of age and the broilers matured at eight weeks, bringing from 40c to 20c per pound live weight in the local market.

There is one more point we wish to emphasize and that is this: Do not make the mistake of starting with "common" hens (which are so common in every sense of the word) because they are cheap. Decide on the breed you desire to handle, of course keeping in view the end you wish to attain, whether layers, show birds, market stock, or whatever it is, then get the best possible birds and stick to them.

## How a Wife Helps Swell the Family Income With Poultry\*

Makes \$500 to \$600 Profit per Year From Flock of About One Hundred and Fifty Layers—Sells Day-Old Chicks, Eggs for Hatching, Half-Grown Pullets and "Soft Roasters"

By A. F. HUNTER

**A**N interesting and inspiring example of how a wife can add to the family income when she so wishes and circumstances favor, is found in the experience of Mrs. Hobell, who lives near the western border of the old town of Hingham, Massachusetts. That Mrs. Hobell clears a profit of from five to six hundred dollars a year from her poultry work is no doubt partly due to a favorable location

\*Reprinted from June, 1917, issue of Reliable Poultry Journal.

(she lives just on the edge of the well-known South Shore soft roaster district south of Boston), but the bulk of the credit for her good success is undoubtedly due to her efficient work.

There are decided advantages in a good location. Prices for eggs from which future soft roasters are to be hatched are good, so that the sale of eggs to soft roaster growers helps the profits; and then, the steady demand for day-old chicks through the late fall, winter and spring months is another substantial help. But there must be eggs to sell and the newly hatched chicks to sell, else there is no profit; to have those eggs and chicks to sell means right planning of the poultry work, and then the careful carrying out of the plans. That is where the efficiency and interest in the work counts big. Unlike some poultrywomen that we hear about, Mrs. Hobell does not carry on this work because there is need to fend against the proverbial wolf; the husband and father is a foreman in charge of one of the rooms in a large shoe factory in East Weymouth and there is a well-filled pay envelope brought home every week.

About 150 White Plymouth Rocks usually are kept but there was considerably less than that number at the time of my visit, because of an invasion of rats into the brooder house at the time she was getting out chicks for her own raising. The houses for the layers (one of which is shown herewith) are about 10 by 24 feet in size, with double-pitch roofs; both roofs and walls are shingled, which makes them snug and warm in winter. About 50 head of layers are kept in each of these houses and there is liberal yard space adjoining each house.

One of the best feed-room buildings that I have ever seen, with an ample incubator room in the basement and an excellent workroom in the loft above, also is shown. The brooder house is annexed to this and the attendant steps directly into the brooder house from the feed room. The grain delivery team can drive right up to the door at the other end of the feed room, and all grain, etc., can be readily handled into the bins and barrels where it is stored until wanted. Various poultry conveniences are provided for use in the feed room.

In the basement are five incubators, and here the 2,500 to 3,000 chicks which Mrs. Hobell sells as day-olds



HOUSES FOR GROWING STOCK ON MASSACHUSETTS POULTRY PLANT

These houses are on the intensive poultry farm of Horace Randall and are used chiefly for brooding chicks. Photo from which this illustration was made was taken September 22.

are hatched, and as these are sold at the uniform price of \$15 per hundred, there is quite a substantial income from this part of the business. Hatching begins in December and continues through the winter and spring; practically all of the chicks Mrs. Hobell can spare are engaged beforehand. Some chicks she keeps to grow into soft roasters there on the place, and there is a good demand for half-grown pullets in late summer; most probably the chicks Mrs. Hobell grows into roasters are the cockerels hatched with these half-grown pullets. Here we see several outlets for products, and they all help to make the goodly net profit from the business. Day-old chicks, eggs for hatching, half-grown pullets, and soft roasters—these are the four chief lines of trade.

The brooding equipment consisted of five portable brooders, which they find excellent for their purpose. One of the advantages of using portable brooders is that they can be moved out of doors after the chicks then in the house no longer need brooder heat, and a second charging of spring-hatched chicks can be brooded outside. This is not at all an expensive poultry plant, nor has large capital been invested in equipment, and yet it serves excellently well in producing a substantial income from the small tract of land used. In addition to the couple of acres occupied by the poultry, there is a fine vegetable and fruit garden. The substantial sum which Mrs. Hobell makes by her poultry work helps out decidedly with the family income, and she says: "and I enjoy the work."

## A Man Seeking Health Builds Profitable Poultry Business\*

Former Shoe Factory Employee Has a Nearly Perfect One-Man Poultry Plant—Makes \$1,500 to \$2,000 a Year Net Profit—Fruit Trees Help Income

By A. F. HUNTER

**M**R. HORACE RANDALL, East Weymouth, Massachusetts, started to work in a shoe factory when he was a boy thirteen years of age, and he worked in the factory for thirty-three years. In that time he steadily

\*Reprinted from March, 1917, issue of Reliable Poultry Journal.

advanced until he was the highest paid hand in the factory. When he reached that top notch his ambition was overstimulated to keep up to the high standard of efficiency which brought him the extra wages, the result of such effort to keep on top being a breakdown in health. The doctor who pulled him through the severe sickness that followed told him to quit the factory and get out of doors.

Mr. Randall was a bachelor at that time (he has since married) and was boarding at the old home with a sister, whose little garden patch was too small to give him out-of-doors occupation, and as his thoughts were tending towards soft-roaster growing to enable him to earn his living, he bought an acre of ground just in the rear of the home lot and began growing chickens for market. His first year's work showed a fair profit and it did much more than that because it built up his shattered health. Having become strongly attached to the poultry business, and fully convinced that it was a first-class business to go into, he began the systematic development of a regular poultry plant, buying some additional land, though his acreage still remains small.

This poultry plant is a most interesting study, because it is practically a one-man poultry plant. The buildings, all small, are of what is generally known as the "colony" type and are scattered over the range. The largest building on the place stands in a yard by itself, off at one side, and is 12 by 25 feet in size, accommodating 100 layers. The stock is chiefly kept in houses 8 by 10 feet in size, which stand in rows, each house in a pen fifty feet square, and there are peach trees for shade all about. The growing pullets are housed in "A-shaped" colony houses, 10 by 10 feet in size. The pullets are placed in these houses as chicks and brooded with colony hovers—about 350 baby chicks being consigned to each.

Mr. Randall has a 3,000-egg mammoth incubator, and hatches a good many chicks for his neighbors and customers. He sold about 7,000 day-old chicks last spring, getting \$15 per hundred. He raised about 1,200 chicks himself, growing the cockerels for soft roasters, and he told me those cockerels were sold at an average price of \$1.77 apiece. As it cost him 63 cents apiece to grow those cockerels to soft roaster size (five to seven pounds weight



A POPULAR STYLE OF POULTRY HOUSE WELL ADAPTED TO THE REQUIREMENTS OF MARKET EGG PRODUCERS

Photo from which this illustration is made was taken in the Vineland, N. J. district, where intensive methods are most successfully practiced. House here illustrated is 15 by 100 feet, and holds 500 White Leghorns. Note the hood over the front to protect opening. Many of the new houses built in this section have wider hoods than the one here shown.

apiece) there was manifestly a net profit of \$1.14 on each one. As these chicks were January and February hatches and were sold at five to six months old there would seem to be a substantial profit in growing soft roasters. He winters about 400 head of layers, about 50 of them being the best of the year-old hens, which are kept for breeders.

There are about forty houses in all spread out over Mr. Randall's "farm," well-built and attractive looking houses, and the plant seemed to me one of the best laid out and best equipped that it has ever been my good fortune to visit. In short, it seemed to me to be an ideal one-man poultry plant. Mr. Randall, however, does not do all the work himself; Mrs. Randall and the little daughter are helpers. He keeps a careful account of all his receipts and expenses, and can tell to a cent just how much he has made during each year he has been in the business. For example, he told me his profits for the year up to the evening before (September 21) were a trifle over \$1,400. With the fowls yet to be sold and the egg income for the rest of the year, it is easy to see that his net income will be \$1,500 to \$2,000.

### Poultry Keeping As a Source of Profit for Boys and Girls

Hundreds of earnest boys and girls not only in the country but in town have found poultry keeping a source of profit. Poultry keeping is especially attractive to boys and girls because of their love for pets and the extremely limited investment required, also because it can be made profitable on any scale no matter how small, and because the work can so readily be adapted to school or work hours. As a result, thousands of earnest boys and girls, both on the farm and in town, have turned to poultry as a means of earning pocket money, of meeting living expenses, of paying their way through school, etc.

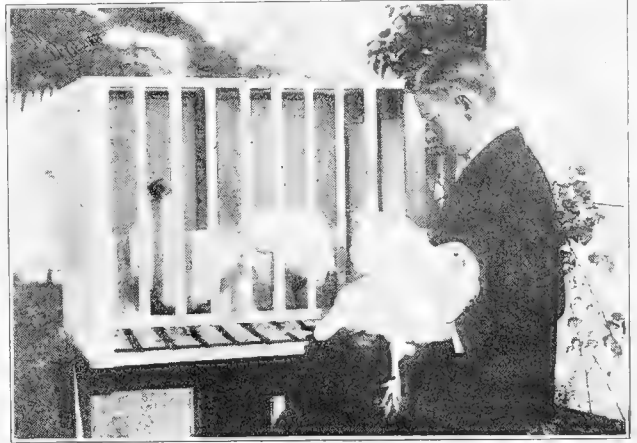
The United States Government has taken a keen interest in promoting such activities and has been of great assistance to many beginners, not only by employing traveling representatives who organize and instruct Girls' and Boys' Poultry Clubs, but also, when necessary, by providing financial assistance. As an illustration of what is being done to encourage and develop this branch of the work the following report of progress in a single county in Florida is presented. What Miss Dorsett has done in her county is being duplicated in a greater or lesser degree in hundreds of other localities in all sections of the country, and without doubt such work is bound to have a tremendous influence upon the industry as a whole.

## Successful Poultry Clubs in Suwannee County, Florida

Boys' and Girls' Poultry Clubs With a Membership of 387 Organized in One County—Every Member Has Standard-bred Poultry and Every One Working Last Year Has An Account in the Bank  
By MISS ALICE M. DORSETT,  
County Home Demonstration Agent

**F**OLLOWING the example set by some other agents in promoting poultry keeping among boys and girls I worked out a plan by which I could secure one sitting of eggs from standard-bred stock for each club member. There were breeders of several kinds of poultry in the

county and each of these, to my satisfaction, wanted a bigger poultry industry and a more progressive county. I asked them to let each club member have a sitting of eggs on the "cooperative plan"—that is, return two of



MEMBER OF A BOYS' POULTRY CLUB PREPARING HIS FOWLS FOR EXHIBITION

the best pullets raised to pay for the eggs. They were glad to do this. The members chose the kind of chickens they liked best, requiring a careful study of the bulletins furnished them and "The Standard of Perfection" which I always took to club meetings. Needless to say quite a variety of breeds were represented in their selection, but no ornamental types.

Three hundred and twenty-eight club members were ready for eggs by December 1. Before this date I asked each member to start one sitting of just plain eggs—the mongrel kind they had—that they might have chickens to sell to help supply the demand. With many miles of hauling, accompanied by various accidents, misfortunes, broken boxes and broken eggs, each girl and boy was finally supplied by May 1. At each club meeting there were reports on work accomplished. Some were encouraging, others were discouraging, such as: "A fox caught twelve of my fifteen chicks last night," and "I picked cotton and went on a summer camp and raised nine roosters."

November 12, Contest Day, came at last and along with it came influenza. Only sixty exhibits came to the fair, but these were most creditable ones. I did not have to bring them in my Ford either, but all came nicely crated and prepaid. I was glad when the Fair Association insisted that the club members compete along with the County Poultry Show. Judge Marshall announced that the best cockerel in the show was a White Leghorn belonging to a club girl 12 years old. In most every case club members won prizes over the breeders cooperating with them. I do not think the breeders were at all displeased at such keen competition. It was interesting to see the care with which these birds had been prepared for exhibit.

I selected from these sixty exhibits the ten best pens for State Fair exhibit, and with these won championship over all counties in the state. Judge Nixon said we had the best Wyandotte cockerel in the whole poultry show. The South Florida Fair Association offered to pay transportation on exhibits if we would cooperate, but to my surprise, no club member exhibiting at the State Fair wanted his birds taken from the breeding pens. I got another ten pens together with which we again won the championship. The prize money, amounting in all to

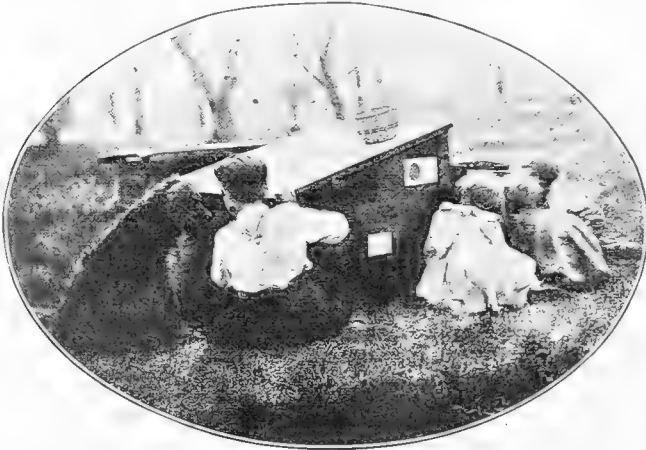
\$200, was divided among the club members and used for buying more hatching eggs.

Every club member now has at least twenty-five standard-bred fowls, and in ten homes the entire flock has been changed from mongrels to standard bred. "One hundred hens to every farm" is the slogan for Suwannee County. No club member stops hatching for season, as chicks can be grown any month in the year in Florida. One girl, starting with twelve eggs, which hatched March 28, 1919, had 85 fine birds March 28, 1920, and besides selling several sittings of eggs she could have sold several hundred sittings to other club members had she been able to supply the demand, which she plans to do next year. We will have a poultry institute during the

in the show. State Fair, Raleigh, N. C., we won a major part of the prizes in the club classes and 1st S. C. White Leghorn cockerel in the open class and these in red-hot competition. At the Official State Poultry Show, Goldsboro, N. C., we won most of the prizes offered in the club classes on Barred Plymouth Rocks and S. C. White Leghorns.

We wish to tell you also about our pigeon and squab business. We have about 100 pairs of Homing and White King pigeons. We use one end of our poultry house, which is 90 feet long, for one pen of pigeons, making a flying pen outside for them to sun and be out in, and we are using part of the barn loft for one pen. Pigeons are very profitable also when handled properly. They are not so much trouble as poultry. We ship squabs almost every week. They are dressed and packed in ice. In 1919 we sold 785 squabs, which was not a very good amount on account of losing some young ones in January and February. The amount received for these was \$445.23; feed cost \$194.96; amount of profit, \$250.27.

This gave us a profit of \$546.79 which is pretty good, we think, as we only have a back lot and not more than three quarters of an acre on which is built a small barn and our henhouses. We expect to have some of the best birds we have yet raised this summer, and they will be heard from in the shows this fall. Other children can do as we did, if they have a good poultry house and some purebred poultry.



CHILDREN OFTEN ARE ENTHUSIASTIC POULTRY RAISERS—  
GIVE THEM A CHANCE

year which will last for five days, and each club member will attend. At this date (May 17, 1920) there are 387 CLUB MEMBERS WITH STANDARD-BRED FOWLS AND EVERY ONE WORKING LAST YEAR HAS A SMALL BANK ACCOUNT.

## Two Boys Net \$546 With Poultry and Pigeons

Two Enterprising Poultry Club Members in North Carolina  
Net \$296 With 60 Hens and \$250 With 100 Pairs  
of Pigeons in Back Yard—Also Win 27  
First Prizes in Most Important  
State Shows

By PAUL and ALEEN WAGNER

EDITORIAL NOTE: Through the courtesy of A. G. Oliver, State Leader of Boys' and Girls' Poultry Clubs in North Carolina, we are able to present the following interesting report of two North Carolina poultry club members. Their profits and show winnings would be highly gratifying to many an adult breeder.

**H**ERE is what brother Paul and I did on our back lot in 1919 with 60 hens divided equally into three varieties—20 S. C. White Leghorns, 20 Barred Plymouth Rocks, 20 S. C. Rhode Island Reds. We mated pens of each and sold eggs for hatching to the amount of \$125; also sold market eggs and chickens for \$468.74; total \$593.74. Feed and other expense for the year was \$297.22, leaving us a net profit of \$296.52.

We won 27 first prizes in 1919 at the best shows in the state in both the open and club classes. At the Hickory Fair, Catawba County, N. C., we won special for best birds

### Girls Make Poultry Records

The United States Department of Agriculture supplies the following reports of success of Poultry Club members in the South:

"Marie Bradfish, who lives in St. Johns County, Florida, has found poultry raising profitable. In 1919 the net returns from her birds were \$739.75. This little Florida girl two years ago joined one of the poultry clubs supervised by the United States Department of Agriculture and the State Agricultural College. She made a good profit the first year and won the state championship. She started her second year poultry work with 105 fowls, valued at \$258.

"During 1919 she sold 1,030 eggs and set 14 dozens. From the fowls raised she sold 49 for \$89 and kept 209, valued at \$525. The total income from her flock for the year was \$1,330.75. When her expenses for feed and the value of the original flock were deducted, her profits for the year were \$739.75. This excellent record won her the prize of \$50 which had been offered by two members of the Board of Control of the State Institutions of Higher Learning to the girl who did the best work in a poultry club in Florida in 1919.

"In Mississippi one of the successful young poultry club girls is Gregory Russell, who lives in Lawrence County, Mississippi. This is her first year in poultry club work. She bought all of the dry feed for her flock but raised a tenth-acre of oats and rape for their green feed. This 15-year-old girl's net return this year from her poultry work, which was supervised by the United States Department of Agriculture and the State College, was \$256.

"Vivian Smith of Yalabusha County, Mississippi, has been in poultry club work for four years. This year her net return from the work was \$386.86. She started four years ago with seven chickens and made a net return that year of \$70. The next year she doubled this amount and the third year she cleared \$240 from her poultry."



## CHAPTER V

# How To Insure Success—What Not To Do

Herewith Are Listed the More Common Mistakes That Beginners Are Liable to Make—Those Who Master the Details of a Definite Approved Method and Who Adhere Closely to It Until They Have Gained Some Practical Experience Will Be in Little Danger of Falling Into Serious Errors

**T**HOSE who have investigated the possibilities of small-plant production, and who perhaps have learned that many making the attempt have met with disappointment, will want to learn how they may, if possible, insure themselves against a similar experience. As a matter of fact, anyone CAN so insure himself if he is in earnest—if he will take pains to be WELL INFORMED in the practical details of the work. Generally speaking, the beginner who learns a good practical method of poultry keeping and adheres rigidly to it until his own experience offers reasonably safe guidance, need not concern himself about the numerous ways in which he can make mistakes. Unfortunately, the desire to experiment or to “express one’s individuality” is extremely strong in many beginners and it is to experiments without sufficient practical knowledge back of them that so many serious mistakes are due—mistakes that are the chief cause of most of the failures and disappointments that occur in connection with back-yard poultry keeping. Some of the more common errors that the beginner is liable to make are here briefly mentioned.

### WHAT TO AVOID IN MAKING THE START

#### Don’t Start Blindly

Many who have decided to take up back-yard poultry keeping fail to appreciate the importance of securing necessary elementary information before making a start. Poultry keeping is simple but it is not so simple that it will not pay to get the advice of those who have had practical experience. Speaking generally, more money is wasted on “original” ideas in buildings and methods than would have been required in starting right. Those who have been in the business for years have very definite reasons for the suggestions they make or the advice they offer, and it is the part of wisdom to profit by their knowledge rather than to show one’s independence by starting where they started and paying the same costly tuition in the school of experience.

#### Don’t Buy Fowls Blindly

The different breeds have each their peculiar qualities and some of them are better suited to back-yard conditions than others. Don’t buy stock blindly without knowing or caring what breed is represented. Proper care in selecting fowls with reference to their breed and individual characteristics may make a great difference in the income received, also in the pleasure of caring for them.

#### Don’t Follow Untried Plans in Building

Probably more mistakes are made in building back-yard poultry houses than in any other one thing. Many beginners would rather adopt some idea that appears to be unique than to follow the commonplace outlines of the kind of house that the experienced poultry keeper regularly builds. Mistakes in design that will waste time and labor, mistakes in construction that will add greatly to

the cost, mistakes in ventilation that will affect the health of the birds—these may all be avoided by adopting an approved plan. Most of the poultry plants that have failed, both small and large, have freak poultry houses on them. It is true that some poultry plants that are successful also have freak houses, but in these cases their owners have succeeded in spite of their mistakes in building, not on account of them.

#### Don’t Build Makeshift Houses

The poultry keeper’s attitude towards his flock is determined to a large extent by appearances. He gives good-looking fowls better attention than scrubs. He takes better care of a neat, attractive house than one that is built without regard for appearance. That is one reason why the poultry keeper with a plant that is neat and attractive almost invariably gets better results than one whose buildings are an eyesore. If you cannot afford to build attractively and with new lumber, make the best of what you have, but remember that reasonable expense incurred in making house and surroundings neat and pleasing in appearance is money well spent.

#### Don’t Keep Inferior Stock

Even though you may have only a small flock and are interested only in the production of eggs for table use you will find that you can well afford to keep standard-bred fowls—cannot, as a matter of fact, afford to keep anything else. Such birds look better, lay better, weigh more, and in every practical detail are more desirable than birds of mixed or mongrel breeding. It is not necessary to buy exhibition stock unless you want to breed such, but at least get standard-bred fowls so that the birds will be uniform not only in color and size but in other characteristics as well.

#### Don’t Keep Too Many Breeds

It is rarely advisable for the beginner to have more than one breed, particularly where he has only a limited amount of room. If the different breeds are allowed to run together they seldom do well, and to maintain two or more separate pens in close quarters adds to the cost of the buildings, increases greatly the amount of labor required in looking after the birds, and is of no practical advantage. It generally is much better to select the breed that will best meet your conditions and that you like best, and then concentrate your attention entirely upon it.

#### Don’t Expect the Impossible

Wonderful results sometimes are secured even by the inexperienced, but it should be borne in mind that these extraordinary results are the exception and not the rule. Be reasonable in your expectations and your demands on the fowls, and be satisfied with fair returns upon your investment of time and money. With increasing experience and skill you will be able to get better and better

results, but the greatest success comes to those only who have qualified themselves by years of practical experience.

### **DON'TS IN GENERAL MANAGEMENT**

#### **Don't Frighten and Abuse the Birds**

Fowls respond quickly to good treatment and they enjoy being treated as pets. Hens that are contented and happy are always more productive than those that are nervous and timid, constantly suspicious of their caretaker and ready to fly to the farther end of the yard whenever he appears on the scene. A little time spent in getting acquainted with the birds and in securing their confidence will be repaid several times over in the better production that will be realized from them. Incidentally, the caretaker will learn a great many interesting facts in regard to his fowls and their habits.

#### **Don't Be Impatient for Returns**

A great many back-yard poultry keepers are unreasonably impatient with their new flocks. After having secured the fowls and put them on regular rations they expect almost instant production. This is unreasonable. There are good physiological reasons why fowls must have some time in which to become accustomed to their surroundings and to get acquainted with their caretaker before they can be expected to become productive. Feed the birds well and give them the necessary time in which to show what they can do.

#### **Don't Overlook Everyday Details**

The poultry keeper who keeps his hens under observation from day to day, noting their conduct, observing the condition of the droppings on the platform, etc., will find that he will get much better results and have fewer losses. Where no special notice is taken of the birds, diseases sometimes become deep seated before the symptoms are noted. The proverb, "the eye of the master fatteneth his cattle" applies with equal force in the care of fowls. Oftentimes extraordinary variations in returns are reported by individual poultry keepers where the only noticeable difference in management is the closer attention given to everyday details.

#### **Don't Neglect Disinfection**

With fowls in close quarters the danger from infectious diseases is greatly increased, also the danger of soil contamination. It is highly important under such conditions to use disinfectants freely. Don't wait for the fowls to get sick before doing this but treat disinfection as insurance and keep the premium paid up. In other words, use disinfectants freely and often about the poultry house, and yards too, if small.

#### **Don't Neglect Culling**

No one who has a flock of layers can afford to neglect culling. Whenever the egg yield drops below 50 per cent you can count upon it that there are some hens in the flock that are not laying and that are a source of unnecessary expense. If you familiarize yourself with culling methods you will have no difficulty in identifying these birds.

#### **Don't Overlook the Advantages of Artificial Light**

The use of artificial light for the laying flock is no longer an experiment but a practical measure of proved value in securing maximum egg production during the high-price months. Even if you can do no more than hang

up a lantern in the house you will find that it will pay you well to do this. Artificial light will not only bring your pullets into laying earlier in the fall and enable you to get profitable production even from late-hatched pullets, but if properly handled will give you a larger total yield for the year.

#### **Don't Overstock**

The back-yard poultry keeper is under constant temptation to keep more fowls than he has room properly to accommodate. This increases his feed bill and, as a rule, results in lower production from the large flock than would be secured from the smaller number that could be properly accommodated. Fowls of the larger breeds should have four or five square feet of floor space per hen and Leghorns not less than three and one-half feet, and it is simply a waste of feed to keep larger numbers than can be given this amount of room.

#### **Don't Try to Expand Too Fast**

After success with a small flock has encouraged you to plan for larger things don't make the mistake of expanding more rapidly than your experience and your finances will warrant. With small flocks, or in side-line poultry keeping, it is a good plan to make the fowls pay for all additions to the plant. If that rule is adopted the beginner will find his plant growing no faster than he is able to take care of it and to protect his investment.

#### **Don't Let Fowls Become a Neighborhood Nuisance**

Make up your mind at the start that your fowls will be kept on your own premises, not only part of the time but all of the time. Lack of respect for the rights of neighbors is directly responsible for many of the unreasonable restrictive ordinances in regard to keeping fowls in town. Keep no males in the laying flock, confine all fowls to your own premises, keep the houses and yards clean and sweet smelling and there will be few objections from the neighbors.

#### **Don't Practice False Economies**

There are various ways in which the beginner is apt to practice false economies. Feeding defective rations because some needed element is high priced or hard to secure, restricting the amount of feed the fowls get to reduce expenses, using too much sloppy kitchen waste because it does not cost anything, omitting all glass from the laying house in cold climates, buying cheap building materials that will answer the purpose for only a short time, buying cheap stock where good fowls could be secured at only comparatively slight advance in price—these and many other means of "saving" are false economies that will in the long run cost the poultry keeper a great deal more than the adoption of a more liberal policy.

#### **Don't Be Irregular in Care of Fowls**

Fowls quickly become accustomed to a definite schedule of feeding and care and will do better when the schedule is regularly adhered to. Irregular methods, such as feeding three or four times one day and only once at another time, letting the fowls out early in the morning or late in the day as happens to be convenient, sudden or extreme changes in the ration, all have an unfavorable effect upon the production of the fowls, and also upon their health. It is better to adopt a plan that can be adhered to with reasonable uniformity day after day, even though it might not appear to be as good as some other which, because more exacting, is apt to be neglected.

**Don't Neglect Lice and Mites**

The poultry keeper who makes liberal use of disinfectants or lice-killing preparations will have little trouble with parasites, but a little neglect along this line in warm weather may result in the house becoming infested with mites. After they are established it is extremely difficult to get rid of them. Don't wait for the mites to appear but paint or spray the perches, perch supports, nest boxes, etc., once a month in warm weather, unless you use one of the commercial preparations that retain their effectiveness for months.

**DON'TS IN FEEDING****Don't Feed Unbalanced Rations**

Just because you have only a few fowls is no reason for thinking you need not give any especial attention to feeding a balanced ration. This is an essential in the proper nourishment of fowls no matter in what numbers they may be kept. If you are not familiar with the subject use some standard brand of commercial poultry feed—by far the simplest way of providing a balanced ration. Correct feeding means increased production and lower cost. An unbalanced ration often costs more than a higher priced one that is well balanced, simply because more of the former is required properly to nourish the fowls, and more of it is wasted.

**Don't Depend Too Largely Upon Kitchen Waste**

Waste from the kitchen is good feed but it is nearly all soft and fowls that are fed exclusively upon it will develop indigestion sooner or later. They should have at least one full feed a day of hard grain. It is better to throw away some of the kitchen waste, if necessary, rather than to risk the health of the birds by feeding it too freely.

**Don't Feed Too Much Moist Mash**

A great many poultry keepers who have found that the feeding of moist mash means better egg production seem to think that if a little is good a good deal is better and feed entirely too much of this part of the ration, resulting in digestive disorders. One feed of moist mash daily may safely be given but rarely more.

**Don't Overfeed or Underfeed**

It is not a difficult matter to determine whether the fowls are being properly fed, and there really is no excuse for anybody overfeeding or underfeeding. Overfeeding is wasteful and makes the fowls overfat and imperils their health. Underfeeding means certain decreased egg production. Learn to know when your fowls are being properly fed.

**Don't Neglect Exercise**

Fowls are naturally highly active in their habits and when in confinement on heavy rations will not do well unless attention is given to providing compulsory exercise. Use plenty of litter so that birds will have to scratch for the grain part of the ration, give the soft feed either at noon or in the evening, and when the fowls are running out spade up a section of their yard to encourage them to dig in the moist earth—in fact, do anything practical that will help to keep them on the move.

**Don't Feed Musty or Sour Feeds of Any Description**

If the waste from the kitchen is sour it should be burned or put in the garbage can. Sour feed will quickly cause sickness among the birds. Musty grain is equally injurious. Give the birds nothing but sweet, wholesome

feed and the problem of keeping them in good health will be greatly simplified.

**SPECIAL DON'TS FOR CHICK RAISERS****Don't Buy Cheap Chicks**

If you are starting with day-old chicks, don't buy low-priced stock. The cheap chicks that are sold by the 5c and 10c stores and elsewhere are mostly of inferior breeding and it is not reasonable to expect good results from them. Be willing to pay a fair price and buy from responsible dealers who will give you the worth of your money and will take an interest in your success.

**Don't Let Young Stock Crowd in Coops and Brooders**

Coops that were plenty large enough for the chicks when first hatched will become overcrowded as the chicks grow, and heavy losses are experienced each year by persons who fail to take this into account and to provide larger, more roomy, better ventilated quarters for the growing stock. When the chicks pile up on the outside of the brood coop, or when the brooder is clearly seen at night to be overfull, relief must be provided in some way. A few nights in overcrowded quarters may give the chicks a setback from which they will never recover.

**Don't Neglect Shade**

Chicks that do not have plenty of shade rarely make good growth during hot weather. They like bushes and tall-growing weeds, but if these are lacking, provide shade by using strips of burlap or in any other way that is practicable. This protection cannot be neglected without serious consequences.

**Don't Let Chicks and Adult Stock Run Together**

Young chicks that have to take their chances in the general flock usually are mistreated and underfed and never grow as well as they should. Either do not try to raise chicks at all or provide separate quarters for them so that they will have a chance to grow and thrive normally. The same thing applies where chicks of different sizes are kept together. That also is unwise as it handicaps the smaller birds seriously. Often it is better not to raise more than one brood, even though that may appear to be insufficient for your needs, rather than to raise together two lots noticeably dissimilar in size.

**Don't Fail to Put Eggs Down in Spring**

If you have a surplus of eggs after April 1 you cannot afford to sell them until you have put down as many as you will need in fall and early winter before the new flock will come into laying. Eggs can be preserved at little cost and should remain in good condition for months.

**Don't Fail to Keep a Record**

It is easy to give snap judgment as to the profit, or lack of it, realized from the back-yard flock, but no one who has not kept a careful record really knows just what returns it is making for its feed and care. Keep an exact account of expense, of eggs laid, and fowls eaten or sold, and don't guess.

The foregoing is a rather formidable list of "don'ts" and some perhaps may feel rather discouraged in reading them. The fact should be emphasized, however, that it is not necessary for anyone to encounter the various stumbling blocks that are here pointed out or make the numerous mistakes mentioned. Learn the right way and stick to it, and let someone else try the various things that should NOT be done.

## CHAPTER VI

# How to Hatch and Rear Chicks Successfully

Helpful Suggestions That Should Insure to the Beginner Complete Success in Hatching and Rearing His Chicks, Whether He Plans to Raise Only a Few or Several Hundred—Complete Daily Schedules Are Given for Brooding and Feeding From the First Day to Maturity, Which Greatly Simplify the Work



ANY persons make their start in poultry keeping during the spring months, doing so with a single sitting of eggs or an incubatorful, or possibly with a good-sized brood of baby chicks.

In either case, their future interest in poultry keeping is apt to be determined by their success during the first few weeks. Almost everyone likes to raise chicks when they all live and do well, but many promptly get discouraged when their broods grow sickly and die off. A good deal can be done to insure initial success by see-



NEST FOR SITTING HEN

Nests for sitting hens should be 12 to 15 inches square and at least 12 inches high. In warm weather more ventilation will be required than in here provided when door is closed.

he is raising chicks from his own breeders no reasonable measures should be neglected that will assist in keeping the fowls in first-class breeding condition (see Chapter XIV).

Whether or not it is practical for any given person to raise chicks in his back yard depends chiefly upon the interest he takes in the work and the amount of room he has available. Without doubt, if the chicks can be given proper feed and protection, it is true economy to raise a flock each season. The cost of raising a good-sized brood should be half or less than half of what their cost would be if purchased in the open market when grown. It also is practically the only way in which many back-yard poultry keepers are able to obtain a supply of early pullets for fall and winter egg production.

### Management of Sitting Hens

While, as has just been indicated, the natural method of hatching chicks has definite limitations and has now been largely abandoned even by many who raise only small numbers, there still are some who, for one reason or another, wish to hatch a few chicks in this way. Where this method is to be followed there are several things that can be done to insure good results and to avoid the numerous difficulties usually associated with hen hatching.

Nests for sitting hens should be located in a separate compartment so that the hens will be free from interference from the rest of the flock. It is scarcely worth

while to attempt to incubate eggs with hens unless such conditions can be provided. The sitting hen requires comparatively little room for exercise, and quite a large number can be accommodated in a small compartment. The nests should be of fairly good size, and an orthodox method of preparing them is to put a good heavy sod or two or three inches of loam in the bottom, with a liberal allowance of not too coarse straw on top. The provision of sod or earth probably is not at all essential to best hatches under ordinary conditions, but at least it will do no harm.

Broody hens should be allowed to remain on the regular nests for a day or two, until certain that they are determined to sit, when they may be removed to the regular hatching nests previously prepared. If they are moved at night and quietly handled they usually will settle down to their duties in the new nests without much trouble, provided they cannot see or get back to their old quarters. The hens should be confined to the new nests until the next evening, when they should be allowed to come off for feed and exercise. Take them off if they do not leave of their own accord. This should be done a little before dark and the hens will return to the nests as soon as they have eaten. If not, they should be put back and again confined until the morning of the second day after. Any that do not voluntarily return to the nest when let off this time are apt to be unreliable and had better be placed in a broody coop and broken up and returned to the laying flock. Hens that refuse to occupy the new nests can often be persuaded to do so by giving them sufficient attention, but usually it pays better to let them go.

When the hens are placed on the nests they should have two or three nest eggs. After they have settled down to their duties these are removed and a sitting of suitable size given them. Avoid the common tendency to place too many eggs in the nest. Hens cannot keep a large number of eggs warm in cold weather, and the



CONVENIENT COOP FOR HEN AND CHICKS

Coop should be 2 by 2½ feet for ordinary use. Front is covered with close-mesh galvanized wire cloth or netting. Photo from Md. Exp. Station.

whole hatch may be lost if the hens are given more eggs than they can cover properly. Even a good-sized hen should not have more than ten eggs at that season, and it is doubtful whether it ever pays to give them more than fifteen. Before setting the hen give her a thorough dusting with some good lice-killing powder or insecticide.

Where hens are to be used for hatching there rarely are any broody until the season is well advanced. Hence, depending upon natural means of incubation results in late hatches and, consequently, late-maturing pullets in the fall. To have broilers early in the season when they are highest in price and most desired, to get chicks out early so as that they will be well grown before the hot summer months come on, to get early pullets, to have the chicks of uniform age, or to bring off successive hatches so as to utilize space and equipment to best advantage—if any of these is the object, incubators must be used. Practically all incubator manufacturers make small-sized machines especially designed for the use of the back-yard poultry keeper. They are not expensive to purchase or to operate, it is an easy matter to learn to use them, and with proper care good hatches are assured.

#### Incubator Management

The principles of successful incubator management are the same, in a general way, regardless of the kind of machine used, or where it is operated. However, different types of incubators and different methods adopted by manufacturers in equipping them with thermometers, moisture devices, etc., make it necessary to have special instructions from the manufacturer of the particular machine used, and these should be the operator's final guide, as far as they go. The manufacturer certainly knows better than anyone else what methods are likely to give best results with his machine. If the first hatch or two should not prove to be entirely satisfactory when following these directions as closely as possible, communicate directly with the manufacturer, describing conditions under which the incubator is being operated and giving accurate information in regard to the hatch and the respects in which it has proved disappointing. The manufacturer then should be able to give such additional information as will be necessary in order to insure success.

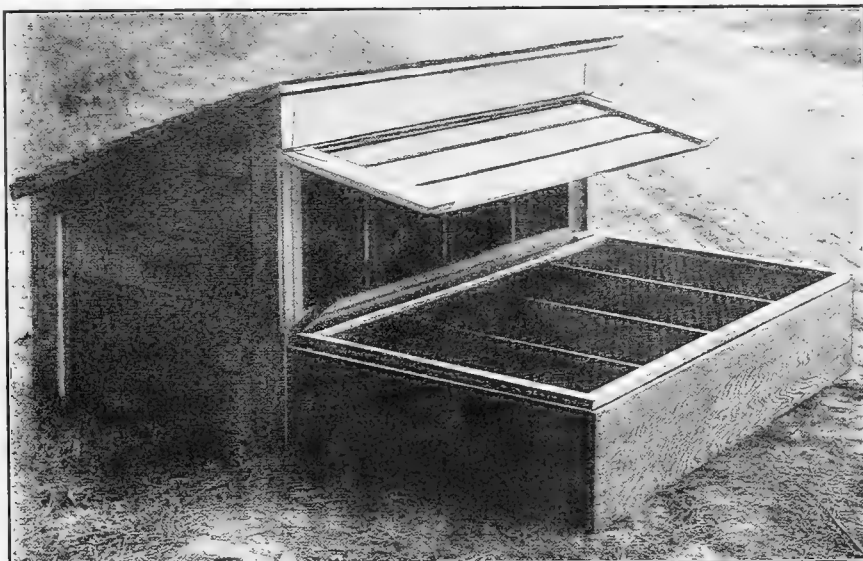
The operation of incubators of reliable make is by no means a difficult matter. It is only where adjustment is imperfect or when the operator persists in trying to make the machine hatch under unreasonably adverse conditions that he experiences serious trouble. Modern machines are so well constructed, so nearly automatic, and afford so favorable conditions for embryonic development that they require only slight care and attention on the part of the operator, if they are properly located and correctly adjusted at the start.

#### What Eggs to Use for Hatching

The length of time that eggs can be held depends quite largely upon the season of the year and the vitality

of the breeding stock. The safe rule is to set them as soon as possible, and never to hold them over two weeks if it can be avoided. Good hatches sometimes are secured with eggs held for a longer time, but they are exceptional, and the vitality of the chicks is liable to be seriously affected, even though the hatch may be satisfactory so far as percentage is concerned.

Few beginners give sufficient attention to sorting and selecting the eggs that they place in the incubator. None that show noticeable defects of any kind should be used even though some of them might hatch. Double-yolked eggs, abnormally large ones, those with peculiar shells, etc., should be discarded, also those that are quite small. Small eggs mean small chicks every time, and usually there is a high percentage of loss among them. It is a good deal better to operate the machine only partially



COOP AND RUNS FOR SITTING HENS OR BROODS OF CHICKS

Where several sitting hens or broods of chicks are to be provided for, this compartment coop will be found convenient. Partitions are movable frames covered with canvas or burlap. Coop is 5 feet long, 3 feet wide, 3 feet high in front and 2 feet in rear. Photo from Oregon Exp. Station.

filled, if necessary, rather than to use eggs of which only a small percentage can reasonably be expected to hatch, and which at best will produce weakly chicks. However, it should be borne in mind that directions for operation usually are based on full trays, and when the machine is only partially filled it may be necessary to reduce ventilation accordingly and sometimes to maintain a slightly higher temperature. Frequently, also, more attention must be given to moisture.

#### Location of Incubator

For the average operator the best available location is a well-ventilated cellar. Usually the temperature in such a place is fairly uniform, and there is a higher and more uniform degree of humidity, which simplifies the moisture question. In cold weather cellars are warm, or can be made so without much expense, and in warm weather are much cooler than rooms entirely above ground. Another reason which sometimes favors the cellar as a location for the incubator is the fact that machines there are less liable to be interfered with. Do not attempt to operate more than two or three lamp-heated machines in an ordinary cellar, however, unless special provision is made for ventilation.

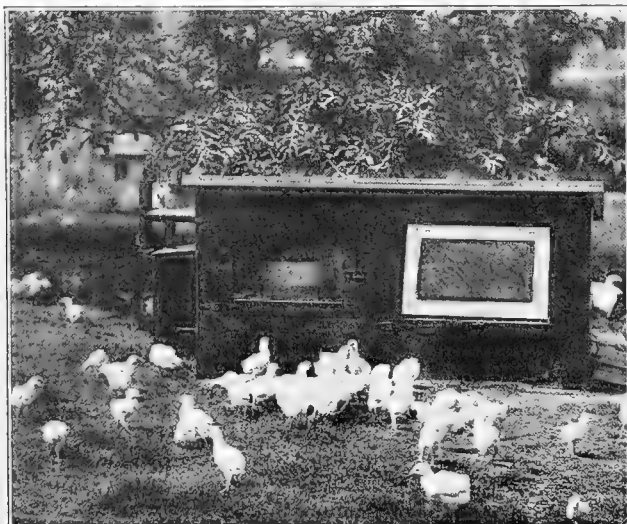
Where the incubator must be run in an above-ground room, every effort should be made to keep the temperature uniform, and thus avoid making unreasonable demands upon the incubator regulator. If possible, select a room facing north rather than in another direction. If the sun's rays can enter at any time during the day (which invariably will cause a rapid rise in temperature) the windows should be provided with blinds or wooden shutters so that this cannot occur. It is a great deal easier to make necessary changes in the lighting or heating of the room so as to maintain a fairly uniform temperature than it is to secure an adjustment of the incubator regulator that will take care of wide extremes. The air in above-ground rooms, especially if heated by furnaces, hot-water radiators, etc., is much drier than in cellars, and this condition must be remedied by supplying moisture in whatever way is most convenient.

#### Incubator Temperature

Theoretically there is only one correct temperature at which to incubate eggs, but in practical incubator operation the style of the machine, kind of thermometer, season of year, stage of hatch, etc., all have a bearing upon the exact degree to be maintained. Let the manufacturer's directions in regard to temperature be the positive guide. Use the style of thermometer that he recommends and keep it in the particular location on the tray that he prescribes. Outside instructions on this subject almost invariably confuse the beginner.

#### Moisture and Ventilation

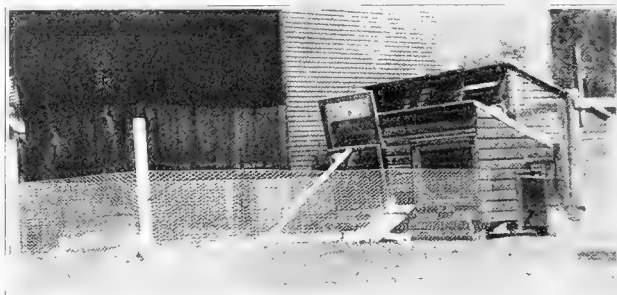
These two factors in artificial incubation are the manufacturer's own problems, and his instructions should be followed exactly. Different makes of incubators vary widely in their methods of supplying heat and in the circulation of air in the egg chamber, and practices that give excellent hatches in one machine may prove most disappointing when applied to one of another type. In studying directions for adjusting ventilation or supplying moisture, however, bear in mind that these are intended to meet a general average as to location, and those whose conditions vary widely from such will have to adapt the instructions to their peculiar requirements. If they find difficulty in doing this or if results are not up to expectations then the manufacturer should be consulted.



POPULAR TYPE OF LAMP-HEATED OUTDOOR BROODER

#### Turn Eggs Twice a Day

Eggs should be turned regularly twice a day from the morning of the third day until the chicks begin to pip, or until they can be heard in the shell. There is no doubt that eggs are turned much more frequently than this in natural incubation and many incubator operators believe



HOMEMADE OUTDOOR BROODER WITH LAMP-HEATED HOVER

This photo was taken on a back-yard plant, and shows a good-sized home-made brooder case equipped with a lamp-heated hover.

that it pays to turn four or more times daily. Directions sometimes are given to discontinue turning on the eighteenth day. If the hatch is coming off in good time this is correct, but if delayed, as is quite often the case, to discontinue turning on the eighteenth day may mean an appreciable reduction in the number of chicks secured. It is much better to continue turning until the chicks begin to pip, regardless of when that may be.

#### Advantage of Testing Eggs

The operator's only reliable means of keeping in touch with the development of the embryo and learning whether it is progressing normally or not is by repeatedly testing the eggs throughout the hatch. The beginner especially should make a complete test at regular intervals of five or six days, and should test a few eggs every now and then between times, in order that he may become thoroughly familiar with the appearance of the embryo at all stages of growth. By testing he is able to follow the development of the air cell, and can tell at a glance whether the eggs are drying down at the proper rate. He also learns to recognize normal embryonic development and thus determines whether the correct temperature is being supplied.

#### Why Eggs Should Be Cooled

The cooling of eggs during incubation is a debated point and its particular influence on the embryo, if it has any, is not fully understood. There are some indirect advantages, however, and most operators practice it to some extent, especially in warm weather. The usually accepted rule for cooling is to lower the temperature of the egg to a neutral point—that is, where it will feel neither warm nor cold to the touch. The time required to do this varies widely with the outside temperature. Where the incubator is operated in a cold room it is doubtful whether cooling is of any practical value unless it is found desirable to do it in order to check too rapid development of the embryo. The average operator cools entirely too much in cold weather, which is one of the most common causes of delayed hatches.

#### What To Do When Hatching Begins

Under normal conditions the hatch will need no attention and no assistance aside from seeing to it that the

temperature is kept as it should be. If the hatch is a little slow in coming off, or if the chicks are being removed from time to time during the hatch in order to leave more room for the later arrivals, the temperature on the egg tray will almost certainly drop when most of the chicks are out. That is one of the chief reasons why there are so many complaints of chicks sticking in the shell. During the latter part of the hatch it is desirable to give special attention to the temperature, changing the regulator if necessary to keep it up to 103 degrees.

It sometimes is desirable to give the last chicks a little assistance. While those that are not able to get out of the shell without help usually are not worth helping, this is not always the case. Where the chicks cannot get out on account of the drying and consequent hardening of the membrane, all that is necessary, frequently, is to wring a flannel cloth out of hot water and spread it over the eggs. This should be left in place until the membrane is softened (10 to 20 minutes), when it should be removed. Repeat this operation a little later if it seems necessary. Any chick that is strong enough to live will be strong enough to get out with this assistance.

#### Taking the Chicks Off

When the chick is first hatched it is an extremely delicate organism, not entirely developed. Partly for this reason, also because the thin coat of down with which it is covered is only a partial protection at best, it is in no way able to stand low temperatures or sudden changes. The best possible treatment for newly hatched chicks, therefore, is to leave them in the incubator for a day so that they may be somewhat hardened and their development completed. Chicks need much more air than they required as embryos, and when the hatch is over about all the air that the machine is capable of admitting should be supplied. Under some conditions, where the hatch is

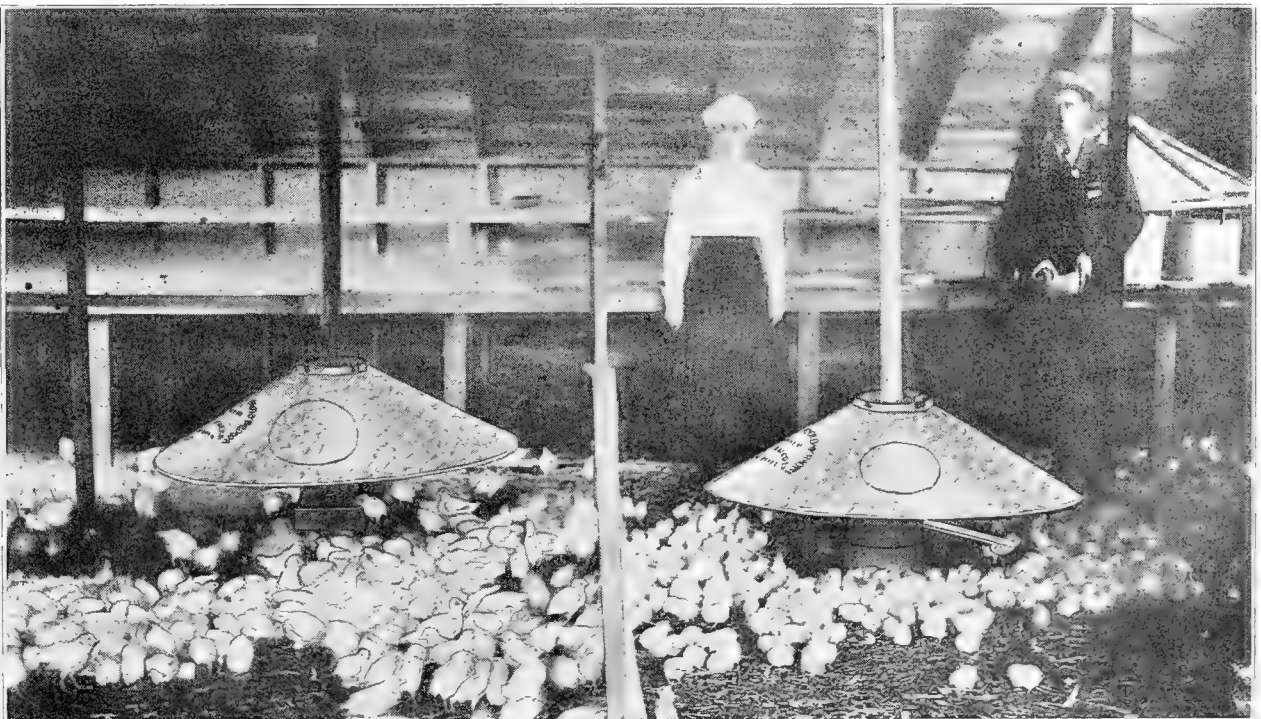
unusually good so that the first-hatched chicks are being inconvenienced by close confinement, the oldest may be removed from the machine and kept in a warm box or basket. By the time the chicks are 24 hours old, however, they should all be in a good, warm brooder, ready for a drink of water or milk and by the end of the second day, their first feed.

#### Need for Brooding Equipment

Great numbers of chicks fall victims every year to failure to provide for their comfort and warmth. This failure may take the form of having no brooders at all; or, when brooders are provided, there may be too few of them for the number of chicks to be brooded, or they may be of inferior design, flimsy, unsafe, and generally unreliable. In either case, the final result is about the same; the percentage of loss is excessive and sometimes ruinous, and even when the chicks manage to survive they often are weakly and stunted, never develop properly, and are incapable of giving satisfactory results either in the laying flock or the breeding pen.

The need for artificially heated brooders is all the more imperative because of the general tendency toward early hatching, which results in the chicks being brought into the world at a time when winter is not entirely over, and when severe cold and long spells of stormy weather are still to be expected. The light coat of down with which the baby chick is covered affords some protection, but by no means enough to keep it warm at low temperatures. Just a few minutes too long away from a source of heat may cause serious trouble.

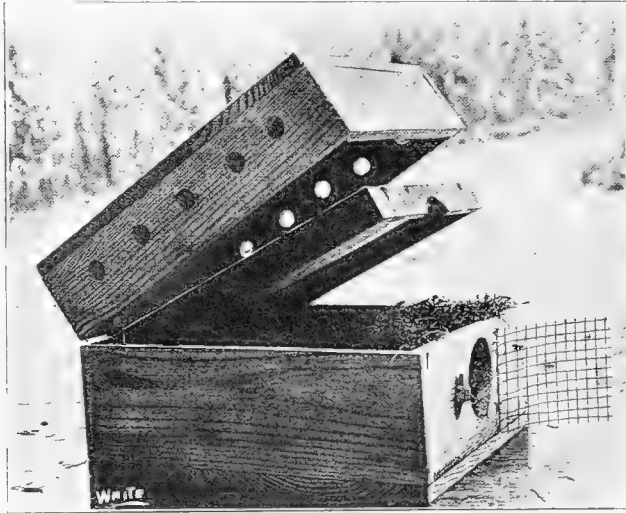
Epidemics of so-called "white diarrhea" often are directly due to improper brooding temperatures or to overcrowding. Brooder pneumonia usually is traceable to one or the other of the same causes, as also are lack of thrift, stunted growth, slow development, failure to feath-



TWO "STANDARD" TYPE COLONY HOVERS INSTALLED IN LAYING HOUSE

This type of hover will brood several hundred chicks in one flock. Stove is heated with coal and equipped with thermostat which regulates temperature by controlling the draft. In many cases it is practical to brood the chicks in empty laying houses where the pullets are to remain when full grown. Coal- and oil-burning colony hovers are well adapted to such use.

er out properly, and many losses during the first two months that are not accompanied by any special symptoms except lack of vitality. It is scarcely possible to overemphasize the fact that most of the ills to which chicks are subject develop into serious epidemics only through neglect or mistreatment which lowers the chick's



CONVENIENT TYPE OF FIRELESS BROODER

Note the muslin-covered frame which acts as a hover, and the ventilation holes in the top. Bottom of box is filled with litter so as to bring the chicks' backs up against the hover. Photo from Maryland Exp. Station.

natural vitality and resistance to disease, and it is safe to say that every chick raiser who fails to provide suitable brooding equipment or enough of it, loses each year more than it would cost to do so.

#### Types of Brooder Available

Inadequate brooding facilities are only a little less prolific cause of disease and loss than having no brooders at all. Chicks crowding and trampling each other under foot, brooding different ages under the same hover, necessity for taking heat away from the chicks before they are old enough—all these are common disadvantages accompanying a lack of brooder space, and everyone of them takes heavy toll in the flock. The better types of brooders now on the market are highly developed, well made, durable and moderate in cost, and they are absolutely indispensable on well-managed poultry plants. In heating capacity, in economical use of fuel, and in accuracy of temperature regulation, they are marvels of efficiency. The chick raiser is entitled to scant sympathy in his losses if he deliberately neglects to avail himself of the help that may be his at so reasonable cost.

Poultry keepers now have a wide variety of brooding equipment available for their use, and merits of the different types of brooders should be carefully weighed in deciding which to adopt. Select the kind that is best adapted to the size of the flocks that are to be raised and to the conditions under which they will be operated.

#### Raising Chicks in Fireless Brooders

The practical poultry keeper has comparatively little interest in fireless brooders because their use involves much extra labor, and chicks do not do so well in them as in artificially heated brooders, unless carefully looked after. The small-scale poultry keeper, however, who has only a small flock—20 to 50 chicks—who is afraid of heated

brooders, or who desires to brood chicks at minimum cost for equipment, finds that he can use fireless brooders to good advantage.

This type of brooder is designed to conserve the bodily heat of the chicks. It consists generally of a low, round or square box with an adjustable hover top which is placed so that the chicks can get their backs up against it—see illustration on this page. The hover top may consist of a piece of burlap or cheese cloth, either of which, being of open texture, will afford some ventilation. If necessary, this hover may be covered with cotton batting or planer shavings or any similar material that will conserve heat and still will not be air-tight. The thickness of the covering is adjusted to weather conditions. The dimensions of the brooder must be adapted to the size of the flock. A large hover for a small flock means a waste of heat and discomfort for the chicks; too small a hover will cause overcrowding and, as a rule, the ventilation will be inadequate. A suitable size for a flock of 20 chicks is 12 by 12 inches, adding about 8 square inches for each additional chick.

The general management of chicks in fireless brooders is about the same as in lamp-heated brooders except that much more attention must be given to training them to use the hover. There is nothing about the cold, dark hover space of a fireless brooder to attract chicks, as in the case of one artificially heated, and they must be carefully watched and trained until they have thoroughly learned that they can get warm by getting their backs up against the hover. Usually they need more or less attention throughout the entire brooding period, and it is chiefly due to carelessness in this respect that so many persons have poor results with brooders of this type.

Because of lack of artificial heat, the hover compartment in the fireless brooder is more or less damp, and the interior should be thoroughly aired and dried out once a day. If the brooder can be placed in the sunlight that is the best method, but if that is impossible then the hover should be dried out before a stove daily, and fresh, dry litter placed in the brooder as often as conditions require it.

#### Lamp-Heated Brooders

Lamp-heated brooders are made in different styles and sizes, and are ideal for brooding small flocks. They are low in first cost, are easily operated, fuel is readily obtainable everywhere, and they are adaptable over a wide range of conditions as to locations and climate. Persons who do not have available houseroom can secure complete lamp-heated brooders that can be operated outdoors, in-



GOOD LOCATION FOR OUTDOOR BROODER

In warm weather outdoor brooders should be placed where the chicks will have plenty of shade. The row of sunflowers illustrated above furnishes excellent shade for the chicks and the seeds are good poultry feed.



dependent of any form of enclosure or protection. Such a brooder is illustrated on page 34.

### Colony Hovers

While colony hovers are of comparatively recent development, their popularity is such that they have quite largely displaced other kinds of brooding equipment where many chicks are to be raised. These hovers represent great economies in cost of equipment, fuel and time, and give the best of results in everyday use. The larger sizes are built to accommodate as many as 1,000 chicks, though there are few who care to have more than 500 to 600 in one flock under even the largest of hovers, and most prefer not to exceed 300 to 400. Colony hovers are made to burn either coal or oil and are equipped with thermostats that automatically control the hover temperature by regulating the draft or fuel supply, thus insuring the comfort of the chicks at all times and avoiding waste of fuel. They have sufficient heating capacity to keep a good-sized room at a comfortable temperature besides maintaining correct brooding heat under the hover.

### DETAILS IN THE CARE AND FEEDING OF CHICKS

The beginner is much more apt to be successful if he keeps his brooder in a comfortable house or apartment until warm, settled weather has arrived, no matter what type of brooder is used. For lamp-heated hovers small colony houses are ideal, and if the lamp fumes are piped outdoors comparatively little ventilation will be required, thus conserving heat. Avoid small, low coops, however, and makeshift structures. Chicks invariably will be better cared for if they are in a house or room convenient of access and comfortable for the attendant. If an outdoor brooder is used, locate it in a warm and sheltered spot, and by all means provide a covered runway for the chicks. There are apt to be periods of several days at a time when the weather is too stormy for chicks to be outdoors, and even if confined to a good-sized brooder at this time they will fall off rapidly in condition.

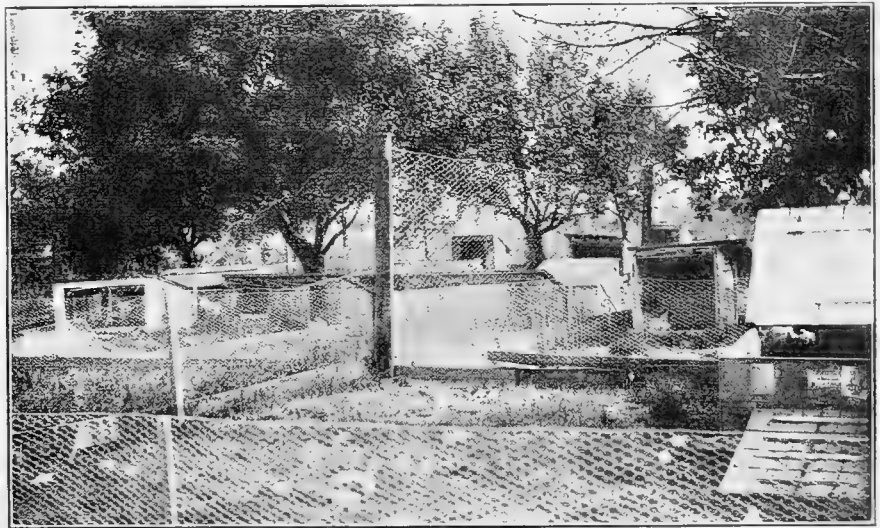
### Brooder Temperature

During the first day or two the hover compartment should be kept at 100 to 102 degrees at the level of the chicks' backs. If the thermometer is so mounted that the bulb is not in that position, this will have to be taken into consideration. After two or three days the temperature may be allowed to drop a little, but should not go below 95 degrees during the first week. It is customary to recommend dropping the temperature about five degrees each week, and, as a rule, that will be found to be about right. Different broods of chicks vary in their requirements in this respect, however, while a somewhat higher temperature is always required in cold weather than in warm. So, while the thermometer should always be kept in place and should be consulted regularly, if the chicks clearly are not warm enough at any given time the temperature should be raised regardless of whether it is "according to the rule" or not.

### Make Free Use of Litter

The litter used in the brooder and in the brooder house has a great deal to do with the well-being of the chicks. If it is too coarse the chicks cannot work it over readily and do not get the feed that sifts down through to the floor. If too sparingly used the chicks will not get sufficient exercise in scratching for feed, and will soon develop leg weakness and other troubles. Without doubt the most satisfactory material for the purpose, if it can be obtained at reasonable cost, is short-cut alfalfa. The chicks will eat many of the fine particles of leaves, blossoms, etc., and will be the better for so doing. Several inches of this material can be used to good advantage. One popular method of feeding known as the "deep litter method" is to bury enough chick feed in short-cut alfalfa at one time to meet the chicks' requirements for three weeks or more. Six to eight inches of litter is used in this case. In the South, cottonseed hulls usually are obtainable at low cost and are excellent for the purpose. If neither alfalfa nor cottonseed hulls are available, use chopped straw, chaff or mow sweepings, but beware of any such material that is moldy or extremely dusty.

During the first two days the chick raiser will give his attention chiefly to training his chicks to use the hover so that they will know where to go when they are cold. This is readily done by keeping them confined near the hover and gradually increasing their liberty as they become acquainted with their surroundings and learn how to find their way back. It is desirable to give the chicks the liberty of the brooder or the house pen just as soon as possible, but do not enlarge their run so fast that they are



SCENE IN BROODER YARD ON SMALL MONEY-MAKING PLANT

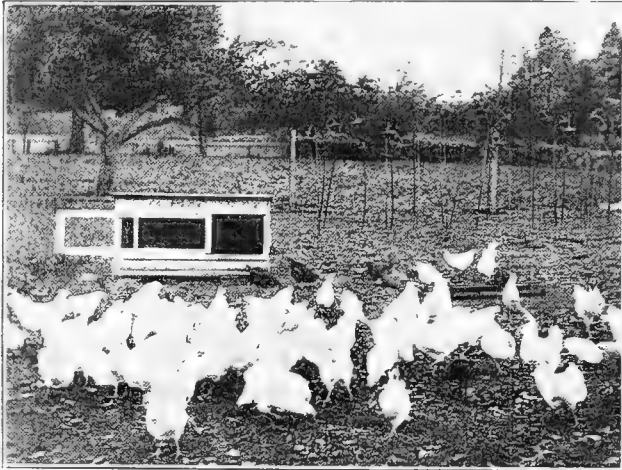
The plant here illustrated was located on the outskirts of a village and, while only a limited acreage was available, excellent results were secured—not only in egg production but in raising the pullets needed to renew the laying flock.

in danger of losing their way and huddling together for warmth outside rather than going to the hover. Huddling or crowding is one of the dangers that the poultry keeper must avoid if he is to raise his chicks successfully.

### Care of Brooder House

Cleanliness in the brooder house is always important and especially so when the chicks are brooded in large flocks. The floor should be well covered with litter, and

this must be changed often enough to keep it dry and free from foul odors, or from becoming excessively dusty. The litter should be fine and light so that the chicks will have no difficulty in turning it over and getting at the grain on or near the floor. For chicks up to three weeks old there is nothing better for the purpose than short-cut alfalfa.



LOW-COST ROOSTING COOP FOR SMALL FLOCKS OF GROWING FOWLS ON RANGE

If this is unobtainable or too expensive, clover hay cut quite short, wheat chaff or chopped straw may be used, varying the depth according to the character of the material and the age of the chicks. In the South, cottonseed hulls have been found satisfactory for this purpose. Lacking anything better, sawdust and planer shavings may be used after the chicks are several weeks old, but neither is desirable for newly hatched broods.

Many persons keep young colony-brooded chicks in confinement for a rather long period, and in order to guard against cannibalism, leg weakness, lack of thrift, etc., all of which are conditions that are apt to develop among chicks that are kept in close quarters, it is imperative to give special attention to their exercise. After the first few days all chick feed should be scattered over the litter and, if necessary, should be buried in it in order to keep the chicks busy a good part of the day.

Until the chicks are thoroughly hover-wise they must be watched and never allowed to get far from home. If properly trained, however, by the time they are two weeks old (one week in mild weather) it should be safe to let them have access to a small outdoor run at least a part of each day, and their yard or range should be increased just as rapidly thereafter as they can be trusted with greater liberty.

#### How to Feed Young Chicks

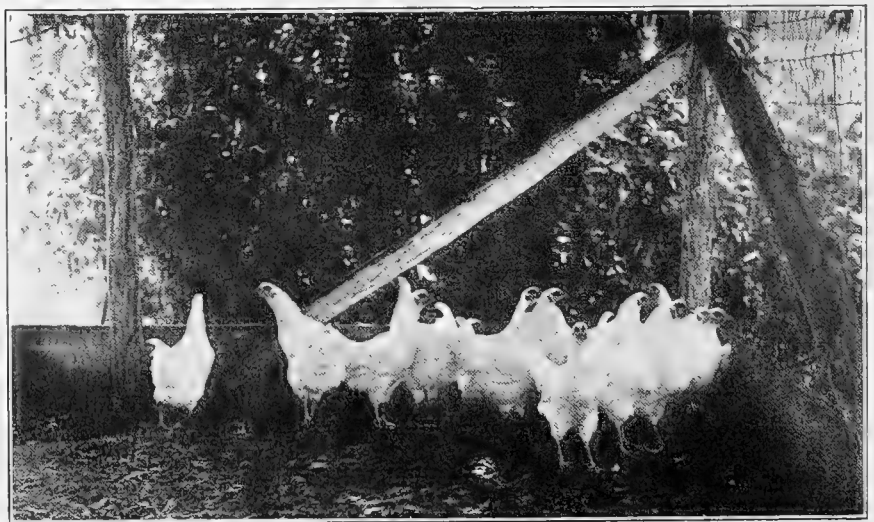
The feeding of chicks is a comparatively simple matter, thanks to the excellent commercial feeds that are now available for the poultry keeper's use. It is not necessary for him to spend his time mixing feeds, baking johnnycake, etc., as he can get

better ready-mixed feeds than he can prepare at home, and they cost little, if any more.

The first day or two the chick needs nothing to eat. When hatched, its abdomen still contains 40 to 50 per cent of the volume of the original yolk and this will supply every requirement for two days, or more if necessary. If the chicks are received by parcel post or express, however, it is safe to assume that they are ready to be fed on arrival. After allowing them a little time to get warm and accustomed to their new quarters, give a light feed as suggested for the third day in the Feeding and Brooding Schedule presented herewith. It is a good plan to give the chicks a drink of water first (which they often need more than food), and then let them pick at some sharp sand or chick grit for a while before feeding. During the first week it is wise also to sprinkle a little sand or grit over each soft feed when given, to make sure that the chicks get enough of this necessary part of the ration.

There is more or less diversity of opinion and practice regarding the feeding of newly hatched chicks, due mainly to differences in the conditions under which the chicks are raised, the skill of the feeder, and the vitality and vigor of the stock. It is quite possible for an expert to raise a brood of chicks successfully, using almost anything that can be fed with safety to adult fowls. Beginners, however, will find that it is to their advantage to use the best rations they can secure. The experience of poultry keepers generally is that chicks do best on soft feed for two or three days, and thereafter need at least one-half of their ration in that form, the balance consisting of a mixture of cracked grains. It is possible to raise chicks on grain without any soft feed, or on soft feed without any grain, but better results are regularly secured where the two are provided in suitable combination.

By way of stating the essentials of chick feeding and brooder management in the simplest manner and in the form best adapted to daily reference, the accompanying Feeding and Brooding Schedule has been prepared. This is not the only way in which chicks can be raised, but it is a practical, thoroughly tested one, and the beginner can rest assured that if he will faithfully follow this schedule he will have little trouble in successfully raising his chicks if they are strong and vigorous to begin with.



VINES PROVIDE SHADE FOR BARE YARDS

If growing stock must be confined to bare yards, train vines over the fences, as here shown, to supply shade. Young birds will not do well if they have no shelter from the hot summer sun.

COMPLETE FEEDING AND BROODING SCHEDULE FOR CHICKS FROM 1st TO 28th DAY

DAY	FEEDING				BROODING	
	CHICK FEED	MASH	MISCELLANEOUS FEEDS	DRINK	BROODER TEMP.	GENERAL MANAGEMENT
1st.					100° at level of chicks' backs.	Keep chicks confined close to hover. If they get out push them back under at frequent intervals.
2nd.			Small pile of chick grit on brooder floor near hover.	Water or milk. Give cool water, but not cold.	100°	Give a little more liberty, but watch them closely to prevent their getting chilled while outside. Use litter enough to keep the brooder floor well covered.
3rd.		Special nursery feed at intervals of 2 to 3 hours. Moisten with milk if available.	Sprinkle grit lightly over each moist feed. Continue to do this until 8th day.	See that all the chicks learn how to drink today.	100°	Let the chicks have room enough to get at the feed without crowding, but push them back under the hover at first sign of discomfort. Put them back at frequent intervals anyway.
4th.		Same as above.	Keep grit before them in hoppers all the time.	Provide fresh clean water whenever the supply gets soiled.	98°	Let the chicks run in and out of the hover at will giving all the liberty they can be trusted with, but continue to put them back under the hover at intervals.
5th.	Two light feeds.	Same as above but feed lightly at times when chick feed is given. Remove surplus promptly.	Give a little succulent green feed, increasing gradually. After a few days let chicks have all they want.	Scald water and milk vessels daily.	98°	Clean out soiled litter daily from the hover space, and replace with fresh material. Except under the hover, litter does not need to be removed daily, but should be changed often enough to keep it dry and free from odor.
6th.	Two or three feeds.	Two or three regular feeds, alternating with chick feed. Add a little of some good mash mixture to the nursery feed.	Add 2% bone meal to the mash mixture, and continue feeding it during growing period, or until meat scrap can safely be fed.	Never let the chicks get too thirsty. Provide enough founts so that there need be no crowding.	98°	Increase depth of litter in the brooder or on brooder-house floor as the chicks learn to scratch for the chick feed.
7th.	Three feeds.	Two feeds, increasing proportion of mash mixture and decreasing nursery feed.	Granulated charcoal in hopper constantly hereafter.	Place drinking vessels on low platform so chicks will not scratch litter into them.	95°	Chicks should have the run of entire house pen by this time, if it is not too large. Watch to see that they do not crowd in corners or "sun spots."
8th to 14th.	Same as above.	Two feeds, increasing mash so that by the ninth day nursery feed can be entirely omitted if desired.	Add 5% sifted meat scrap to mash or equivalent amount of fresh or cooked meat, cut fine.		Gradually reduce temperature to 90° by the 11th day.	If weather is warm, let the chicks outdoors for a while during the middle of the day, confining them close to the door at first. Increase the size of run as rapidly as they can be trusted. Keep plenty of litter on the brooder-house floor.
14th to 21st.	Number of feeds may be reduced to two if chicks have good outdoor run.	Two feeds daily. Always use trays or small troughs for moist mash. Never throw it on floor of brooder or on the ground.	Increase proportion of meat scrap to 10% by end of this period.	Continue to use protected water founts until chicks are well grown.	Reduce temperature gradually to 85° by end of period.	No matter what the weather is, let the chicks run out every day, and encourage them to stay out if they are disposed to loaf in the house. Spade up a section of the yard to induce them to scratch in the loose earth. Busy, active chicks will never have leg weakness if outdoors.
21st to 28th.	Same as above. Add whole wheat and coarse cracked grains.	Two feeds daily. If chicks are running out, limited dry-mash feeding may begin. Leave before the chicks all the time.	Increase meat scrap to 15% if chicks have no milk or any other source of animal food.	If the chicks are on range, see that the water vessels are placed in the shade.	Reduce to 80° but remember that chicks MUST be kept comfortable.	By the end of this period the chicks should be well developed, active, and able to take care of themselves generally. From this time on give them all the liberty possible, but do not allow them to run in the weeds, tall grass, etc., in wet weather.

Special Points in Feeding

**Grit.** Chicks need grit before feed. Sharp sand is good, but specially prepared chick-size grit usually is most readily obtained. Feed it in hoppers and during the first week sprinkle a little over each soft feed given.

**Nursery Feed.** This is a specially prepared feed to be given during the first few days. It may consist of bread crumbs and milk or hard-boiled eggs, johnnycake or something similar, if homemade, but the commercial nursery feeds are better as a rule, and much more convenient. Feed for several days, gradually adding a good mash mixture and reducing the nursery feed, which may be entirely discontinued after a week or ten days.

**The Mash.** This consists of finely ground meals, and may be fed either moist or dry in hoppers. A good formula for a home mixture is equal parts by weight of bran, corn meal, and white middlings, with 5 to 15 per cent of best meat scraps, the exact amount depending upon the age of the chicks. One-half part of breakfast oats may be added if obtainable at a fair price. The cheapest way to feed moist mashes is to provide shallow trays or pans, letting the chicks help themselves at will, removing the surplus in five minutes after feeding. Convenient feeding vessels also are obtainable, these being so constructed as to prevent the chicks from getting into the feed with their feet. Such feeders will undoubtedly save their cost in a short time. The mash may be fed dry in hoppers where moist mashes are not convenient, but better growth

and development will be secured, as a rule, when the latter are regularly supplied.

**Chick Feed.** This is a mixture of cracked grains and small seeds. After the first two or three days about one-half of the ration should consist of chick feed. Use a good standard brand even if it costs a little more. Buying low-grade feed is the poorest kind of economy.

**Milk.** There is nothing better for young chicks than milk, either sweet or sour, and by many it is believed that an abundance of this affords a measure of protection against diarrhea. Care should be taken to keep milk vessels clean, scalding them out at least once a day.

**Animal Feed.** Chicks need meat in some form almost from the start, though it should be fed very sparingly during the first ten days, especially if the chicks have milk to drink or if infertile eggs are mixed in the mash. Fresh lean meat is best of course, but meat scrap may safely be used, sifting out the parts too large for chicks to swallow.

**Green Feed.** Succulent green feed is a natural part of the chick ration, and should be supplied almost from the start. Lettuce leaves, chopped onion tops, finely cut cabbage, mangels, etc., are all good and after the first week may be fed liberally. Sprouted oats also are excellent, though during the first two or three weeks it is advisable to feed only the sprouts, chopped fine.

**Charcoal.** This can be secured in chick size and should be kept before them in hoppers from the start. It

is an excellent corrective and its use will help greatly in preventing digestive disorders.

### Care and Feeding of Growing Stock

While losses usually are few in number during the "growing period" and the chicks do well if reasonably favorable conditions are given, many poultry keepers en-



COLONY HOUSE WITH SAFETY DOOR

Door is elevated about 2 feet above the ground and provided with an alighting shelf for the chicks. Door is left open day and night and chicks are readily trained to go in and out, but four-footed enemies cannot disturb them.

counter serious difficulties as a result of plain carelessness. The chicks now are large enough so that they can stand some abuse without noticeable ill effects, but the poultry keeper can depend upon it that if he does not properly feed them, is careless regarding their brooding or housing, or the conditions under which they are kept, his losses due to slow growth, stunted development, inferior health, etc., will in the long run prove quite serious.

### Brooder Temperature

In warm weather the chicks may not need artificial heat after they are four weeks old but, early in the season and in cold, wet weather well along into the summer, chicks under eight weeks often are quite uncomfortable without some heat. The average chick is not well feathered out until six weeks of age or older, and up to this time artificial heat should be supplied or at least the poultry keeper should be able to provide it, even though during mild weather he may allow the lamp or the stove to go out.

### Cold Brooders Needed

After artificial heat is no longer supplied it is desirable to provide the chicks with some kind of cold brooder under which they can collect at night. It may be of the simplest type, its purpose being merely to confine the body heat of the chicks and keep them warm and comfortable, and it should be so constructed as to prevent their piling up. For a flock of 50 to 100 chicks a good cold brooder can be made by using a box about 3 feet square, with walls 8 to 10 inches high, and a cloth hover so adjusted in height that the chicks can get their backs up against it. The floor under the hover should be well littered with fine-cut straw, chaff or planer shavings, with the material banked up in the corners to prevent huddling at these points.

For larger broods a frame of suitable size may be located along one side of the colony or brooder house, this frame to be covered with muslin or burlap, with curtains of similar material around the open sides. If necessary, one or two additional thicknesses of burlap, or a light

covering of planer shavings, may be placed on top to retain heat. This affords a comfortable place for the chicks on cold nights and should be used until they no longer need it, which fact will be plainly indicated by their refusing any longer to go under. Then perches should be provided and the chicks taught to use them.

### Desirable Changes in Ration

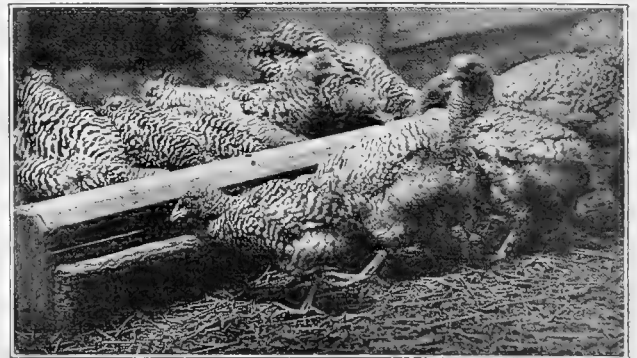
About the fourth week, as a rule, chicks no longer are satisfied with ordinary chick feed, but demand larger grains, and these usually are cheaper than chick feed it is economy to introduce them into the ration as rapidly as practicable. Many manufacturers of commercial poultry feeds provide a special grain mixture for growing stock, but if this is not available, the ordinary scratch feed put up for adult fowls can safely be fed after the chicks are six weeks old, gradually increasing the proportion as the chicks show their preference for it.

If home mixtures are used, either in whole or in part, cracked corn should be made the basis of the mixture, adding wheat, barley, kafir corn, etc., as available, and as price warrants. From the time the chicks are five or six weeks old they can safely be fed all the sprouted oats they will eat, or if these are not available, soaked or boiled oats may form a liberal part of the ration. Do not feed dry oats to chicks, however, except in limited quantity. They can be depended upon not to eat an excess of fibre if the oats are boiled, soaked or sprouted, but it is dangerous to feed them dry until the birds are well on their way to maturity.

The number of feeds that should be given will depend quite largely upon whether or not the chicks have free range. When kept in confinement, it usually will be found most satisfactory to feed them morning, noon and evening, giving two feeds of cracked grain and one of moist mash. If the chicks are on open range there probably will be few of them about the coop or house at noon, in which case two feeds a day may be sufficient.

### Moist and Dry Mash

Many persons find it more convenient to give the moist mash in the morning when the chicks are turned out, a full feed of mixed grains or cracked corn at night, and soaked or sprouted oats at noon, if a noon feed is given. In all cases a good palatable dry mash should be supplied in hoppers, and if the chicks are on range it is practicable to hopper-feed cracked corn also. Nothing at all is gained by stinting the growing chicks. The more



FLOCK OF PLYMOUTH ROCK CHICKS AT FEED TROUGH

With the feed trough protected in the manner here indicated, chicks cannot get into it, and the contents will be kept clean and much waste prevented.

COMPLETE FEEDING AND BROODING SCHEDULE FOR CHICKS FROM FIFTH WEEK TO MATURITY

WKS.	GRAIN FEEDING	MASH	MISCELLANEOUS FEEDS	DRINK	BROODING AND GENERAL MANAGEMENT
5th to 8th.	Gradually change over from chick feed to a coarser grain mixture. If a good brand of commercial growing feed is not available, use the regular scratch feed for adult fowls. Feed twice a day, usually noon and evening.	The chicks should be given dry mash now. Until they are accustomed to it watch them and if necessary limit consumption for a time. Continue to give one moist mash feed daily for best growth and development.	Keep grit constantly before the chicks and unless sure that it is not needed supply granulated bone in hoppers also. If the yards or the range do not furnish plenty of SUCCULENT green feed, see that a supply is provided.	Continue to supply water in two-piece founts and keep them where the chicks will not be able to scratch litter into them. If milk is available keep it before the chicks constantly in CLEAN drinking vessels.	Continue to supply some heat in cold and damp weather. Where hovers or brooders are used without heat, take advantage of every sunny day to air the hover and to dry out the space under it. Brooders without artificial heat are always more or less musty and damp.
8th to 12th.	If the chicks are in confinement, continue to feed two grain feeds a day. Chicks on range after the weather becomes warm will usually be scattered over the fields at the noon hour, and will not come for feed. In this case one feed a day (in the evening) may be sufficient.	Supply one feed of moist mash daily. This and the two grain feeds may be given as convenient. Moist mash in the morning suits most persons best. Keep a dry mash in the hoppers all the time hereafter.	Same as above. The mash should carry 10 to 15 per cent of meat scrap unless certain that the range is supplying an abundance of insects, worms, etc.	Protect the water vessels from the sun. Chicks do not like lukewarm water and it does not do them as much good as when reasonably cool. Empty the vessels every night and fill them with fresh water again in the morning, and keep them always in the shade.	It seldom will be necessary to supply heat now, though it usually will be found desirable to continue the use of cold brooders until toward the end of the period, if the season is cold. Chicks should learn to go on perches when cold brooders are abandoned. They will be safer, and there will be less danger of their crowding.
12th to 20th.	The regular adult grain mixture can be fed now, or a home mixture of coarse cracked grain, whole wheat and barley. Feed oats sprouted or soaked. Continue to give two feeds a day to chicks in confinement and one for chicks on open range. With range chickens, keep cracked corn in a hopper or box where they can have access to it whenever they are hungry.	Whether the dry mash which is to be fed continuously until the chicks arrive at maturity should be supplemented with a daily moist mash will depend upon the convenience of the caretaker and the condition of the birds. Without doubt, growth can be hastened by one feed of rich moist mash daily.	Supply adult-size grit, keep up the supply of succulent green feed, and if the chicks seem to be getting tired of the regular ration, introduce anything new that may be available, to stimulate their appetites and keep them on full feed.	Usually larger water vessels now will be required. Earthenware vessels of one-half to two gallons in size are excellent for summer use, as they are easily kept clean and not readily upset. If kept where small chicks have access to them, they will have to be protected in some way to prevent chicks from being drowned.	See that there is plenty of perch room for all of the chicks, and if some of them are a little slow about taking to the perches, put them up by hand at night until they learn to go on. Do not allow them, under any condition, to bunch and huddle in corners. As soon as the cockerels begin to annoy the pullets, remove them. Keep a close watch for lice, and disinfect the coops and perches at frequent intervals.
20th to 26th.	Feed liberally, but vary the proportions of the grains according to the breed and the development of the chicks. If Leghorns, and they appear to be developing too rapidly, increase the proportions of oats. If pullets, and these are maturing too slowly, increase the corn.	Same as above.	If the birds are early hatched and appear to be coming into maturity too early, decrease the amount of meat scrap. In the case of late-hatched birds the amount of meat scrap in the mash can be safely increased to 25 per cent.	Increase the number of drinking vessels so that the growing stock will have plenty of water to drink.	As the fowls approach adult size see that their coops and houses are not overcrowded. It is better to sacrifice a few, if necessary, rather than permanently to injure all. Provide all ventilation possible. Growing stock must not be shut up in close, stuffy houses.

they eat the faster they grow, and the cheaper it is in the long run to raise them to adult size, or to market age if they are to be sold before they reach maturity.

**Importance of Green Feed**

Green stuff is one of the cheapest feeds for chicks when it is grown to good advantage, and there is nothing that is so good for them. For that reason, even though the birds may be on open range, it often is desirable to make some special provision for succulence. Rape and Swiss chard are popular for this purpose during the summer months, also cabbage, the latter being especially desirable where the chicks are confined and must have their green feed carried to them.

The average range supplies a limited amount of animal feed, but rarely sufficient for the needs of the chicks. It usually is desirable to provide some meat scrap, though this may not be necessary if the chicks have all the milk they care to drink. Semisolid buttermilk now is generally available for the use of poultry keepers in all parts of the country and at fairly reasonable prices as compared with meat scrap or any other source of animal feed.

Growing chicks must have grit in order properly to digest their feed, and, as a rule, a supply of commercial grit should be kept on hand. This may not be needed by range chicks, but if the feeder finds that they pick up grit

greedily when a small amount is thrown out for a test, he should see to it that a supply is kept where they can

**Growth Affected By Crowding**

Too much emphasis can scarcely be placed upon the fact that the conditions under which chicks are kept and the rations fed have a marked effect upon the development of the birds, and the grower has no right to condemn a breeder for supplying inferior stock unless he has done his part by giving the chicks favorable conditions for their development. Where the chicks are badly crowded, or where yardroom is limited, it nearly always pays to sell the surplus cockerels and cull pullets as broilers. There is no practical advantage in keeping the birds to maturity when, in order to do so, it is necessary to handicap the entire brood by crowding. Whenever there is any doubt as to whether or not there is sufficient room, give the pullets the benefit by selling off the cockerels just as fast as they reach marketable size.

In order to put the essentials of care and feeding of growing chicks in the simplest and most concrete form, the accompanying schedule has been prepared, and if the chick raiser will keep it on hand for reference during the summer and will follow the suggestions there given, he will find that his young stock will grow rapidly, will be thrifty in condition, and will mature normally and at the lowest feed cost.

## CHAPTER VII

# Some Practical Poultry Houses and How to Build Them

Medium-Cost Houses to Meet Every Practical Need of the Back-Yard Poultry Keeper Are Here Illustrated and Described—Helpful Suggestions for Locating and Planning Small Poultry Plant—Details of House Construction Enable the Beginner to Do His Own Carpentry Work Successfully and Economically

**P**LANNING the back-yard poultry plant should receive careful consideration and it is true economy to secure all available information on the subject before actually beginning building operations. It is never wise to build hastily nor on the impulse of the moment, even though only a small flock is to be kept. The beginner will do well to study the subject until he has a clear idea of what he is going to do and what he will need in order to do it.

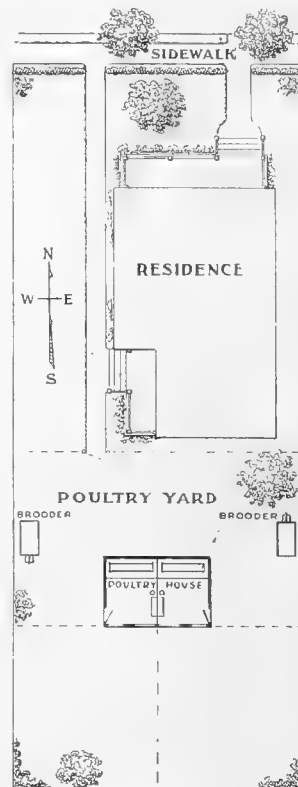
Success with fowls depends, in every case, upon the caretaker's interest in them, and it is much more important than appears on the surface, to give special attention to making the poultry plant attractive. "Appearances" have much to do with the attitude that one takes toward his flock—which fact explains the reason why those whose poultry plants are neat and pleasing in appearance so often get better returns from their fowls than others who have makeshift buildings. It is true that fowls may do just as well in a cheap, rough structure as they will in one that is neatly built and made attractive to the eye, provided they get proper care. The care the fowls receive, however, is apt to be more or less in keeping with their surroundings, and the average person is much less likely to maintain his interest in a flock that has nothing whatever to commend it to him except the number of eggs laid, than would be the case if the fowls were of good breeding, and the house one that he could be proud to show to his callers.

Neatness and attractiveness do not necessarily call for much added cost. They may be secured with quite cheap materials if only a little pains are taken. The back-yard poultry house illustrated on this page shows what may be done with low-cost materials, without any special increase in cost. The owner is justly proud of it though it was built almost entirely of scrap lumber. On-

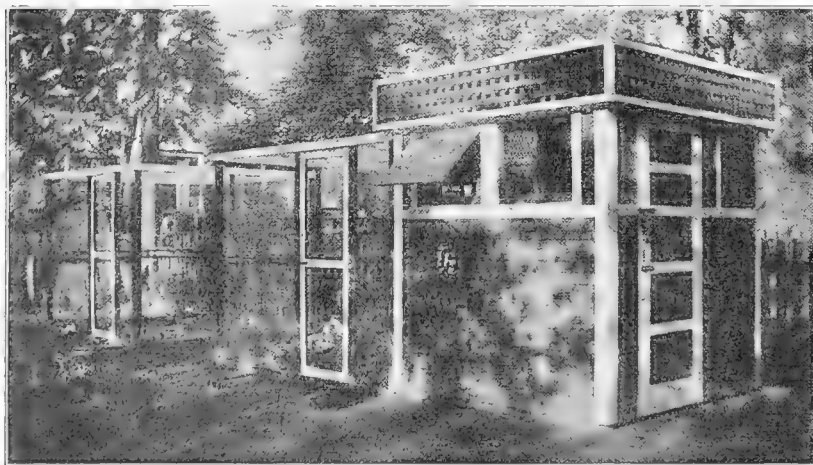
ly a little more material and a little more labor were required than would have been used in providing a shabby structure of which the owner would quickly become ashamed. It is not necessary, however, to put on any "extras" or to introduce special ornamental features. A plain, substantial building, neatly constructed and painted, is always attractive. If short lengths of scrap lumber are to be used they may be arranged in panels, as in the house mentioned in the preceding paragraph, thus disguising the joints. Even rough boards with cracks and knot holes can be worked into an attractive house by covering with prepared roofing divided into panels with narrow strips of wood as in the house shown on page 46.

Those who are fortunate enough to have sheds or out-buildings on their lots can save considerable expense by remodeling them so as to make them available for the use of fowls. This is not necessarily a difficult nor expensive undertaking, but it will pay to do the work well, making the buildings truly comfortable and convenient for the purpose. Too often such remodeling is done in a hasty and ill-considered way and the result is far from satisfactory. One thing that must be kept in mind in remodeling old buildings for this use is the fact that they often are rat harbors and this condition should always be remedied in whatever changes are made. Either put in a concrete floor or, if a board floor is used, raise the building at least a foot off the ground.

Too often those who build waste both labor and material through failure to secure suitable plans. To be genuinely practical, the poultry house, wherever it is built and for whatever purpose intended, should be correctly designed. It is a grave mistake to assume that because the house is to be a small one and expense a serious item any sort of

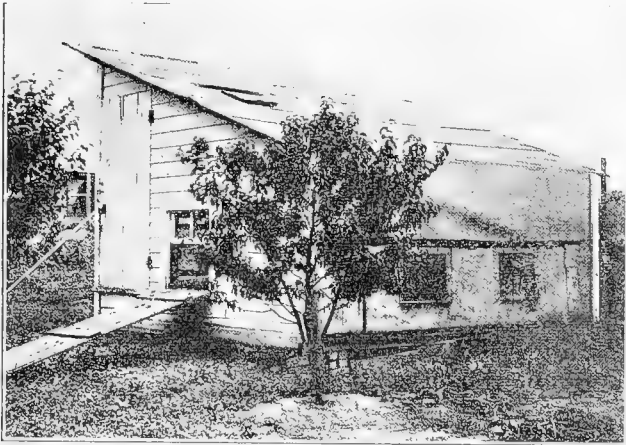


PLAN FOR POULTRY YARD ON SMALL LOT



AN ATTRACTIVE BACK-YARD POULTRY PLANT

This house was made of scrap lumber chiefly and at little cost. It is 6 by 6 feet with a 4 by 4-foot window on the south side. The yard is 8 feet square with a 6-foot fence. To the left of yard is a movable yard of the same dimensions for young chicks.



POULTRY HOUSE WITH WINDOWS ON ALL SIDES

This arrangement of windows gives better lighting and better ventilation, but must be made draftproof in winter. Photo from Kans. Exp. Station.

makeshift structure will do. That usually results in a building that is inconvenient and poorly planned, and which at best only answers after a fashion the purpose for which it was intended. Such structures, because of the discomfort and effort required in caring for them, are almost invariably neglected, lice and mites multiply, and presently the owner gets discouraged and quits.

**How to Lay Out the Back-Yard Poultry Plant**

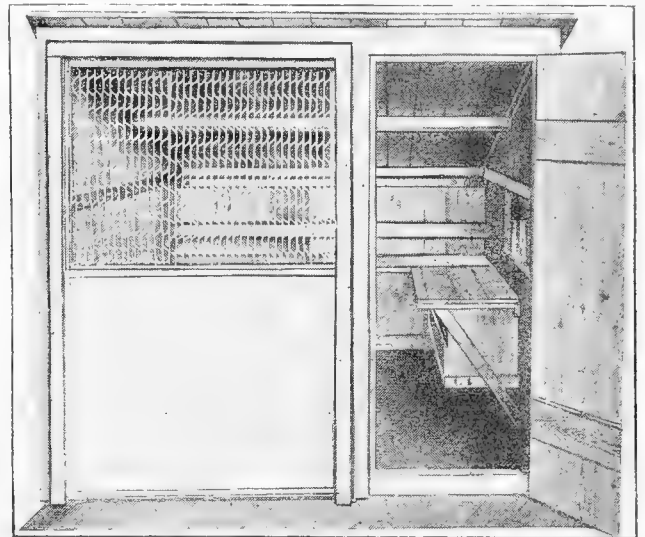
Back-yard poultry plants must be laid out, of course, with reference to the amount of ground available. Those who expect to keep a small flock for egg production, possibly keeping the birds in confinement all or most of the time, will have no special interest in this subject. Others who intend to keep a greater number of fowls, possibly all that can be properly accommodated in the space available, will want to locate their houses and plan their yards with some care.

For a back-yard plant of one or two laying or breeding flocks, where the intention is to raise at least some young stock, a layout such as is illustrated on page 42 will be found quite convenient. Here the rear lawn is utilized for brooding the young chicks until they begin to become troublesome, when they must be transferred to one of the house pens. A practical plan with such a plant is to start in the fall with both pens well filled with layers. These will gradually be culled out until by the time the chicks have outgrown their brooder in the summer

there will be left only enough adults for one pen, the other then being available for the youngsters. So managed, even a moderate-sized lot can accommodate 40 to 50 layers, enough young stock being raised to renew half the flock each fall and providing about as many fowls for table use as the average family will require.

Where a larger number of fowls is to be kept, a practical plan for utilizing a large back yard is shown in the diagram on this page. This drawing is almost an exact reproduction of the layout of a back-yard poultry plant in a New York village. The owner for years realized much pleasure as well as profit from his flock, and made it a source of considerable revenue. He has found it no serious trouble to take care of a flock of 50 to 125 layers, doing so out of regular office hours—mornings, evenings and Saturday afternoons, with a little help from his wife and son, the latter quite small.

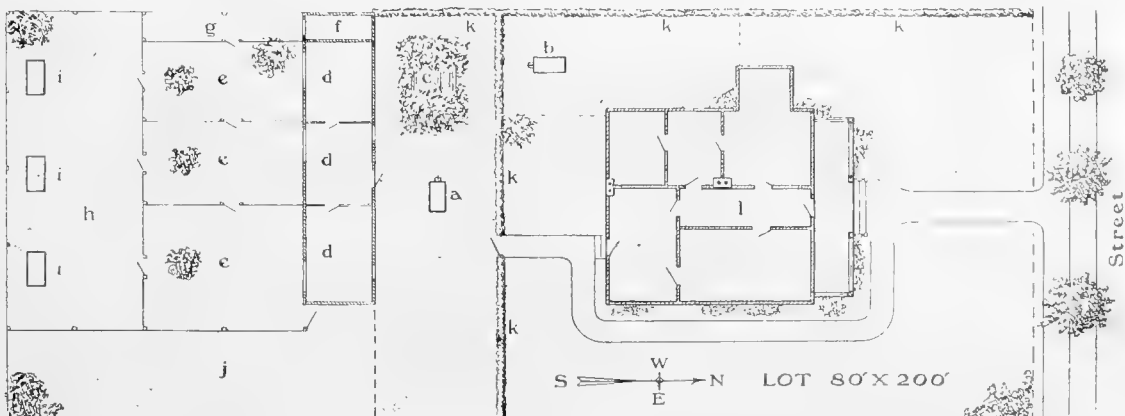
The portion of this lot lying between the street and the hedge, marked K, was a beautiful lawn on which chicks



CONVENIENT LOW-COST HOUSE FOR BACK-YARD FLOCK

View shows front and part of interior. This house may be built with sides and roof in separate sections for easy moving. Note adjustable muslin-covered shutter for regulating ventilation. Photo from Storrs Exp. Station

were brooded in the spring until they began to interfere with the flowers, when they were transferred to the fenced section containing the brooder A and the grape arbor C, which also was a lawn. There they remained until they were large enough to fly out over the 3-foot fence, when



PLAN FOR LAYING OUT A GOOD-SIZED BACK-YARD POULTRY PLANT

This is almost an exact reproduction of the layout of a New York back-lotter's poultry plant on which he keeps a flock of 50 to 125 layers, and raises 200 or 300 chicks each year. He realizes a substantial income from sales of breeding stock and eggs for hatching, also eggs and poultry for table use.

they were again transferred to yard H, where they remained until fall. This yard was provided with three small colony houses, about 3 by 6 feet, in which all the chicks, 200 to 300, were comfortably accommodated until

greatly reducing the danger of the ground becoming infested with disease germs. This often can be conveniently done by providing front and rear yards. Under some conditions the most practical plan is to have a small yard next the house to which the fowls have access all the time and which is frequently cleaned and disinfected; adjoining this is a larger yard kept in sod or in cultivated crops to which the fowls are given access only at such times as it can be done without injury to the growing plants.

One Pennsylvania poultry keeper provided a double yard in this way, the small yard being excavated to a depth of eighteen inches or two feet and filled in with gravel. This gave excellent drainage and practically eliminated all danger of poisoned ground. The adjoining yard was in grass sod, kept neatly trimmed, and the fowls were turned on it often enough to supply them with a large part of the green feed required, but not long enough at a time to injure the sod. Such a grass plot, particularly if the hose can be turned on it in dry weather, will provide a great amount of the best succulent green feed, and it will be available continuously from early spring until late in the fall.

#### Planning the House

The beginner will do well to deny himself the pleasure of planning the house and adopt an approved plan prepared by some person who thoroughly understands the requirements. He will find that by doing this he will get a more satisfactory house and at lower cost than can be secured in any other way. If, for any reason, he desires to make his own plans he should be sure that he thoroughly understands the essentials and knows how to avoid the errors in design that are particularly liable to develop in small houses. It is not possible here to go into detail in regard to poultry house construction, but there are some special questions that every beginner asks and on which he needs definitely to be informed in order wisely to choose between the types of houses available and the different methods of equipping them. These are here considered briefly.

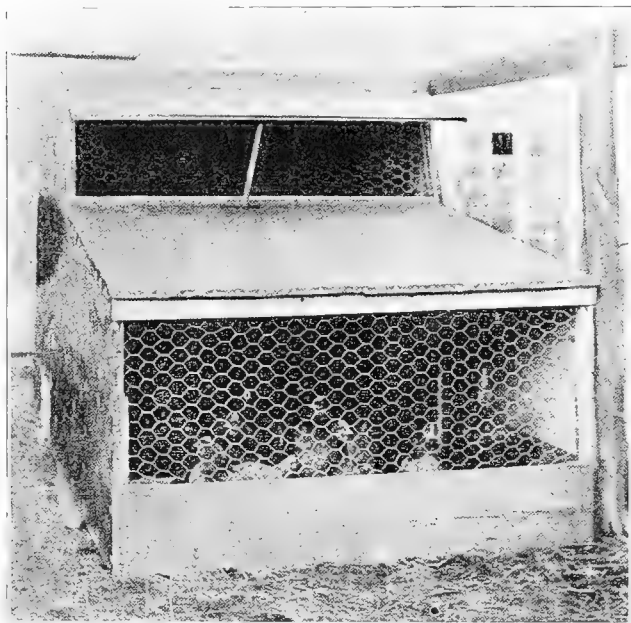
#### Details of Construction

The floor of the poultry house may be of earth, boards or concrete. Earth floors greatly reduce cost and are suitable for small houses that can readily be moved to new locations, thus avoiding the necessity for periodically re-

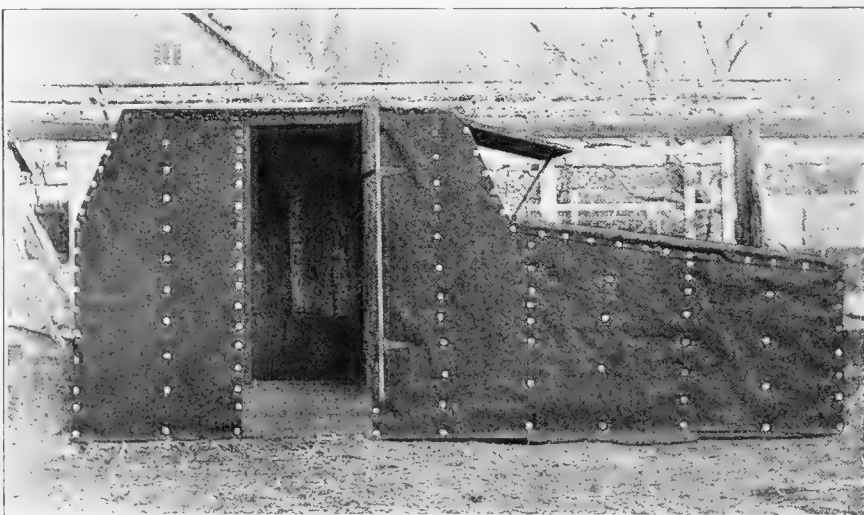
the cockerels reached broiler size. Then they were either marketed or transferred to the cockerel pen F in the permanent house where they could be kept until wanted for use on the table or grown to full size as breeders. The permanent house represented by D D D was large enough to accommodate 125 pullets and hens in the fall. These were culled down through the winter so that at breeding season there were not more than about 25 to a pen. The section J was kept permanently in use as a garden and, in addition, each of the yards E E E was in garden crops once in three years.

This particular poultry keeper was a breeder of standard fowls and his total sales, including hatching eggs and breeding stock, totaled several hundred dollars each year. The frontispiece on page 2 shows a poultry plant similar to the one just described and illustrates how practical it is to utilize a good-sized yard in this way and how attractive in appearance it may be made. In none of the plans presented has any effort been made to designate the size of the houses, yards, etc., as this must be determined entirely by the size of the lot and the number of fowls to be kept or raised during the year.

Where the soil is heavy and not well drained, there is always some danger of soil contamination when fowls are kept in close quarters, and it is advisable, wherever possible, to provide double yards so that they can be used alternately for fowls and for growing crops, the latter using up the fertilizer deposited by the birds and



FRONT VIEW OF POULTRY HOUSE MADE FROM THREE PIANO BOXES

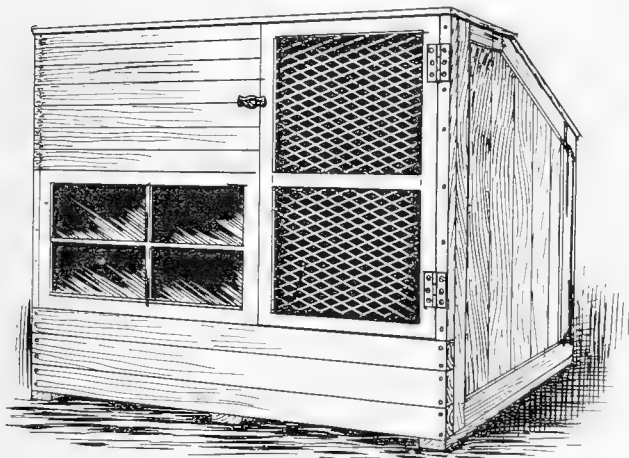


SIDE VIEW OF POULTRY HOUSE MADE FROM THREE PIANO BOXES



moving the dirt and refilling again with clean earth or sand as must otherwise be done. Such floors are not desirable where the soil is not thoroughly well drained. Portable houses of large size should have board floors. These make the house more durable by stiffening the frame so that it is not racked in moving, are more sanitary, and may be made ratproof. Permanent houses should always be provided with board or concrete floors. The latter usually are cheaper in the long run and, being thoroughly sanitary and easily cleaned, are the first choice of experienced poultry keepers.

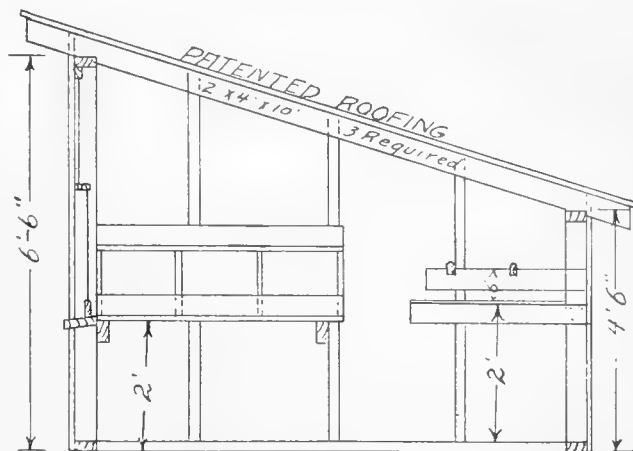
The general dimensions of all well-constructed poultry houses are similar; three and one-half to four feet of floor space are generally allowed for each adult fowl where Leghorns are kept, or 4 to 5 feet where fowls of the larger breeds are kept, and 5 to 6 feet for small breeding flocks. Small houses usually are built with a shed roof, making the front 6 to 7 feet high and the rear 4½ to 5½ feet, these dimensions depending somewhat on the height of the individual caretaker. There is no economy in making the building so low that the attendant cannot enter it without stooping.



A SINGLE PIANO-BOX POULTRY HOUSE

In practically all cases the east, west and north sides are made tight for winter use, providing for most of the light and ventilation in the south front. However, in many sections, a house so constructed is too hot in the summertime and, if over twelve feet in depth, will be much better lighted and ventilated if small windows are provided in the east and west ends. Many also provide windows under the droppings boards in the back part of the house. The results secured in experiments in the use of artificial illumination (see Chapter XVI) have shown the great importance of having poultry houses well lighted in order to prolong the day. A house that has only small openings on the south side will be dark enough to send the fowls to roost half an hour earlier during the short days of winter than would be the case if some light were provided.

A house with small windows on all sides in order to have the floor well lighted is illustrated on page 43, and those who have tried this plan pronounce it quite satisfactory. In any climate where it is necessary to keep the fowls confined to the house for days at a time, a reasonable amount of glass should be provided. Many, even in the North, do not do this, but as a rule houses so built are poorly lighted when the muslin shutters are

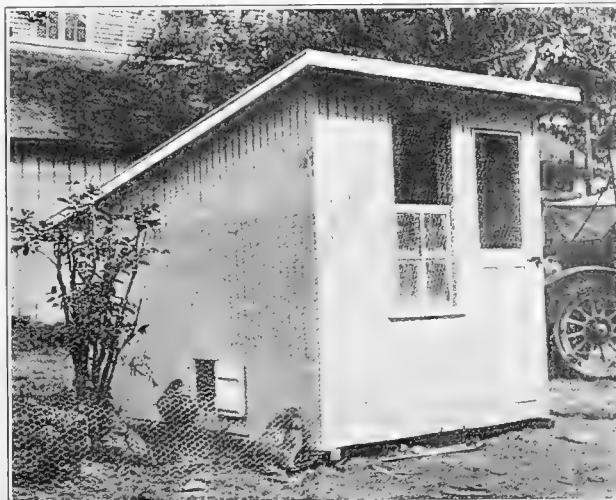


CROSS SECTION OF NEBRASKA BACK-YARD POULTRY HOUSE

Reproduced from Nebraska Bulletin No. 49

closed, as often is necessary in cold or stormy weather, and it is impossible to keep the fowls properly occupied in health-giving activities under such conditions. The use of glass becomes of added importance in view of the growing belief among practical poultry keepers that a reasonable degree of warmth is essential to best production in winter. It rarely is practical to employ artificial heat in the poultry house but it will pay to go as far as possible in making the fowls comfortable by conserving heat without unduly restricting ventilation. This means that enough glass must be used so that the house will be well lighted when it is desirable to keep the muslin shutters closed.

While there are some objections to the use of muslin-covered shutters, this still remains the most practical method of ventilating the poultry house. It provides for an exchange of air without drafts, and experience has shown that the use of a reasonable amount of muslin in a house that has damp or frosty walls will promptly correct the condition. The amount of muslin required depends entirely upon climatic conditions. In the far North a comparatively small area is sufficient, while in the South the greater part of the front may be of muslin if convenient. Obviously, where much muslin is provided no glass will be required. Muslin is easily clogged by dust



SHED-ROOF POULTRY HOUSE FOR SMALL FLOCK OF LAYERS

Photo from Nebraska Experiment Station.

and when wet is almost air-tight, for which reasons many substitute burlap. This material provides for a more rapid air circulation but obstructs the light.

The different illustrations in this chapter show the various arrangements of windows and muslin shutters that can readily be adapted to houses of almost any design. The small house shown on page 43 has no glass at all, which reduces its cost but restricts its adaptability. The muslin-covered shutter is arranged to slide up and down on the outside, working in grooves on either side of the opening. The opening can be adjusted to any desired size, the shutter being held in place by a hook which engages the wire netting back of the shutter. An eye at the top of the frame is provided for the hook so as to close the entire opening when desired.

One objection to openings that go clear up to the roof, as here illustrated, is that under some conditions they permit air currents to follow down the rafters and to strike the fowls on the perches. To prevent this it may

equipment will give a fair idea of how to construct them. Those who want complete plans for poultry houses of any size are referred to "Poultry Houses and Fixtures" (8th edition), a new, profusely illustrated 112-page book published by Reliable Poultry Journal Publishing Company.

#### A Piano Box House

A house for a flock of half a dozen hens can be provided at less cost by the use of a piano box than in any other way. The illustration on page 45 shows a convenient and simple manner of so utilizing such a box. The window and door are placed in what was originally the bottom of the box, the perch being located along the rear. The nests can be placed along one end or, better still, on the outside of the building thus making them more convenient of access and giving more room for the fowls in the house. The door should be a double one instead of single as here illustrated. The outer door should be muslin covered and the inner one of wire. In mild weather or on warm sunny days in winter, the muslin-covered door can be left open, thus providing good ventilation. In cold weather, with this door closed the fowls will be quite snug and comparatively warm.

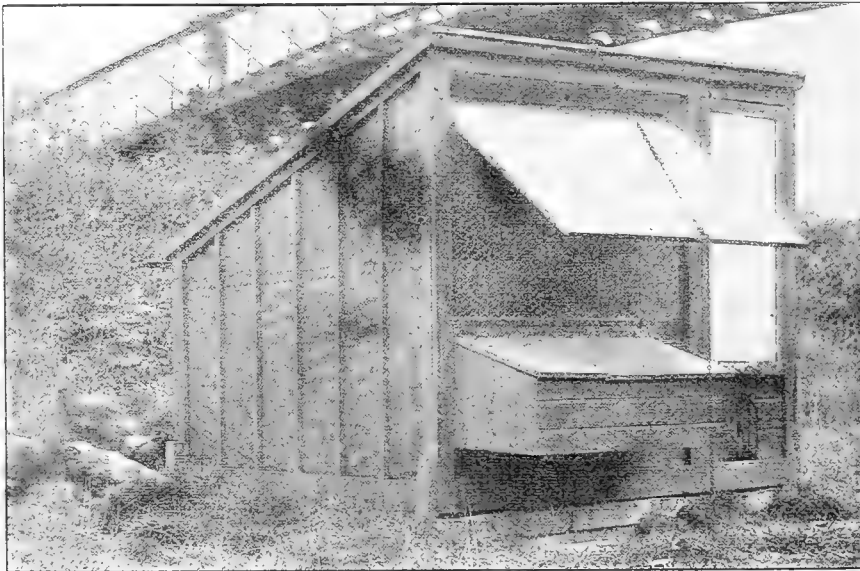
#### Poultry House Made From Three Piano Boxes

The house shown in the two illustrations on page 44 is fairly good sized and represents probably the maximum of floor space that can be secured with a given amount of lumber, or at a given cost. As will readily be seen, two piano boxes are placed in an upright position with the backs toward each other and 2 to 2½ feet apart. The backs are removed and from these material is secured for enclosing space between the two boxes. The third box is placed on the ground with the back down and, after the bottom boards are removed, is fastened to the front of one of the upright boxes.

The back part of the upper side of this third box (originally the front) is loosened and raised so as to give an even slope as shown. If the house is to have an earth floor the boards removed from bottoms and backs should furnish ample material to finish it complete. If a board floor is desired it will be better to provide two-by-fours for sills and joists and some regular flooring lumber. This house is covered throughout with prepared roofing. Perches are located to the left of the door and the hinged shutter on the semimonitor top can be closed down tight on occasion. As here built the house has no glass and will be greatly improved by having small 4- or 6-light sashes on each side. In addition, a muslin curtain for the open front will be found desirable in cold or stormy weather.

#### A Nebraska Back-Yard Poultry House

This house, designed by Professor F. E. Mussehl, head of the Poultry Department of the University of Nebraska, is well planned for the small back-yard flock where all lumber is to be purchased. It can be built quite cheaply of second-hand lumber but will be only moderately expensive if built new. As shown on page 45 it is



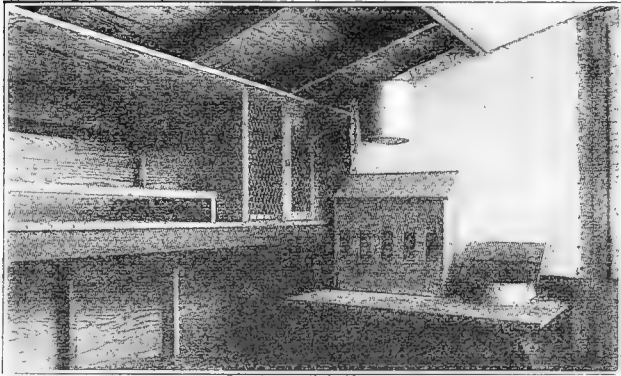
LAYING HOUSE WITH OUTSIDE NESTS AND ADJUSTABLE SHUTTER

be necessary to place a light burlap or muslin screen in front of the perches. In a good-sized house this screen may take the form of a shutter hinged at the top so that it can be hooked up out of the way when not needed. In small houses where a shutter would be in the way, the screen may consist of a curtain attached to a pole and allowed to hang straight down from the ceiling, being rolled up and fastened to the rafters when not needed. As a rule, burlap is the best material to use as it will prevent drafts without seriously obstructing ventilation. The purpose of this screen is not so much to keep the fowls warm, though that also is desirable in extremely cold weather, but to protect them from drafts, and to do this it need not extend below the level of the front perch.

On this and the following pages are illustrated a number of houses suitable for back-yard use, some of them small enough to meet the requirements of a little six to ten-fowl pen for family use, and others large enough for a good-sized poultry plant where enough fowls are kept to make them an important source of income. In the space here available it obviously is impossible to give complete plans for the construction of these houses, but the illustrations presented and the general instructions for

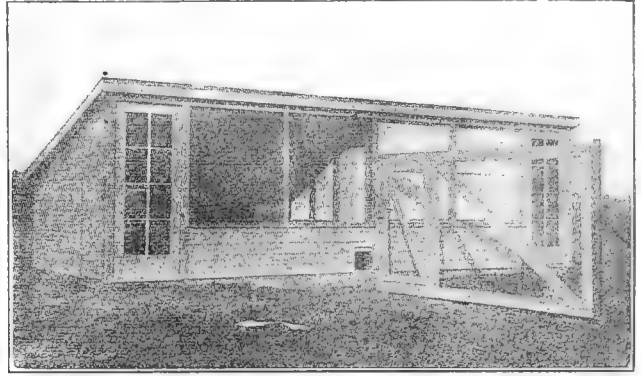
to be constructed of 6- or 8-inch ship-lap or, better still, of car siding, the boards being nailed on up and down. This house is on runners and is intended to be portable, and for that reason is built with a fairly substantial frame

Convenient outdoor nests are provided when laying fowls are to be housed. It can be built of comparatively low-grade lumber or second-hand boards, packing boxes, etc., and when covered with a good grade of prepared roofing



A WELL-PLANNED LAYING PEN

Interior of two-pen house, exterior view of which is shown on right. Feed hopper and water vessel are on elevated platform. Note the ceiling back of the perches and overhead. There is a rear ventilator opening into the spaces between the rafters. Photo from Indiana Exp. Station



TWO-PEN MUSLIN-FRONT HOUSE FOR SMALL FLOCK

Interior view of this house is shown in illustration at left. For average use it is not desirable to have the windows come down so near the floor, and in cold climates smaller muslin-covered openings are advisable. Photo from Indiana Exp. Station

as shown in the cross section. For back-yard use when the house is to be moved but seldom, it can be built without studs except at corners and on either side of windows and door. The front is 6 feet, 6 inches high, and the back 4 feet, 6 inches. The floor may be either 6 by 8 feet or 8 by 8 feet, the former size being large enough for about 12 fowls and the latter for 16. The arrangement of doors, windows, nests and perches is clearly indicated in the cross section and in the half-tone photo-engraving of the completed house. The upper part of the window and the opening in the door are to be protected by means of muslin shutters. The shutter over the window can be hinged to hook up against the rafters when not needed, or may be left loose so that it can be removed and hung up on the wall. The most convenient way to fix the shutter on the door is to hinge it at the bottom so that when not in use it will drop down out of the way.

**A Shed-Roof House with Outside Nests**

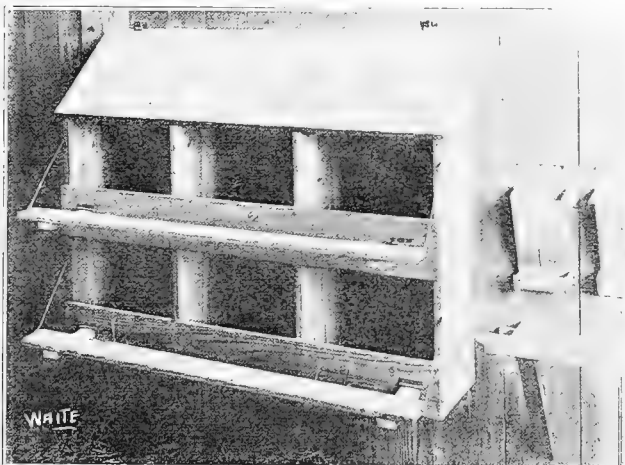
For general use the house shown herewith offers numerous advantages. It is usually built 6 by 8, 8 by 8 or 8 by 10 feet, and is provided with a muslin-covered shutter so that a good degree of ventilation can be secured.

and stripped as here shown, will present a pleasing appearance and will be more durable as well. Outside nests must be carefully constructed in order to keep them dry. The usual objection to such nests is that rain and snow get in around the cracks where the nests join the house. It is not a particularly difficult matter to make the nests storm proof, however, requiring only careful workmanship in constructing them. It is desirable to make them removable for cleaning and disinfecting.

This house has a board floor, and it will be much stronger and more substantial if this is doubled, laying the subfloor diagonally and nailing it solidly to the joists. Over this place a layer of waterproof paper or a few thicknesses of newspapers, and cover with a good grade of flooring, running the boards from front to back, rather than from side to side, which will facilitate cleaning. Houses of this sort are always much more conveniently moved if runner sills are used.

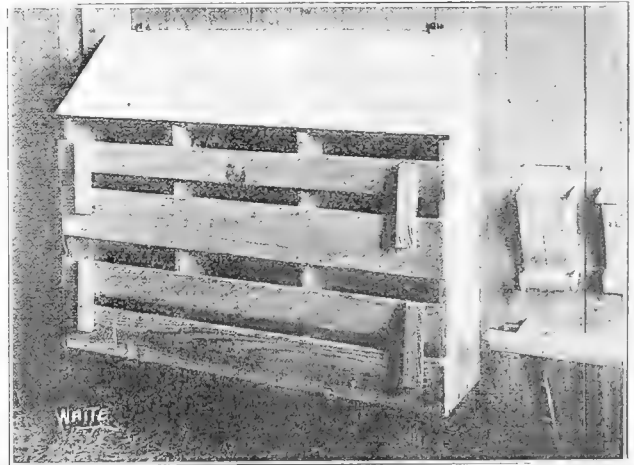
**A Two-Pen Laying House**

The laying house illustrated on this page is an excellent one where two flocks are to be kept. It may be built in any convenient size, though it is rarely desirable to



PRACTICAL WALL NESTS FOR THE LAYING HOUSE, WITH HINGED FOOTBOARDS

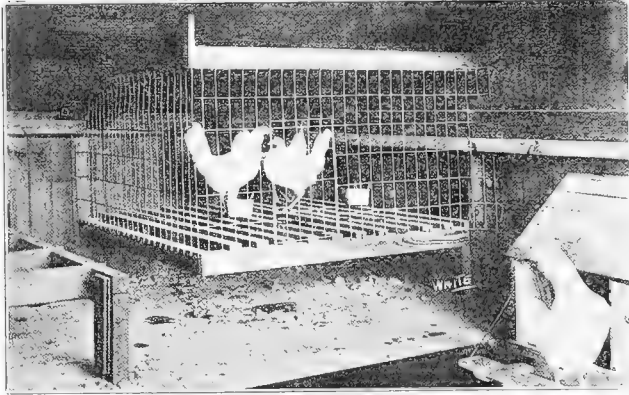
Photo from Maryland Experiment Station.



WALL NESTS WITH FOOTBOARDS RAISED, CLOSING NESTS—COMPARE WITH ILLUSTRATION ON LEFT

Photo from Maryland Experiment Station.

build it less than 12 feet deep. Where cold winters are the rule, rather smaller muslin-covered openings will prove more satisfactory and we do not regard it as desir-



CONVENIENT COOP FOR BROODY HENS IN LAYING HOUSE  
Photo from Maryland Experiment Station.

able to have the windows so close to the floor. All openings should be 18 inches to 2 feet above the floor as it is common experience that fowls in confinement are much better contented where they are not able to look out on the ground. The general arrangement of one pen is shown in interior view given on page 47. It will be noted that a droppings platform runs along the wall, one corner being occupied by a coop for broody hens and along the end of the house, or the partition, are placed feed hoppers and water vessels. The partition between the pens may be of muslin or duck, which will prevent drafts through the house and will entirely separate each pen from the other. The underside of the rafters is ceiled over the perches and there are narrow doors under the eaves communicating with the space between roof and ceiling. When these doors are open additional ventilation is provided which helps greatly in keeping the house cool in summer. Against the roof may be seen the cloth shutter provided for closing the large opening in the front when desired.

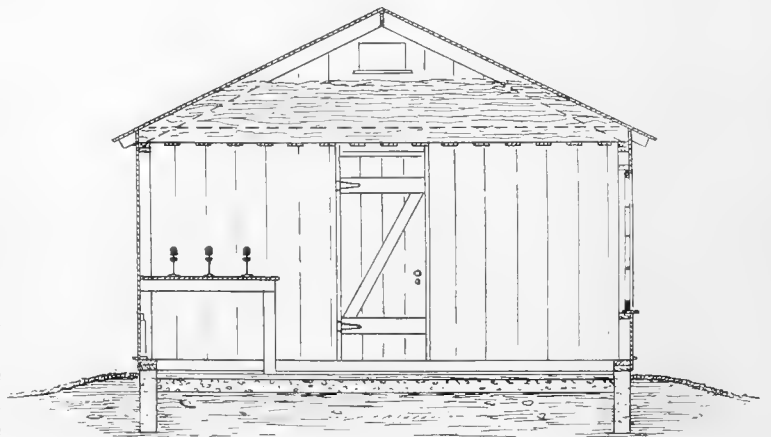
#### The New Jersey Multiple Unit House

When a large laying house is to be built, the one illustrated herewith will be found particularly desirable.

This is the New Jersey Multiple Unit Laying House and the following brief description of it is condensed from New Jersey Bulletin No. 325:

"This type of house has been adopted extensively throughout New Jersey by commercial poultry keepers. The multiple unit idea is standardized as follows: One unit of this house is 20 feet wide and 20 feet deep, giving 400 square feet of floor space. The shed-roof construction is used and the house is so designed in all details that it will furnish an ideal environment. The front is so arranged that plenty of sunlight can be admitted and adequate means for ventilation are provided. Since it is usually desirable to maintain a larger flock than 100 birds, two or more units are generally built together.

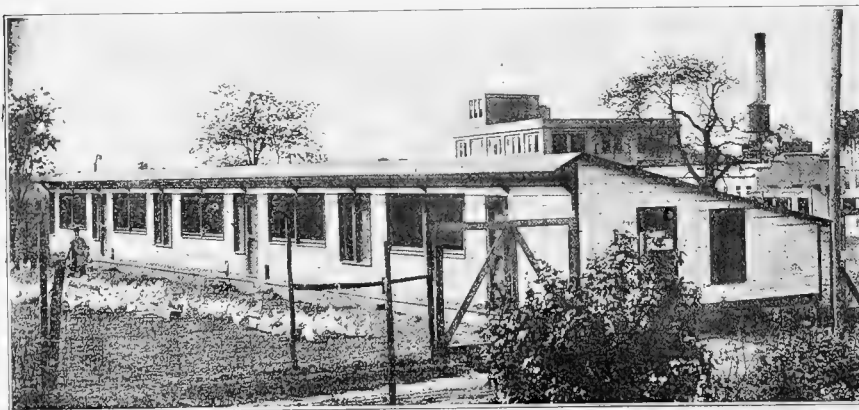
"The house here shown is a double unit and is 20 feet deep and 40 feet long. The sills are 4x6-inch material, posts 4x4, studs and plates 2x4, rafters 2x4, and the house is single boarded throughout on the ends and sides with novelty siding. The back is boarded up and down with yellow pine boards, tongued-and-grooved, and covered with paper to aid in keeping the house warm in cold weather. The roofing boards and all interior partitions, droppings boards and sheathing, are built of 1x8-inch barn boards or ship-lap.



CROSS SECTION OF STRAW-LOFT HOUSE FOR COLD CLIMATES

"The studs in rear wall are 4 feet, 6 inches and 9 feet in front. The house is provided with a 2-foot projection over the front to keep rains and storms from beating in at the windows. The back wall is provided with rear ventilation, so arranged that the air can enter just under the eaves and circulate between the rafters above the perches. In order to protect the birds on the perches, the rear part of the house from the droppings boards to the plate and from the plate to the rafters to a point over the front edge of the droppings boards is sheathed on the inside, thus making a sort of a protected roosting closet.

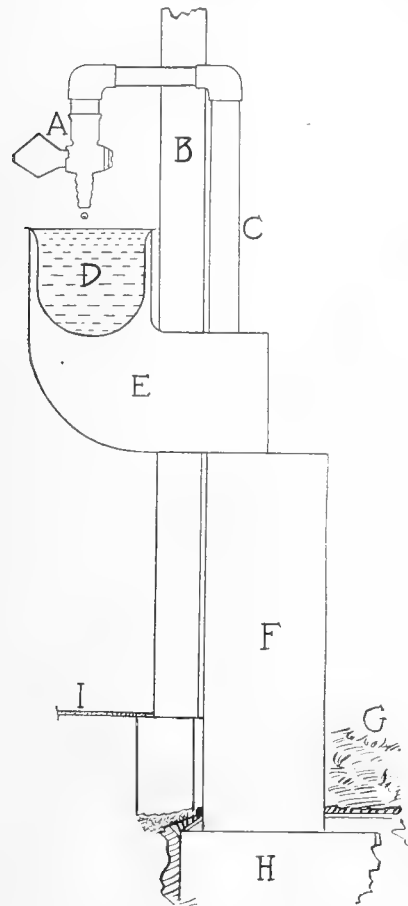
"The house is divided every 20 feet by a solid partition running from the back wall to within 6 feet of the front wall. In the center of this partition is located a large homemade



NEW JERSEY MULTIPLE UNIT LAYING HOUSE

This house, briefly described on this page, is well adapted to the requirements of all poultry keepers who have good-sized laying flocks. Hood shades the front in hot weather and affords some protection from storms. Photo from N. J. Exp. Station.

dry mash hopper, and water vessels, occupy elevated platforms in the front of each section. A dust box is placed directly under the glass window at each end of the house. Each 20-foot section has in the center a muslin-covered opening 4 by 10 feet, equipped with two hinged curtains 4 by 5 feet. At each side of the muslin opening there is a large glass sash 2 feet, 3 inches wide and 5 feet high. One center window in each double section is constructed in the form of a combination door and window, opening clear to the sill."



DRIP WATER SYSTEM

Where running water is available the system here illustrated will save a great deal of labor in watering the fowls. A is a common gas cock adjusted to drip into cup D, which is about 12 inches above the floor. B represents the wall of the building and C, outside feed pipe. Drinking cup overflows into 3-inch galvanized leader pipe (E), which discharges outside the building, the overflow dripping into F which conducts it to the ground. Where the soil will not promptly absorb the water a gravel pit (H) is provided. G represents the ground level outside and I the floor of the house.

installed in a shed-roof house, but the gable roof is much better adapted to the purpose. As here shown, the gable is filled with straw which not only prevents the radiation of heat through the roof but absorbs moisture and makes it possible to keep the house dry with a comparatively limited circulation of air. The straw loft also keeps the house cooler in summer. This method of construction adds somewhat to the cost of building but contributes greatly to the comfort of the fowls.

Another type of cold-climate house is illustrated on page 51. In this house warmth is secured by low roof, careful construction and correctly proportioned windows and muslin shutters. With the latter closed the house will be comparatively warm but is much more apt to be damp than a straw-loft house, particularly when the muslin is clogged with rain or when house is heavily stocked. For this reason the ventilation requires more frequent adjustment than in house shown on page 48.

At each side of the muslin opening there is a large glass sash 2 feet, 3 inches wide and 5 feet high. One center window in each double section is constructed in the form of a combination door and window, opening clear to the sill."

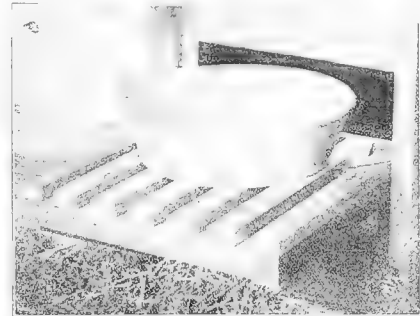
**A House for Cold Climates**

In Cold climates, particularly where Leghorns are kept, it is highly important to make the house as warm as is practicable, and under such conditions there probably is nothing better than the straw-loft plan. A cross section of such a house is presented on page 48, from which the construction can readily be understood. A straw

**Needed Equipment for The Poultry House**

Suitable fixtures and equipment for the poultry house are a more important factor in the success of any poultry

enterprise than is commonly realized. Whether the daily work of caring for the fowls is to be done easily and with comfort, or is to be a constant bugbear, will be determined quite largely by the facilities provided. No doubt much money is

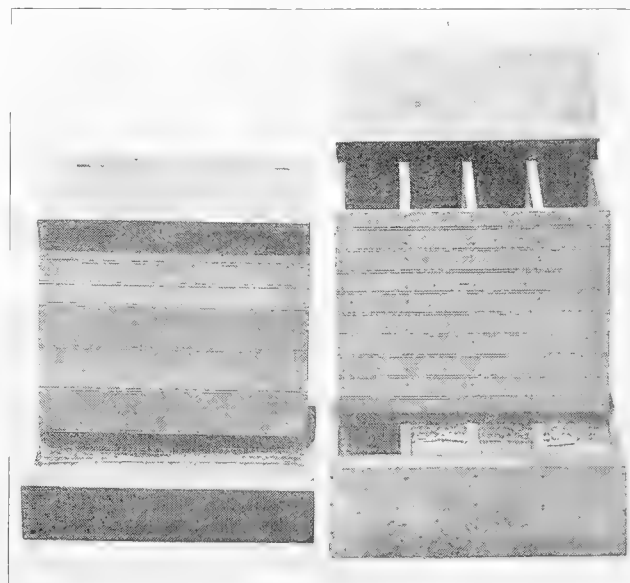


WATER PAN AND PLATFORM

wasted in the unwise choice of fixtures, but probably a great deal more is lost through failure to secure what is really needed. Much has been said about the desirability of having the interior of the house simple and plain, but simplicity can be overdone. It is well to recall now and then that the house and its facilities are provided as much for the convenience of the caretaker as for the use of the fowls, and anything that will make the work easier should by all means be provided. Time and labor-saving equipment about the poultry plant is of first importance, especially where fowls are kept in large numbers or when labor is employed.

Fixtures in the poultry house, large or small, should include perches, droppings board, nests, water vessel and platform, dry mash hopper, compartment grit, shell and charcoal hopper, etc. Some provision should also be made for a holder for green feed, a trough for moist mashes and a dust bath for winter use. If feed is kept in the house there should be cans or bins for storing it.

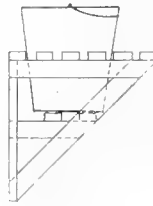
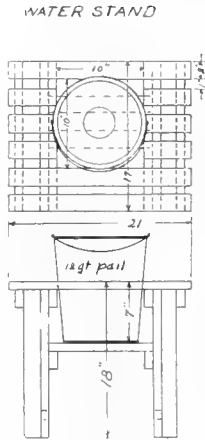
For the most part, the equipment of the poultry house should be light in weight and easily moved for cleaning.



HOPPERS FOR DRY MASH, GRIT, SHELL, ETC.

Hopper on left is for dry mash feeding and is provided with a piece of coarse screen wire cloth to prevent waste. Hopper on right is divided into four compartments for grit, shell, etc., likewise provided with waste-preventing wire "follower."

This does not, as a rule, apply to droppings platforms and nest supports. These can be made movable, but it usually is better to fasten them permanently in place. While it may be desirable to be able to take everything out of the house in the event of its becoming infested with lice and mites, there is no practical advantage in making elaborate and troublesome preparations for meeting a condition that never need be encountered if reasonable care is taken.



CORNELL WATER STAND

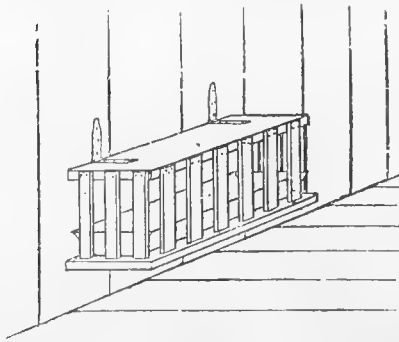
The water stand here shown is used and recommended at Cornell University. It affords a simple, inexpensive and sanitary method of supplying water for large flocks.

**Arrangement of Perches, Platform and Nests**

The interior of the laying house illustrated on page 47 shows a method of installing perches, platform and nests that is quite popular. The perches are supported on hinges at the rear so that they can be raised up for convenience in cleaning the platform. Use 2 by 3-inch material for the perches, if not over 10 feet in length, and 2 by 4 inches when longer. The supporting pieces may be 1 by 4 inches with notches for the perches cut 1 to 1½ inches deep. Where platform nests are not desired, wall nests can readily be provided. There are various types of these, but the nests shown on page 47 are particularly convenient.

**Feed Hoppers**

For use with large flocks it is important to have hoppers of good size. The one illustrated is a desirable type, being easily made and waste preventing in a large measure, and the size of hopper and number of compartments may be adapted to requirements. Hopper on left has a single compartment and in this form is suitable for dry mash feeding, the waste-preventing wire cloth being loose except at the upper side so that it will follow the mash down as the fowls consume it. The hopper on the right has several compartments for grit, shell, etc., and is likewise provided with a wire-cloth cover over the feed trough to prevent the fowls from throwing out the contents. Another good hopper for dry mash is shown in



SLATTED FEED PROTECTOR

May be used for feed trough, water vessel or for holding green feed.

cross section on this page, the illustration making its construction so clear that no particular description is required. In most cases, however, a sloping top will be found more satisfactory than one on which the fowls can perch. If it is found that feed is

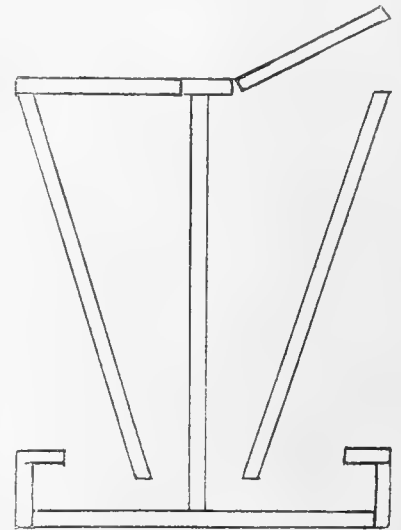
wasted with the hopper in its present form, use a strip of wire cloth or one-inch poultry netting over the feed.

**Water Vessel and Support**

For flocks of good size, galvanized pails usually are preferred for supplying water. These should be supported on a platform at least 18 inches above the floor and wide enough all around to allow the fowls to stand comfortably and drink from all sides. A method of building such a platform is illustrated herewith. The unsanitary practice of placing the water vessel directly on the floor is objectionable, as the water is always more or less contaminated by litter and droppings. The platform here shown will elevate the pail high enough to prevent litter from being scratched into it, and it can be easily and cheaply provided. For a small flock any convenient metal or earthenware vessel may be used, placing it on a slatted platform as illustrated on page 49.

**Drip-Water System**

Where running water is available, various methods of utilizing it to save time and labor have been devised. Professor Dougherty of the California Experiment Station, writes as follows in regard to the system in use at that institution—see illustration on page 49.



CROSS SECTION OF FEED HOPPER

“We use the continuous drip system for indoor pens. An automatic gas cock is screwed onto the end of the feed pipe and adjusted so that it will drip at a moderate rate into the drinking cup which is placed below it. This cup is of pressed galvanized steel, made with lugs at the top which hold it in position in the top of a three-inch galvanized leader elbow. The top of the cup is 12 inches above the floor of the house. Fowls can easily drink from the floor, yet the cup is high enough so that little litter is scratched in. Cup is rinsed once each day. It overflows into the three-inch leader elbow which conducts the waste water outdoors where it drops into a box in the ground. If the ground does not absorb the waste water readily, as may be the case in heavy soils, a small gravel pit should be provided at the foot of the box. Our drip system is inexpensive in operation, and the water is always fresh.”

Most of the equipment here illustrated is homemade, but unless the poultry keeper is skillful in the use of tools and has plenty of spare time he will find that regular manufactured articles are better adapted to his use and, in the long run, more economical.

## CHAPTER VIII

# Feeding the Back-Yard Laying Flock

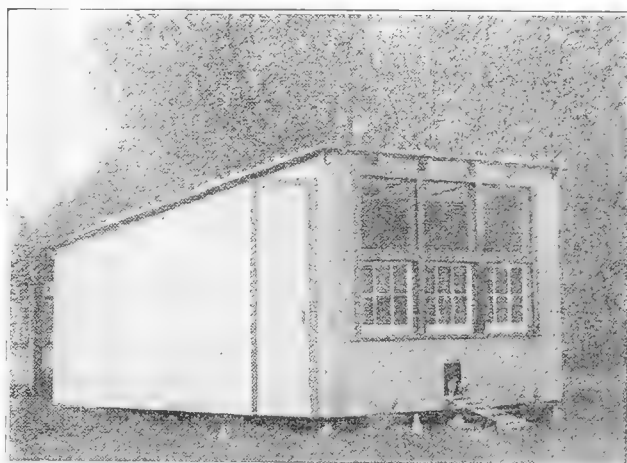
Herewith Are Outlined Practical Methods of Feeding Adapted to the Requirements of Back-Yarders Generally—  
Relative Merits of Different Feedstuffs and How to Combine Them in Satisfactory and Economical  
Rations—How Feeding Methods Can Be Simplified Without Sacrificing Results

**T**HE FEEDING of fowls can be made a comparatively simple matter and beginners, especially, are apt to find that, as a rule, they get best results with plain, easily followed methods and uncomplicated rations. Obviously, every poultry keeper should try to be well informed on the relative values of the different grains and other feeds available for his use. This knowledge is not acquired without persistent study, and ability to make practical application of it comes only through experience. Fortunately, however, the beginner has a short cut to correct feeding through the use of ready-mixed feeds, by means of which he is assured of a good degree of success practically from the start. With only the best interests of the beginner in mind it may be said that his easiest and safest plan is to use standard brands of commercial scratch grains and mash, feeding these exclusively and according to the directions of the manufacturer.

Such rations contain a good assortment of grains giving needed variety, the grain and mash mixtures together supplying the different required nutrients in proper proportion—the “balanced ration”—and the average beginner will find them both cheaper and better than any mixtures that he is likely to make up himself. The average feed store that attempts to carry a good assortment of grains is compelled to charge comparatively high prices for everything outside the common or locally obtainable feeds. This is not “profiteering,” but is the inevitable result of buying in small quantities and often in unfavorable markets. The back-yard feeder, with only a few fowls, who attempts to make up a reasonably varied ration from the supplies available at the local feed store thus finds that his mixtures not only cost him too much, but that he frequently has to use inferior grades.

As compared with average home mixtures, commercial feeds are better because the manufacturer, operating at an important grain center, can get better grades of

grain at a given price than local feed dealers. He has no difficulty in securing suitable variety, can compound his rations according to the most approved and thoroughly tested formulas, and has the machinery for proper preparation and mixing. For home mixing there must be a



A COMFORTABLE COLONY HOUSE FOR COLD CLIMATES

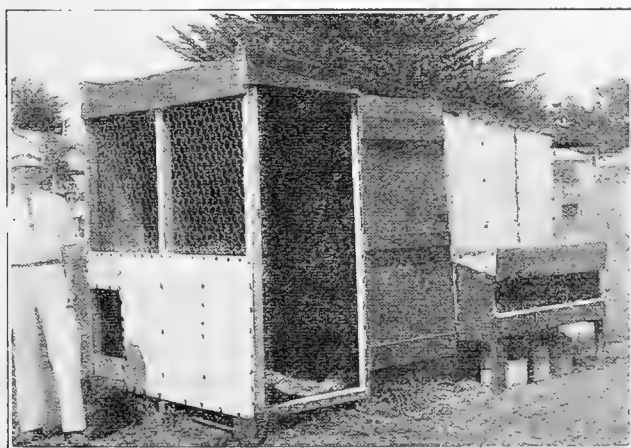
Photo from Central Experimental Farms, Dept. of Agriculture, Canada.

thorough understanding of the feeding question and there must be careful and exact attention to proportions and to thorough blending. These are by no means impossible conditions to meet, but in practice great numbers of poultry keepers have proved to their complete satisfaction that they regularly get better results with less effort and expense where they depend entirely upon ready-mixed feeds.

Of course, all commercial feeds are not equally desirable. Some manufacturers, in attempting to make extra-low prices, use inferior grains or formulas, in particular employing too large a proportion of by-products, thus supplying too much bulk or indigestible crude fibre. It is not a difficult matter for the buyer to detect such objectionable brands. There are a number of reputable manufacturers whose products can be used with entire confidence in their uniform quality and nutritive values. In buying, let quality instead of price be the controlling factor. With mixed grains fed in the litter in the morning and again at night, and with mash fed dry in a hopper to which the fowls have access at all times, the flock will be reasonably well provided for day in and day out without giving any further thought to the subject. Many back-yard poultry keepers follow this practice the year around, and with good results. One objection to this method, however, is that it makes no provision for the utilization of kitchen waste.

### How to Feed Kitchen Scraps

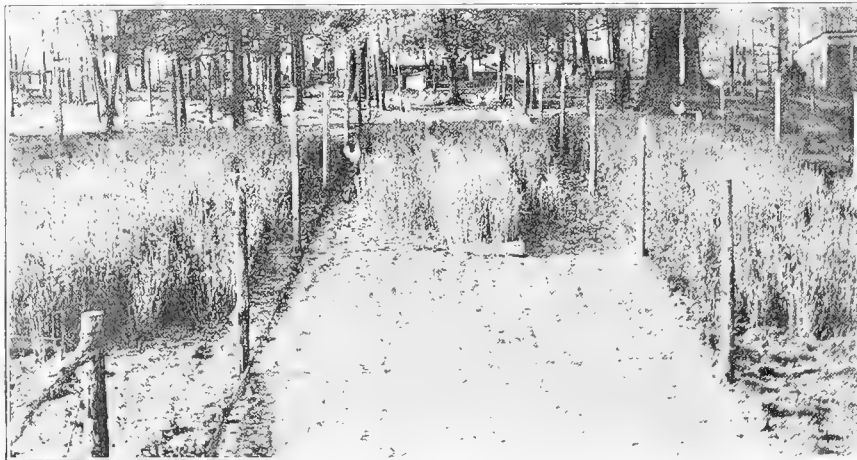
The average back-yard poultry keeper finds that the scraps from his table may be made to form a good part



PRACTICAL, LOW-COST HOUSE BUILT OF ROUGH LUMBER AND COVERED WITH PREPARED ROOFING

of the ration required for his flock, especially when properly fed. A large part of the value of table scraps is wasted, however, as these usually are supplied. Fowls have great difficulty in reducing large pieces to a size suitable for swallowing, and after they have dragged a crust or a piece of meat trimming about for some time trying to tear it to pieces, they are apt to become disgusted with the dirt accumulated on it and abandon the attempt to eat it.

The feeding value of scraps is largely increased by running them through a food chopper—the easiest and best way to put them in edible condition. Parings, vegetables and meat trimmings—anything in fact that is not small enough to be swallowed easily by the fowls—should be prepared in this way. Such material mixed with enough mash or corn meal to take up the excess moisture



HOW BRAN TAKES THE PLACE OF GREEN FEED

Fowls confined to this run had unlimited bran and required less green feed, as a result of which they did not keep the oats in their run caten down as did the fowls in the run illustrated on opposite page. Photo from Maryland Exp. Station

makes a most appetizing feed and one that is highly nutritious as well. Do not feed scraps in a sloppy condition, either chopped or whole, and never throw them on the floor of the house or in the yard. This is not only wasteful, but they soil the litter and make the yard sour and foul smelling. This practice also results in fowls eating much filth and dirt which affects their appetites and sometimes causes sickness. When green stuff and sloppy materials form a large proportion of the kitchen scraps, it is not wise to feed them too freely. The fowls need a good proportion of their ration in the form of hard grain, and it is better to select the best of the scraps and otherwise dispose of the remainder, rather than to risk the health of the fowls by feeding an excess of such material just to "save" it.

Probably the simplest manner in which table scraps can be fed, if they are not run through a food chopper, is to have a trough or narrow box of suitable size in which all waste may be placed. Provide a loose wire screen or "follower," fitting inside the receptacle, which will permit the fowls to pick at the material freely without being able to throw it out and scatter it over the yard or pen floor. This holder should be emptied and thoroughly cleaned once a day, and any material that the fowls cannot dispose of should be placed in the garbage or burned.

Kitchen scraps are often used as the basis of a moist mash to be fed regularly once a day. Some experienced

feeders are opposed to the moist mash and, doubtless, harm is done by feeding it in a careless or indifferent manner. Nevertheless, if the back-yard flock is to be fed economically and the kitchen scraps utilized to the best advantage, there is no escape from feeding moist mashes and the beginner may as well accept this fact and learn how to do it right.

Starting in the morning, the first feed should always be a liberal allowance of scratch grains. At noon, feed kitchen waste consisting of all such material at hand that is edible and in a wholesome condition. After this is run through the food chopper add to it a quantity of good commercial mash mixture sufficient to give the fowls all they will eat in 15 to 20 minutes. If there is not enough moisture in the waste to make a mash of the proper consistency (crumbly wet but not sticky or pasty) use sour milk or waste-liquids of any sort that may be on hand. Feed this mash in a trough so constructed that the fowls cannot get into it with their feet, and let them have all they will clean up. If there is any surplus it should be removed and not permitted to freeze in the trough in winter, or ferment and sour in warm weather.

In the evening it is best to feed whole or cracked grains, giving all the fowls will clean up so that they may go onto the perches with full crops. However, if a surplus of nutritious table scraps is left from the noon meal, a second feed may be given early in the evening, just as it comes from the food chopper or, if too moist to feed in this way, it may be mixed with a sufficient quantity of the dry mash mixture to take up the surplus moisture. Do not depend upon scraps or mash for the entire evening feed, however, especially in cold weather, but give the fowls some whole grain the last thing before they go to roost.

#### Dry Mash or Moist

There can scarcely be any question as to the desirability of providing the fowls with a good dry mash, supplied in a suitable waste-preventing hopper to which they have access at all times. Whether the mash feeding should be limited to this or should also include a regular daily feed of moist mash as well, will depend upon various conditions. It is safe to say, however, that the beginner who feeds carefully will get better production by following the latter course than by depending entirely upon dry mash. The only practical objection to moist mash feeding for the back-yard flock is the fact that the caretaker often cannot be at home to give it at the desired time. If this cannot be arranged for it will be necessary to depend entirely upon the dry mash, in this case taking particular pains to secure one that will be genuinely palatable to the fowls.

#### When Should the Moist Mash Be Fed

There is scarcely an hour in the day that has not been recommended by some one as just the right time for feeding the mash. Every such recommendation, as a



rule, is based on the fact that the mash has been so fed with good results, which seems to be reason enough for doing it that way—until some one else demonstrates that equally good results can be secured by feeding at some other hour. As a matter of fact, it is immaterial when the mash is fed, provided it is fed right. There are, however, practical reasons why it is more difficult to feed it properly when given at certain times of the day than at others. If the mash is looked upon simply as an appetizer and the quantity is limited to a light feed, with dry mash before the fowls all the time in hoppers, it can safely be given whenever it best suits the convenience of the caretaker. When the fowls are to have all the moist mash they will eat, most practical feeders prefer to give it about the middle of the day.

It is common knowledge that fowls that are heavily fed on a rich moist mash generally will huddle in corners and remain comparatively inactive for hours, which is distinctly to their disadvantage if this occurs during the early part of the day. If the mash is fed about noon, however, after the fowls have spent most of the forenoon actively scratching for grain in the litter, a few quiet hours then should do no harm and, being easily digested, the mash will be out of the way before the evening meal when it is desirable for the fowls to have a full feed of whole grain. This is particularly important in cold weather when the nights are long and when, without a substantial evening feed, the fowls will become uncomfortably hungry long before morning. It is chiefly for such reasons as these that the average poultry keeper gets best results when the mash is fed at noon. If there is any reason why it is not convenient to feed it at that time then another hour must be selected, properly adapting the balance of the ration to the change.

#### Does it Pay to Give Warm Feeds

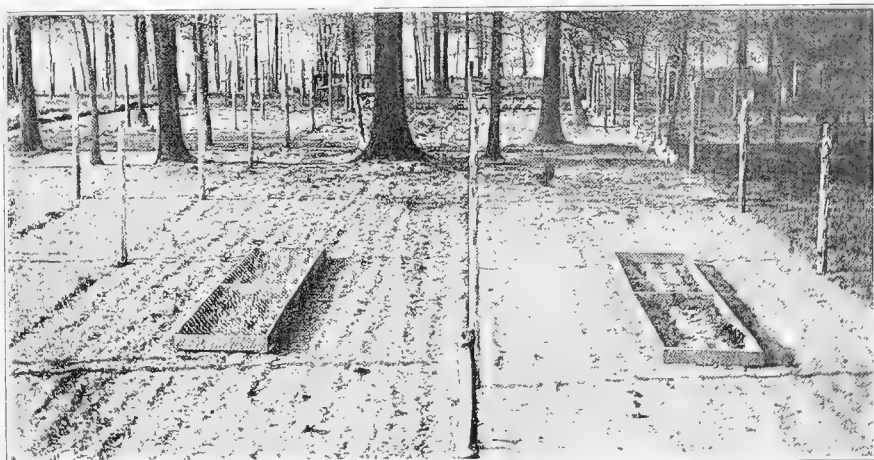
The argument for warm feed rests chiefly, if not solely, upon the fact that **THE FOWLS LIKE IT**. And those who are trying to secure the best possible results from their fowls hardly need be told that an important means to that end is to give them what they want in order to make them comfortable and contented. One of the most important factors in getting eggs in cold weather is appetizing feed and plenty of it. Probably no one has ever proved that warm feeds at night or any other time in cold weather directly bring about an increase in production, but it is hardly necessary to furnish proof that fowls that are well cared for, whose preferences are consulted, and whose appetites are stimulated at this season of the year, will give better results than those that are fed in a routine manner, getting nothing but dry, cold feed. Moist mashes, in particular, should always be mixed with hot water in cold weather, in order to prevent their freezing in the trough before the fowls have satisfied their hunger. No good purpose is served by having the fowls fill up on cold or half-frozen mash mixtures.

The poultry keeper who has large flocks probably cannot take the extra time and trouble required in thus humoring his fowls, but the back-yard poultry keeper

with only a few birds can well afford to do this. It may not be advisable to make warm feeds a regular feature, but when the thermometer drops extremely low, when the fowls appear uncomfortable and with little appetite, then the effect of a warm feed made appetizing by the addition of some choice table scraps, and seasoned mildly with salt and pepper, is excellent. An evening feed that always is popular with hens on a cold night is cracked or shelled corn, thoroughly heated on the stove or in the oven, with a little meat, suet, or something similar added to flavor it. It is never advisable to give feeds that are piping hot, particularly mashes. They should be only pleasantly warm when placed before the hens.

#### How Many Daily Feeds

The beginner is apt to be too greatly concerned about the number of feeds his birds should have, and when they should be given. As a matter of fact, fowls are highly



#### DOES IT PAY TO SUBSTITUTE BRAN FOR GREEN FEED

Hens kept in pen illustrated above had no bran in their ration and made up for the lack by eating everything green in their run. Green feed is a cheaper source of bulk than bran. Compare with illustration on opposite page. Photo from Maryland Exp. Station.

adaptable in this respect, and within reasonable limits the poultry keeper can adopt methods of feeding quite largely to suit his own convenience. This means that those who find it inconvenient to follow the usual three-feeds-a-day method can introduce whatever changes they find necessary, giving only two feeds a day, or one, or they may hopper-feed exclusively, provided they adapt the ration to their method, and provided also that whatever method is adopted is uniformly adhered to. That is, it will not do to feed three times one day, twice the next, and on the following day four times, or none at all.

The most common method is to give three feeds a day, and under ordinary conditions this really seems to suit the hens best. It makes it possible to keep them busy a good part of the day hunting in the litter for the grain part of their ration; it permits utilizing the table scraps in a warm moist feed about the middle of the day; and the fowls can be sent to roost at night with crops full of hard grain.

The back-yard poultry keeper, however, who leaves for his work before daylight during the winter months, and possibly does not return until after dark, cannot practice this method and may find it necessary to give the entire day's supply of grain at one time—night or morning. It is entirely practical to do this if plenty of litter is used and the grain feed buried in it.

### How Much to Feed

One of the most common questions of the beginner is "How much shall I feed my hens?" The usual answer that "no set rule can be given, as their requirements vary greatly under different conditions," does not afford him much comfort. Presumably he already knows that, but



LAWN CLIPPINGS MAKE EXCELLENT GREEN FEED FOR FOWLS AT ALL AGES

having no guide whatever in personal experience he needs some standard of comparison by which he can determine approximate requirements. He finds this especially desirable after his anxiety has been aroused by repeated warnings against overfeeding and overfattening—both real dangers, under some conditions.

The quantity of feed required by a fowl at any given time depends upon the breed to which it belongs, whether it is full grown, whether it is producing eggs, whether it is in poor condition or well fattened, also upon the season, as all fowls require more feed in extremely cold weather than in warm. It also appears to be governed by conditions as yet not understood. For example, in experimental work the writer has found individual variations of as much as 50 per cent in comparing one week's consumption with that of the following week, with all known conditions identical.

Heavy-laying hens naturally will consume somewhat larger quantities of feed than ordinary producers. The Leghorn hens during the first five years of the Storrs Laying Contest, with an average yearly production of 161.8 eggs, each consumed 3.64 ounces of feed daily. During the same period the Plymouth Rock hens in the contest, with an average production of 153.4 eggs, averaged to consume 4.25 ounces of feed daily. At the Vineland Contest (third year) the average feed consumption of Leghorns was 3.5 ounces (average egg yield 188) and of Plymouth Rocks, 3.93 ounces (average egg yield 169.2). A safe general rule to follow is to give a half-feed of grain in the morning, keep dry mash before them dur-

ing the day and give all they want of cracked grains at night. In addition, pullets or extra heavy laying fowls may have all of a good, bulky moist mash that they will clean up promptly at noon.

### Warm-Weather Feeding

The back-yard poultry keeper who has a flock of laying fowls will not find the daily care of them in summer particularly different from wintertime requirements, aside from the fact that the work will be less exacting, and the returns often much more encouraging. At this season of the year fowls that are reasonably well fed are pretty certain to lay well under almost any condition. Assuming that the winter ration has carried an extra-liberal proportion of corn, the approach of warmer weather will be the signal to reduce this grain, substituting feeding wheat or wheat screenings, also oats, preferably soaked.

At this time of the year the health of fowls in confinement is quite apt to be at a low average, as the result of various long-continued irregularities in feeding and management. Plenty of succulent green feed is one of the best conditioners, and where digestive disorders are present, granulated charcoal should be kept before the fowls. If the kitchen waste does not afford a sufficient supply of green feed, the best way to provide it is in the form of sprouted oats. These can be produced in a small way in a pan kept in a warm place in the kitchen or in the furnace room, but a much more practical and convenient way is to secure a small-sized oats sprouter with independent source of heat, so that a regular supply will be available. After the grass gets a start it is an excellent plan to allow the fowls to run out on the lawn for an hour or so in the morning or at any other time of the day when they can be watched and prevented from doing any injury. The lawn can be made an important source of green feed if the fowls are handled in this way, or if the grass is cut with a lawn mower and given to them regularly.

### How to Reduce Cost of the Poultry Ration

There are both direct and indirect ways of reducing the cost of feeding fowls. Among the former may be mentioned: careful buying, wise selection of feeds, economical feeding, and utilizing homegrown green feed



SURPLUS LAWN CLIPPINGS SHOULD BE DRIED AND STORED FOR WINTER USE

To the right is shown green grass just after it is mowed and to the left is shown a pile of dried grass ready to be packed away in barrels for winter feeding. Properly cured, this material will retain its color and will keep without molding. When thoroughly steamed it is greatly relished by the fowls as a winter green feed.

in place of grain. The average small-scale poultry keeper buys his feed in small quantities, and pays dearly for the privilege. Even if no more than ten or twelve fowls are kept it will pay to buy everything, with the possible exception of meat scrap, oyster shell, etc., in 100-pound bags. Practically all dealers give an important discount over retail price in such quantities, and a reduction of 10 to 15 per cent in the feed bill can readily be effected in this way.

In most cases the cheapest and most satisfactory way to store feed is in galvanized iron garbage or ash cans with covers, selecting a size that will be large enough to hold the contents of a 100-pound bag. For the meat scrap and other special feeds that are purchased in less than 100-pound lots get smaller cans of the same sort. If these are blocked up off the floor so that the bottoms do not rust out they will last many years and will save their cost several times over.

By wise selection of feeds is meant buying such as the fowls will eat readily, and that give the maximum of nutrition for the money invested. Do not buy expensive grains if something cheaper is available, and do not be slavishly bound to any special feeding formula. Watch the price of standard grains, learn their nutritive values, and use most freely the kind that gives the best value for the money. However, in trying to economize do not be governed too much by the price per bushel or pound. Remember that fowls cannot digest crude fibre at all and that bulky, trashy feed may cost a great deal more in the long run than a better grade.

By more economic feeding is meant feeding well-balanced rations, and in correct quantity. With poorly balanced rations it may take five pounds to give the fowls as much of some essential nutritive element (protein for example) as would be secured in four pounds of a better-balanced ration costing no more per pound. Overfeeding is not a common source of loss in the poultry yard, but it sometimes occurs nevertheless. The results of overfeeding are wasted grain and the overfattening of fowls. With hens in good production there is little danger of overfeeding, but there is danger of supplying an excess of scratch grains resulting in failure to consume the less palatable but nutritious parts of the ration.

Waste of dry mash at the hopper is a common source of loss. This may be due to defective construction in the hopper or to the use of a poorly proportioned mixture that tempts the hens to keep picking at it and throwing out the less palatable part to get at something they particularly want. Such waste in the aggregate may amount to a considerable sum, and it is altogether unnecessary. Often a slight change can be made in the hopper that will stop it. If not, there are plenty of other hoppers on the market that are satisfactory in this respect.

About the worst possible way to try to reduce the feed cost is by skimping on quantity. The fowls require a certain amount for maintenance and that much at least

the poultry keeper must provide, regardless of cost. Having done that, only a little more is needed to supply the additional amount required for egg production or normal growth, and it is true economy to supply it.

Green feed is more than a relish for fowls. It supplies various nutritive elements in a highly digestible form, and if freely supplied will materially reduce the amount of grain required. Under ordinary conditions no poultry feeder has gone his limit in reducing feed costs until he has made provision for an abundant supply of succulent green feed.

The foregoing "direct" ways of reducing the cost of the ration are all practical and worth while, but the greatest saving can be made by "indirect" methods, by which are meant those that reduce the cost per pound of flesh gained or per dozen eggs laid, doing so by securing a higher degree of efficiency in the flock. After all, what the poultry keeper really is interested in is not reducing the amount he pays out for feed, but increasing the percentage of profit that he realizes from the feed supplied. As a rule, the poultry keepers who have the largest net income per hen usually have the highest feed bills. The greater profit is made possible by the higher average of



YARDS SHOULD BE UTILIZED IN GROWING GREEN CROPS WHENEVER POSSIBLE

The luxuriant growth of corn in the yards in above illustration shows how much green feed can be produced in a small space. Growing crops also provide shade and purify the soil

production secured. By all means save on the cost of feed wherever possible, but beware of economies that mean lower cost per fowl and greater cost in production.

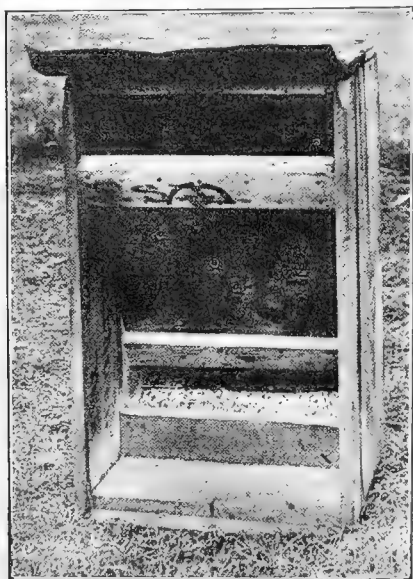
#### Qualities of Different Feeds

The poultry keeper who for any reason prefers to make his own grain and mash mixtures needs to have a fairly comprehensive knowledge of the relative values of the different grains and other feedstuffs available for his use. It is not possible within the limits of this book to go into detail in regard to this, but the interested reader will find "How to Feed Poultry for Any Purpose with Profit" (published by Reliable Poultry Journal Publishing Company—see page 104) a source of complete and authentic information on this subject. The following brief suggestions on the different poultry feeds in common use are given that the beginner may have a fair working knowledge of the subject, thus to enable him to supplement

ready-mixed rations when necessary or desirable, and to make up home mixtures for emergency use.

Special attention should be given by the beginner to variety in feeding, a matter of decided importance in getting maximum results either in growth or production. It is not necessary to go to extremes in this respect, but it is not reasonable to expect that either chicks or fowls will have the keen appetites which are demanded for best results in either growth or egg production unless reasonable variety is provided. The beginner should also understand that while there are some feedstuffs that every practical poultry feeder prefers to use because experience has demonstrated their value, there is none so essential that it must be secured regardless of cost. On the contrary, any disproportionate increase in the cost of a given grain should be the signal for promptly reducing its percentage in the ration, or for omitting it entirely, substituting the next best thing available at more reasonable cost.

**Corn** is by all odds the most valuable grain that the average poultryman can feed and, as a rule, the cheapest.



LOW-COST DRY MASH OR GRAIN HOPPER

For the back-yard flock corn should always be cracked, except in the evening feed in extremely cold weather, when whole grains may be safely fed. The objection to whole corn is based upon the fact that the kernels are too easily found and the fowls have practically no need to scratch for it—a serious objection indeed, in the care of closely confined flocks. It is probably the

most completely digested of any of the grains fed to fowls and owing to the high percentage of fat or oil which it contains, is excellent for winter feeding. If sufficient attention is given to the fowls' exercise, it may safely form a considerable part of the grain ration even in summer.

Corn is generally regarded as a highly fattening grain. Some of its value in this respect, no doubt, is due to the readiness with which fowls can satisfy their appetites on the large, readily seen kernels, but the comparatively high percentage of oil and the extra palatability and digestibility of the grains doubtless has a direct bearing upon this fact. Whatever the explanation may be, the beginner should realize that its free use in warm weather is attended with some danger, and since cracked corn frequently is almost as expensive as wheat, the safe plan is to use the latter grain freely if price makes it practical to do so. Wheat is low in fat and the kernels are small and readily buried in litter so that much more effort is required of the fowls in getting their share of the daily allowance.

**Wheat.** While experiments show that fowls usually will do better on corn than on wheat when limited to a single grain, many poultry keepers depend quite largely upon the latter, particularly in sections where but little corn is raised. At the present time comparatively little good milling wheat is fed, screenings and "feeding wheat" being used instead. Apparently, wheat that is shrunken or below milling grade for some other reason, even if slightly damaged, is quite satisfactory for feeding, but the poultry keeper should bear in mind that damaged grains of any kind must be fed with care. Fowls are highly susceptible to digestive disorders resulting from mold or fermentation and where there is any evidence of this in the grains fed, the proportion used should be quite limited.

**Oats** have always been a favorite grain with poultry feeders, particularly where the grains are plump and heavy. They carry a high percentage of crude fiber, however, and their feeding value, pound to pound, is lower than either corn or wheat. In the dry state they should not be fed too heavily, as the sharp points and excess of fiber cause serious trouble at times. The beginner is apt to conclude that since oats usually can be purchased at a much lower price per bushel than either corn or wheat, it is economy to substitute them for the more expensive grains, failing to take into consideration the difference in nutritive values due to the greater percentage of crude fiber, which has no feeding value for fowls.

In order accurately to compare the feeding value of different grains, the weights of their nutritive elements alone should be considered. For illustration, in 100 lbs. of oats there are 76.5 lbs. of nutrients (fiber, ash and water free) as compared with 85.7 lbs in shelled corn, and 85.9 in wheat. Making the comparison on the basis of the bushel, there are 24.5 lbs. of fiber, ash, and water-free nutrients in one bushel (32 lbs.) of oats, 48 lbs. in one bushel (56 lbs.) of corn, and 52 lbs. in a bushel of wheat. If 100 lbs. of corn are worth \$3.00, then 100 lbs. of oats are worth \$2.678, and 100 lbs. of wheat will be worth \$2.995. Or, if corn is worth \$1.50 a bushel, oats would be worth 76.6c per bushel and wheat \$1.62. There may possibly be a slight difference in the digestibility of the nutrients in these grains, but it is not probable that it is material, and there is not sufficient definite information on this subject to make a practical comparison on this basis.

Keeping these relative values clearly in mind the poultry feeder should have no difficulty in determining when he can feed oats to advantage. The preceding comparisons have been on the basis of 32-pound oats. Where extra-heavy oats are obtainable their value in comparison with corn and wheat will be greater, pound for pound, and that of light, chaffy oats containing a much higher percentage of fiber will be less. In actual feeding, oats are at a further disadvantage, due to the fact that while a limited amount of crude fiber is an essential part of the ration, the percentage must be much lower than in the rations of any other of our domestic animals. About 4 per cent for the entire ration seems to be most desirable and when the proportion noticeably exceeds this it is apt to result in decreased production, and acute intestinal disorders.

Fowls can handle a much higher percentage of the crude fiber in oats if the grains are thoroughly softened. It is for this reason that boiling and soaking are so highly recommended. It has been found that where oats

are prepared in this way, or by sprouting, they can be fed in almost any quantity desired without injurious results. It is not certain that such preparation adds to the digestibility of the grain (though it probably does so in the case of sprouted oats), but unquestionably it makes the grain much more palatable to the fowls, prevents danger of injury through the sharp points penetrating the comparatively thin membrane of the crop, and greatly reduces the irritating effect of the husk upon the intestines.

**Other Grains.** The three grains just mentioned should form the bulk of all grain mixtures except where there are special reasons for introducing other less commonly used grains. There are many others, however, that can safely be fed to fowls in liberal proportion, and where price makes it an object to do so these may largely replace corn, wheat or oats. Barley, rye, buckwheat, kafir, milo, peas, sorghum seed, etc., are all eaten more or less readily by fowls, but the back-yard poultry keeper will rarely find it to his advantage to purchase these grains at the feed stores. Sufficient variety for all purposes is provided in a mixture of corn, wheat and oats, and there is no special advantage in adding any of the other grains mentioned unless price makes it an object to do so. In no case should any attempt be made to force the fowls to eat any grain that they do not want, simply because it is a little lower in price than something else. The saving that will result from this policy will fall far short of offsetting the slower growth or reduced production that is practically certain to result.

#### Ingredients of the Mash

The mash part of the ration affords the poultry keeper's best means of balancing the nutritive ratio and, as a rule, makes it possible to reduce the cost of the feeding through the use of various by-products. It is generally assumed that the mash and grain should be fed in about equal proportions. Where growth or egg production is to be stimulated, however, the skillful feeder may considerably increase the proportion of mash. This is done either by feeding moist mashes, or by decreasing the amount of grain fed thus forcing greater consumption of dry mash. Where either practice is followed, however, due care must be taken that the right kind of mash is fed and the health of the birds should be closely watched. The beginner will do well to stick to the conservative 50-50 ratio, and in case of doubt to increase the grain part of the ration rather than the mash. To do this may result in slightly lower production but there will be less risk of unfavorably affecting the health of the fowls.

**Bran.** In most cases bran is the starting point for the mash formula, not because of its feeding value, which is considered lower than some other feedstuffs, but because it has an excellent effect upon the digestion, helps to give the mash mixture the proper consistency, affords necessary bulk, and also contains a relatively high percentage of minerals which are essential to health and production. Because of its comparatively low feeding value, bran is not a particularly economical feed, and the per-

centage to be used is determined chiefly by the amount needed to put the mash mixture in proper mechanical condition for feeding, either dry or moist. As a rule, not over twenty-five per cent (by weight) of bran is used in the laying mash.

**White Middlings** are much more nutritious than bran and more palatable as well, and usually are added to the mash in about the same proportion as bran. It is seldom practical to use a larger quantity than this, owing to their tendency to make the mash sticky and pasty, in which condition it is not readily eaten. In proper proportion, however, middlings are a desirable addition to the mixture and should not be omitted unless unobtainable or too high in price. There is some confusion in different parts of the country as to the meaning of the term "middlings," but what is here meant by "white middlings" is a by-product in the manufacture of flour, not quite as fine or as white as low-grade flour or red dog, but with much less bran than "shorts" or "brown middlings."

**Corn Meal** is almost invariably an ingredient of the mash. It increases palatability and, being low in crude fiber, its use is especially recommended where the mixture otherwise would be too bulky. It also helps to counteract the pastiness of a mash rich in middlings. A



A CROP OF MANGELS GROWN FOR WINTER GREEN FEED

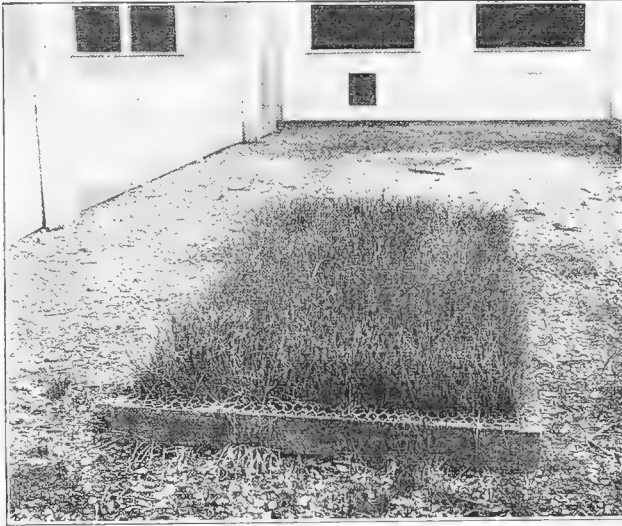
Mangels are highly popular among poultry keepers for winter feeding. They are easy to grow and are enormously productive on fertile soil. With proper handling they will keep in good condition throughout the entire winter in caves or vegetable cellars, but must not be exposed to freezing temperature.

practical objection to using much corn meal is the fact that this necessarily limits the amount of cracked or whole corn that can be fed, and as it generally is desirable to use corn freely in the scratch grain mixture its use in the mash should be limited to the amount required to make it palatable and to have it in proper mechanical condition.

**Rolled Oats.** Under many conditions it is desirable to add rolled oats to the mash mixture, meaning by this whole oats that have been run through the rollers or through a feed mill and crushed or partly ground. Where rolled oats are low in price they can be substituted in part for bran. This grain is quite high in crude fiber, however, and if soaked or sprouted oats are fed there seldom is any need for them in the mash mixture.

**Meat Scrap.** Animal matter in some form is a necessity in the feeding of fowls of all ages and it cannot be neglected in the ration of either chicks, growing stock or adult fowls without loss. Fresh meat no doubt is the

best form in which to supply it, but it rarely is possible to obtain this at reasonable cost. The green cut bone secured at meat shops usually is priced too high to be an economical feed, though it may be used in limited quantity for the sake of variety. Under most conditions commercial meat scrap will be the back-yard poultry keeper's



A GREEN FEED PROTECTOR

The frame of this protector is of 2 by 4-inch material, covered with one-inch netting. Illustration shows a splendid crop of oats that has been protected from the fowls in this way until it secured a good start. Photo from United States Department of Agriculture.

mainstay. Tankage is used by many owing to the lower price at which it may be secured and, as a rule, good results are reported. Meat scrap, however, is generally regarded as a more desirable feed for fowls and is more uniform in quality where standard brands are used.

Some ready-mixed mashes do not contain meat scrap, and as this material is rather high priced, the back-yard poultry keeper needs frequently to be reminded of its importance in the laying ration and urged to keep a supply on hand for use as needed. If the hens are eating about equal quantities of mash and grain and laying well, meat scrap may be added to the mash at the rate of 20 to 25 per cent. If the fowls are not laying heavily, or if the kitchen scraps contain an appreciable amount of meat, the proportion may be reduced to 10 per cent, provided the reduction does not make the mash less palatable and thus interfere with its consumption.

Fresh butcher's scraps or green cut bone may safely be fed at the rate of one-half ounce daily per hen, but if supplied too freely will cause digestive disorders. The same is true of meat scrap, too heavy feeding of which will soon be indicated by soft, dark-brown droppings with a peculiarly offensive odor. Tankage is more variable in quality than meat scrap and must be fed with greater care. It is deficient in bone, one valuable ingredient of meat scrap, for which reason it will probably pay to add some ground bone or bone meal to the mash when tankage is used.

**Other Ingredients of the Mash.** The foregoing feeds form the basis of all mash mixtures and usually nothing else is actually required. Just as in the case of grains, however, where other mill feeds are obtainable at favorable prices they may be substituted to a reasonable extent. Oil meal used in the proportion of 5 to 10 per cent is regarded as particularly desirable during the molting

season, and should always be added where there is a tendency to diarrhea, also in mash mixtures that are too high in crude fiber. Cottonseed meal is used in the South to a considerable extent in place of meat scrap. Quite contradictory reports have been published in regard to its desirability in the poultry ration but it appears to be safe to use it in limited quantity (not to exceed ten per cent of the mash mixture) if a good grade of meal is obtained. It is said, however, that meal made from seed that has been frozen is apt to cause trouble. At its best it is only a partial substitute for meat scrap and where the latter can be obtained at a reasonable price the addition of cottonseed meal to a mash mixture is not advised.

Buckwheat middlings are highly nutritious and where available at moderate cost may be used freely. Ground barley, rye, or almost any grain or seed meal may be added to the mash in limited proportion, being careful, however, to make no radical changes except for good reason, then to introduce them GRADUALLY. In every instance where something unusual is added to the ration the feeder should watch the fowls carefully, noting daily the consumption of the new feed and the condition of the droppings on the droppings platform so that any tendency to digestive disorders will be observed and suitable changes made in the feed mixture before serious trouble develops.

#### Home Mixtures of Feeds

A great variety of formulas for home mixtures could be given, but to do so would be confusing rather than helpful to the beginner. As a matter of fact, practical feeders follow closely the same formulas, differences in proportions or in grains used being largely matters of personal preference or availability of supplies. Employing only common feedstuffs that may be secured almost anywhere in this country, a practical formula for a scratch grain mixture consists of the following: For winter feeding: two parts of corn, one part of wheat, one part of heavy oats—by weight in each case. For summer feeding: one part of corn, two parts of wheat, one part of oats. Other grains may be added to this foundation mixture as desired, observing the precautions already suggested.

A good mash mixture for laying fowls and growing stock consists of one part of bran, one part of middlings, one part of corn meal, to which add 10 to 25 per cent of meat scrap, the percentage varying with the age of the fowls, their productiveness, and whether or not they have any other source of animal food. The proportions of the different ingredients in the mash mixture depend to some extent upon the fineness of the meals employed, and for that reason any formula should be looked upon as tentative, to be modified as occasion requires. If the fowls consume more mash than seems desirable, this may be checked by increasing the percentage of bran. If too little is eaten, increased consumption may be secured by making the mixture more palatable, doing so by increasing the percentage of corn meal or meat scrap.

#### Some Accessories to the Ration

The feeds that have been discussed, as represented in well-proportioned grain and mash mixtures, commercial or home mixed, supply most of the fowl's bodily requirements, but not all. To have a complete ration these must be supplemented by other things.

Grit plays an important part in fowl digestion and best results cannot be secured indefinitely without its use,

though fowls sometimes appear to get along well without it for comparatively long periods. Almost any kind of crushed stone, pebbles, broken dishes or crockery will answer the purpose, though most will find it true economy to use a good brand of commercial grit.

**Oyster Shell.** This material is the almost universal source of supply for eggshell material, and it cannot be omitted without loss. Do not make the mistake of thinking that so long as the fowls do not lay soft-shelled eggs they are not in need of shell material. Experiments have shown that production may be cut down one-half or more, and the size of the eggs greatly reduced by the lack of shell material, without the appearance of any soft-shelled eggs. Laying fowls will not eat much grit when oyster shell is provided and often appear to do well without any, but it is better to be on the safe side and keep a supply of both before them all the time.

**Charcoal.** Many feeders do not supply charcoal but it deserves a place in every poultry ration. It acts as an absorbent, corrects acidity, and helps to overcome indigestion in early stages. To a large extent charcoal is insurance against indigestion.

**Milk.** Milk is an exceptionally good feed for fowls of all ages and now that it may readily be obtained in the form of semisolid buttermilk at almost any poultry feed store, its general use is to be recommended. The backyard poultry keeper will, of course, see that his fowls get all the surplus milk from the kitchen, either sweet or sour, and where milk enters into the ration the percentage of meat scrap can be correspondingly reduced.

#### Use of Condiments

Digestive stimulants, such as red (Cayenne) pepper, ground ginger, mustard, etc., have a place, though a comparatively unimportant one, in poultry feeding. Unfortunately most persons who undertake to use them go to extremes and, in the long run, lose more than they gain. All condimental feeds should be regarded as mild correctives, practical for use because readily available, but to be employed only as temporary stimulants where some error in feeding or care has thrown the fowl out of condition. Their use is particularly indicated in cases of acute diarrhea, loss of appetite, etc.

With pure, wholesome feed and careful feeding such ailments should rarely develop, and it is certain that where the use of such stimulants becomes advisable there is something definitely wrong with the feed or the method of feeding it, and this must be found and corrected if good results are permanently to be secured. It is useless to resort to condiments and leave the cause of the disorder uncorrected.

Condiments probably have some stimulating effect on the egg organs also. Ground mustard has been especially recommended for this purpose and many persons have reported excellent results from its use. They probably will have some effect in the case of fowls about ready to lay, but are practically worthless in "forcing" production in the case of immature pullets or resting hens. They have

no such power, and their use simply adds to the cost of feeding and is apt to result in liver troubles.

The danger in feeding all condiments is in the use of too large quantities, or in continuing to feed them for too long a time. The proper quantity to use can readily be determined by tasting the feed. It should be seasoned pleasantly to the taste, and no more, and their use should only be continued for a limited period.

#### Green Crops That Will Help to Reduce the Feed Bill

Comparatively few poultry keepers make any serious effort to realize the possibilities for economy in feeding that are afforded by the free use of green feed. Even where an effort is made to provide such material, it is done not because of its nutritive value but merely because it is believed that a certain amount is required in order to keep the fowls in good health. Green feed undoubtedly improves the digestion of fowls, supplies needed bulk and corrects the constipating effect of concentrated feeds such as hard grains, rich mashes, meat scrap, etc. But just because it is looked upon as a sort of accessory to the ration instead of an economical source of highly nutritious food, it generally is provided in as limited quantity as the poultry keeper can "get by" with.

There may be peculiar conditions under which the poultry keeper can afford to buy bran, mealed alfalfa, etc., at a cost of one and one-half to two cents per pound, to be used in the place of green feed, but these conditions are not common. Practically the only expense for green feed is the labor involved in its production. With small flocks this need hardly enter into consideration as, under average conditions, the limited amount needed can be grown at odd times when the labor utilized would otherwise have no cash value.

#### Green Feed Protector

Those who have comparatively small runs for their fowls find it possible to raise a good deal of green feed in runs by using protectors similar to the one shown in the accompanying illustration. The purpose of this protector is to give the plants a chance to reach fair size, after which they will stand weeks of grazing if the fowls



A BACK-LOT POULTRY YARD SEEDED TO ALFALFA

This scene on the poultry plant of R. W. Van Hoesen, New York, shows a splendid seeding of alfalfa and red clover in foreground with a plot of corn in front of the colony houses where young stock is being raised. The corn will furnish shade in hot weather, with a few more weeks' growth, while the alfalfa and red clover will furnish the best of green feed throughout the entire growing season.

are prevented from scratching and trampling them and picking off the tender young shoots as they come through the ground. Such quick-growing crops as lettuce, rape, rye, oats, etc., are especially adapted to this use. The protector may be made of 1-inch boards about 6 inches wide, for the sides and ends, covering with 1-inch-mesh netting and using cross strips to hold the netting up in the middle, if necessary. A convenient size for the frame is 4 feet by 8 to 12 feet.

Carefully prepare the ground where the seed is to be sown, spading it thoroughly and putting it in garden-bed condition. Then sow the seed and cover with the protector. In warm weather the plants will grow quickly in the fertile soil of the average poultry yard, and as they come within reach of the fowls they will be greedily eaten. When the plants become woody and slow in growth, prepare a new seed bed and start a new plot. With a little effort the entire run may be utilized in this way during the season, not only providing a great deal of succulent green feed, but also purifying the soil.

#### Growing Special Green Crops

**Cabbage.** Cabbage can be used either as a soiling crop or stored for winter use, but if too heavily fed it sometimes unfavorably affects the quality and flavor of the eggs produced. Many persons find it a practical plan to grow cabbage for market, selling all the sound heads and feeding to the fowls the trimmings and the plants that fail to head properly.

**Mangels.** Among vegetable crops grown for winter use, mangels usually are the most desirable. Great quantities can be produced on an acre of ground. Mangels need not be seeded extra early as they make their growth rather late in the season. Drill the rows three to three and one-half feet apart, use plenty of seed and do not cover too deeply. As is the case with beet seed generally, germination is rather uncertain. To be sure of a good stand it is wise to sow liberally and thin the plants to eight to ten inches in the row. The young mangels that are thinned out will make splendid summer green feed, but do not make the mistake of letting them stand too long before thinning. Tearing out surplus plants after they begin to crowd in the row will injure those that are left, and may seriously check their growth. Give mangels clean cultivation and pull them before freezing weather.

**Miscellaneous Vegetables.** There are numerous vegetables and waste products of the farm and garden, such as potatoes, beet tops, tomatoes and apples, also clippings from the lawn, edible weeds from the garden, etc., that should be utilized when available. They are all valuable and they all help to save more expensive feeds.

**Sprouted Oats.** Where special provision must be made for green feed there is nothing better or more practical for everyday use than sprouted oats. In common practice the grains are soaked for a few hours and then spread on shallow trays and kept moist and warm, under which treatment they quickly sprout and then are greatly relished by the fowls.

The length to which the sprouts are allowed to develop before feeding depends upon the rapidity with which they grow, and on the personal preference of the feeder. To utilize the feeding value of the oats to the best advantage and to avoid danger of mold, it is better to feed when the sprouts are quite short, and only a few days at the right temperature are required to grow them to this stage. Small lots of oats can be sprouted in trays or pans in the

kitchen or furnace room, but for quick growth and convenience in caring for them a regular oat sprouter should be provided.

#### Drinking Water

An ample supply of wholesome drinking water is highly important for fowls of all ages, particularly in hot weather. Lack of water, even for a short time, will cause intense suffering, while drinking from unwholesome sources is quite apt to cause disease. Even when water is regularly supplied much trouble results from a lack of cleanliness in the vessels used. In hot weather various forms of bacterial growth increase with great rapidity in water and when the drinking vessels are placed where filth can accumulate in them or are left with sides coated with slime, a great risk is taken. The ordinary bodily requirements of fowls for water are about the same at all seasons, the normal wide range in daily consumption being influenced chiefly by weather conditions, also by whether or not the fowls are laying. At the Missouri Experiment Station a pen of 60 White Leghorn hens averaged to consume 2½ gallons of water daily during the warm weather, or at the rate of one gallon daily to 16 hens. For suggestions in regard to how to supply suitable water vessels, etc., see Chapter VII.

#### How to Prevent Drinking Water From Freezing

Fowls need an abundance of drinking water in winter as well as in summer, and will not do their best without it. Fresh, clean water should be available for their use from the time they come down from the perches in the morning until they go to roost at night, no matter how cold the weather may be. This is especially important when dry mash is fed, as fowls will eat little of such materials unless they have water with which to wash it down. Moreover, if the best possible results are wanted from the fowls, do not compel them to drink ice water, which will chill them, retard digestion, and seriously interfere with their bodily comfort.

The back-yard poultry keeper often finds it difficult to keep water from freezing in severe weather, particularly if the supply for the entire day must be given in the morning, with no opportunity to warm it up during the day. Founts may be secured that are equipped with small kerosene burners by means of which the water can be kept at a moderate temperature, regardless of outside conditions. The cost of operating these is slight, and they are entirely safe when properly handled. Those who are so placed that they do not wish to use heated-founts can secure double-walled founts, with an insulating air space between. In common practice these are filled with hot water the night before so that the insulating air blanket will be thoroughly warmed and the water reduced to a temperature suitable for drinking by morning. It then will remain free from ice throughout the day, under all ordinary winter conditions.

A homemade insulated water vessel can be provided by using a pail or can of suitable size, placing this in a covered box a few inches larger and deeper than the pail, this extra space being packed with chaff, sawdust, planers' shavings, or similar nonconducting material. The box should be deep enough so that when the water vessel is in place only the top will be above the cover. A water vessel insulated in this manner, if filled with warm water in the morning, should keep free from ice throughout the day.



## CHAPTER IX

# General Care and Management of the Laying Flock

**Back-Yard Poultry Keepers Have the Best Chance to Secure Maximum Production From Hens—How to Hasten Maturity of Late Pullets—Importance of Using Plenty of Suitable Floor Litter—How to Regulate Ventilation in the Laying House—How to Break Up Broody Hens Quickly**

**W**ITH good, well-bred pullets coming to maturity and beginning to lay in October, getting profitable egg yields is largely a matter of proper feeding, comfortable housing and good treatment, and the last-named condition is by no means the least important of the three. Time and again persons whose fowls were in no way remarkable as to breeding, and whose housing conditions were far from the best, have reported most excellent production, for which the only probable explanation that can be offered is that the caretakers were "good poultrymen"—meaning chiefly that they gave their flocks proper care. Laying fowls are far from being machines. They will, as a matter of fact, respond surprisingly to intelligent and sympathetic treatment; and often this is the only "secret" of individual success.

The small-scale operator has a much better chance to secure high egg records from his fowls than those who have large flocks and must depend upon quantity of production for their profits rather than securing maximum returns per hen. Even where all feed is purchased an average of anything over 100 eggs per hen should be clear profit; and when production reaches 125 to 150 eggs or better, as can quite readily be realized in almost any small flock, the net returns should satisfy the most enthusiastic. There is nothing mysterious or especially difficult about getting good egg production either in the winter or at any other time. It is simply a question of having hens or pullets that are capable of laying and of **KEEPING THEM IN LAYING CONDITION.**

It is true that many beginners do not have fowls that meet these conditions, but that is not so much because it is especially difficult to do so as because many will not take the pains to learn what are the essentials in good egg production at any time, and under any condition. An illustration of this point is afforded by a letter recently received from a man who was considering investing in a small flock, but who had become uneasy because of the experience of a neighbor who had "started in pretty strong this fall with about forty hens and to date he has not secured any eggs and has found it a rather expensive matter to carry these unproductive hens for so long a time."

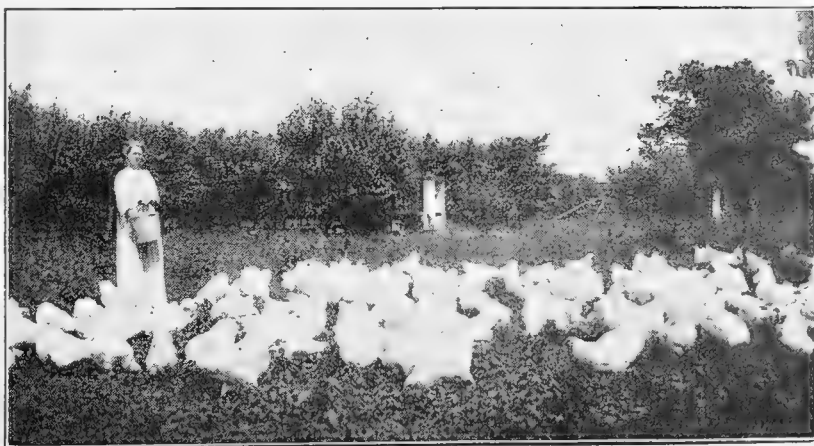
It was unreasonable, of course, for either our correspondent or his neighbor to expect hens to begin laying just as soon as they were purchased and placed in their new quarters, particularly so since their owner was without experience and must learn how to care for his fowls and how and what to feed. Even with skillful management, pullets or hens must have a little time in which to become accustomed to their new quarters

and get into good laying condition. Just how long it will take to do this will depend upon certain factors, these varying in number and importance with different flocks and different operators. If it takes longer than the impatient owner thinks it should, there still is only one practical thing to do and that is to continue feeding the hens properly, keeping them comfortable, and making sure that conditions generally are such as are favorable to production. Depend upon it that when the fowls are in condition to lay, **THEY WILL LAY.**

If the beginner just mentioned, however, was one of the large number who make their start blindly, assuming that "a hen is a hen" and buying without accurate information as to the character or the condition of the fowls; if pullets, not knowing how many weeks of feeding would be required to bring them to maturity; if hens, not knowing how old they were, or whether they were a lot of worthless culls from the flock of some one better informed, he had only himself to blame if his venture proved a losing one. Just because there are only a few conditions essential to success is not a good reason for ignoring all of them.

### Hastening Development of Pullets

Persons who must depend upon buying laying flocks each season often find it impossible to secure early-hatched pullets, and must content themselves with late-hatched, immature birds that will not begin laying for some time. Pullets never begin laying until they are fairly well matured and rounded out, and until this condition is reached they should be fed a ration designed to hasten maturity rather than one intended to promote egg production. On a laying ration with a high percentage of protein, young pullets will keep right on growing instead of maturing, and so long as growth continues there is no hope of their laying. What is needed at this time is not a laying ration, but a fattening one which



A VALUABLE FLOCK OF WELL-GROWN BIRDS READY TO GO INTO WINTER QUARTERS

will check growth and cause the pullets to take on fat instead—a most important point in hastening maturity.

To promote early laying, therefore, the ration should contain liberal proportions of corn and animal feed (fresh butcher's scraps are especially desirable) and, if possible, a daily feed of a rather heavy moist mash—that is, one not too high in crude fiber. It is not advisable to feed oats freely as that grain is particularly favorable to promoting growth. Continue this fat-forming ration until the pullets get plump and begin to sing and otherwise indicate that the egg organs are well developed, after which it may gradually be changed to the regular laying formula.

It is not necessary nor desirable to resort to extreme measures to provide exercise for late pullets. Exercise is helpful in preventing adult fowls from becoming over-fat, which is a sufficient reason for avoiding it with the immature pullets that the owner is deliberately trying to fatten. These will need just exercise enough to enable them properly to digest their food and to keep in good health, but if not too closely confined they will need little attention from the caretaker in this respect. Stimulants and condiments are of limited value in hastening egg production. There is nothing that will "force" either hens or pullets to lay when they are not in condition to do so, and after they are in proper condition, good wholesome feed and plenty of it is about all that is needed to start production, if other conditions are reasonably favorable.

If the flock consists of hens instead of pullets, a fattening ration should be avoided unless the fowls are known to be in poor condition. Molting hens must be allowed time in which to grow the new coat of feathers and to recover from the strain of the preceding laying season. Efforts to bring them into laying early in the winter are rarely profitable. They should be well fed, however, supplying a good nutritious ration, and when their appearance indicates that they are approaching laying condition they should then be placed on a laying ration, avoiding

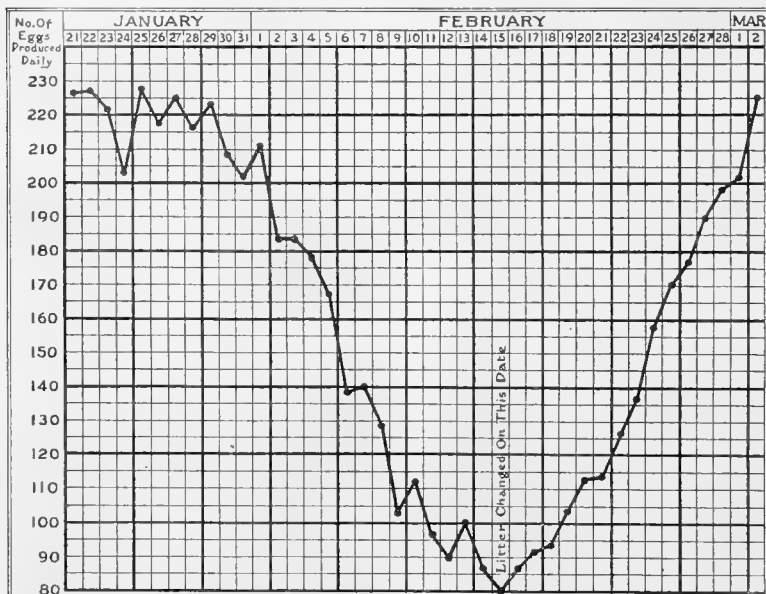
too heavy feeding, however, until egg production actually begins, otherwise they may take on too much fat.

Artificial illumination is extremely helpful in hastening fall egg production in either pullets or hens, and no commercial egg producer can afford to neglect the use of this modern method—see chapter XVI.

**Litter For the Poultry House and How to Use It**

Litter for the poultry house floor is valuable chiefly as an absorbent and deodorizer, as an insulator (making the floor warmer in cold weather), and as a means of providing exercise for fowls in confinement. Unless absorbed by litter the moisture contained in the droppings of fowls will make any house damp and foul smelling when the atmosphere is quite heavy or ventilation is restricted in order to retain warmth. At such times all the help that can be afforded by an ample supply of absorbent material is required in order to keep the house in a sanitary condition. Dampness has an especially unfavorable influence upon the health of fowls, young or old, and when to this is added foul odors, disease is never far distant. In winter, litter keeps the fowls' feet from coming in contact with the cold floor and adds greatly to their comfort. Another advantage is that it forms a cushion upon which they may alight when they fly down from the perches. Bumblefoot and injuries to egg organs are common troubles when fowls are allowed to fly down from high perches and alight on bare, hard floors.

Litter too often is looked upon as a sort of "extra" that can be employed or omitted according to convenience, instead of being regarded as an essential no more to be neglected than feed or water. And there is no more short-sighted economy than being oversparing or indifferent in its use. As an illustration of the practical importance of looking after the supply of litter and of renewing it often enough to keep it reasonably clean and fresh, the experience of a New York poultry keeper may be mentioned. This man had a flock of 440 White Leghorns that



AN ILLUSTRATION OF THE IMPORTANCE OF USING CLEAN LITTER

Above chart shows in graphic manner the egg production of the flock of 440 White Leghorns mentioned on this page. Litter should have been changed by January 25, but this was not done until February 15, and the black line, which indicates the egg yield, shows the result. After litter was changed production quickly came back to normal.

went into the winter in good condition and were laying well until the litter became badly soiled and damp, due to long use and the close confinement of the fowls. Through an oversight there was no straw on hand with which to renew the litter and none could be obtained for some days. As a direct result the egg yield fell off rapidly and from an average of about 205 eggs per day it dropped to 80 on the day when a supply of straw was secured and the house thoroughly cleaned out and relittered. This done, the egg yield at once began to improve and in 14 days was back to two hundred. This record is graphically reproduced in the illustration on this page, which is worth the careful study of anyone who thinks that he can safely neglect this seemingly minor detail.

**How Much Litter to Use**

The amount of litter to use and the frequency with which it should be renewed, will depend upon a number of factors. So far as cleanliness and the comfort of the fowls are concerned, it need only be deep enough to keep them off the bare floor and to prevent droppings from sticking to it. But it must be re-

renewed as often as it becomes noticeably damp or foul smelling in winter, or dusty in dry weather.

So far as saving in the cost is concerned it is doubtful if a sparing use of litter is any more economical than supplying it freely. A thin layer will get damp and foul smelling in a comparatively short time. A deep one will absorb moisture and deodorize the droppings, and will remain comparatively fresh and clean for a much longer time than would the same quantity of material applied in thin layers and frequently renewed. For this reason the most practical and economical plan is to keep a good coat of litter on the floor at all times. As it wears down, add fresh material as needed, continuing to do this until dampness or the accumulation of pulverized droppings near the floor makes a complete cleaning out necessary.

The use that is to be made of the soiled litter and droppings will have some bearing on how freely it is employed. The poultry keeper who grows some cultivated crops and thus is able profitably to utilize the fertilizing value of the droppings can better afford to use the litter freely than can those who have no profitable way of disposing of this valuable by-product. Whatever material is employed, care should be taken to use none that is extremely dusty or moldy. Fowls do not like to scratch in dusty litter, and the constant irritation of the mucous membrane of nostrils and throat caused by the dust sometimes results in outbreaks of catarrhal disorders. Moreover, dust in certain materials contains great quantities of mold spores which, when inhaled, may cause a serious disease of the lungs. Clover hay and shredded corn fodder or stover are particularly dangerous in this respect.

#### Kind of Litter to Use

For most poultry keepers there is comparatively little choice in materials, as they must take whatever is available. Probably few who are able to secure wheat or oat straw at low cost will give any further thought to the

subject. Straw answers the purpose well, remains loose with an occasional stirring, does not readily break up into small particles, and probably is the most attractive of all litters so far as the fowls are concerned. Straw is high in cost in many localities, however, and its use then can scarcely be classed as practical.

Where planer shavings are obtainable at low cost they may be used to good advantage, especially in combination with straw. Shavings alone make a good covering for the floor in warm weather, when they are employed chiefly to keep the floor clean. As scratching litter they are not satisfactory, but a mixture of shavings and straw is preferred by many to straw alone. Such a mixture is more absorbent, provides more exercise and lasts longer than a coat of straw of the same thickness. Shredded corn fodder or stover is used by many, and while not as desirable as straw, is a fairly satisfactory substitute for it. It should be well cured and free from mold.

Various other materials are used locally, such as hay, leaves, pine needles, sawdust, coarse sand, etc., but none can be considered really satisfactory. Hay usually is too fine and packs badly; clover hay mats and the leaves quickly break up into fine dust and are wasted. Forest leaves are good while they last, but they also break up quickly and become quite dusty. Moreover, the labor cost of collecting them is out of proportion to their value. Sawdust and clean, coarse sand are good as absorbents and for the protection of the floor, but of no value as scratching material. In the South, cottonseed hulls have given the best of satisfaction in many cases and are comparatively inexpensive.

#### Seasonable Directions for the Care of the Laying House

Persistent efforts have been made in the last few years to perfect a type of poultry house the ventilation of which would require little or no adjustment to meet changing weather conditions. Throughout what may be called the "poultry belt," however, such changes are so extreme that it is doubtful whether automatic ventilation will ever prove entirely satisfactory. Even if this object could be achieved the practical value of the feature probably would be comparatively slight to the small-plant operator. One of the important details in the everyday care of fowls is SEEING THEM; and the almost inevitable result of automatic methods that reduce the attendance of the caretaker is that the fowls fail to receive that careful observation which is much more apt to accompany frequent visits to the poultry house.

Muslin when clean and dry is the best known medium for introducing fresh air into the poultry house without drafts and without undue loss of heat. It is important to remember, however, that muslin when wet or heavily coated with dust admits but little air. Many persons, therefore, who have houses properly constructed and adequately equipped with muslin curtains often find the circulation of the air too slow because of the condi-



COTTONSEED-HULL LITTER IN LAYING HOUSE

This interior view of a laying house at the Texas Agricultural and Mechanical College Poultry Farm, shows the floor littered with cottonseed hulls. This material is sanitary and gives the house a neat appearance. Photo also shows special eaves and floor ventilation, and manure pit used in place of droppings platform.

tion of the muslin, or because the shutters are kept closed when they should be open. A moderate degree of still cold will do the fowls no particular harm—not nearly so much at any rate as impure air or excess moisture. It is impossible to give an exact statement of the temperature above which the shutters may be left open or below which they should be closed, as there is a decided difference in the amount of cold that fowls can stand, depending upon whether or not they have been gradually accustomed to low temperatures. When winter opens with an extreme cold snap before they have become hardened they will be uncomfortable at considerably higher temperatures than would be the case after they are accustomed to winter conditions. It is necessary, therefore, to use



SCREEN FOR PROTECTING FOWLS FROM DRAFTS

In narrow houses, also in buildings of faulty construction, it sometimes is necessary to provide a screen to protect the fowls from drafts on the perches. Screen here shown is permanent but for ordinary use one which can be fastened up against the rafters when not needed will prove more satisfactory.

more caution early in the season about exposing the fowls to severe cold. After they have become properly hardened there is no need for closing the muslin curtains, day or night, unless the temperature drops down to 20 degrees or below. In the daytime they should always be open when the sun is shining and the temperature is much above zero. An exception to this may be noted in the case of windy weather when the shutters should be closed at higher temperatures than would otherwise be necessary.

The novice who wants to keep his hens as comfortable as possible often is uncertain as to how to determine whether he is giving ventilation enough, but with a little experience he learns to gauge it by the smell of the air and by the amount of moisture present. An infallible sign of too little ventilation is the presence of excess moisture. Reasonably clean litter that feels damp to the touch, and walls and ceilings with frost or moisture standing upon them, all point clearly to the need for more air, which should promptly be provided even though it may involve lowering the temperature of the house beyond what is considered desirable.

#### Preventing Direct Air Currents

Many poultry keepers who have cloth-front houses experience some difficulty with direct air currents which strike the fowls either on the perches or on the floor when the fronts are open. Sometimes this condition is the result of defective planning and construction and can only

be corrected by making suitable changes in the house. It is not desirable to have the bottom of the opening closer than three feet to the floor and, as a rule, at this height there will be little trouble. If the fowls are exposed to direct air currents when on the perches—a common fault in houses that are less than 12 feet wide—they should be protected by curtains.

#### Summer Ventilation

Little need be said in regard to summer ventilation except to urge providing all that the construction of the house will admit. If after doing this the pens still are uncomfortable, additional means of providing for air circulation should be installed. The style of rear ventilator illustrated on page 47 can be adapted to almost any type of house and should never be omitted where the summers are hot. If small windows are placed under the platform, these should be removed as soon as warm weather comes on, which will help greatly in making the back part of the house comfortable. Hens often suffer more from heat than from cold, and production and health during midsummer are apt to be seriously affected by confinement in hot, stuffy quarters.

#### Cleanliness

Speaking generally, a poultry house is clean so long as it is dry and reasonably free from odors; and that condition depends more on ventilation than on the frequency with which the droppings are removed. A droppings platform covered with an inch or two of dry droppings will promptly take up the moisture of each night's deposits and the house will be as free from odor as one that is cleaned every day or two. If the droppings remain moist, however, due to weather conditions, they should be removed daily or, in freezing weather, as often as they thaw out so as to make removal possible. As a means of keeping droppings dry and to make it easier to remove them in freezing weather, it is always desirable to cover the platform at each cleaning with some absorbent material such as dust, sand or sawdust.

#### Treatment of Broody Hens

Those who have fowls of the larger breeds, such as Plymouth Rocks, etc., are apt to find that many of their birds are persistently broody in the summer and unless they are rightly handled the egg yield will be materially affected. Fowls of the lighter breeds, such as Leghorns, Anconas, etc., are less liable to become broody, though there are no breeds that are entirely "nonsitting."

It is a comparatively easy matter to break up broodiness if it is taken in hand promptly. Hens that are allowed to sit for several days, however, before any attempt is made to break them up, will frequently continue broody indefinitely in spite of any measures that may be taken. Just as soon as it is clear that the hen wants to sit she should be taken from the nest and placed in a coop especially provided for the purpose. This coop should be open all around, with a slat bottom. Confine the broody hens until they stop clucking, but do not starve them. Continue to feed them well and supply succulent green feed, water, etc., so that they will keep in good physical condition. Where this practice is followed they will usually begin laying again within a few days. Broody hens that are well fed will begin laying in half the time that would be required in the case of those that have been starved and abused during this period.

## CHAPTER X

# Egg Production Without Outdoor Runs

**Outdoor Runs Not Essential to Profitable Egg Production—The Conditions Under Which Famous Layers in Vineland Contest Are Kept Can Readily Be Duplicated by Any Back-Yard Poultry Keeper—Remarkable Record Made by Flock Kept in Confinement from Chickhood to End of First Laying Year**



ATTENTION has been called elsewhere to the fact that many back-yard flocks are kept confined to their houses all year through, no yards whatever being used. If fowls so confined are to give good egg yields they must, of course, receive proper care and treatment. To do this naturally calls for more work than would be demanded where fowls have ample room, but those who do not find it convenient to provide yards have the satisfaction of knowing that this need not interfere with their keeping fowls successfully if proper methods are adopted.

At the Indiana Experiment Station in a 12-month test with fowls on open range, in yards, and confined to their houses, it was found that the yearly production of pullets in constant confinement was only 16 eggs less than in similar flocks having free range, and only 12 eggs less than in flocks that had good-sized yards. In this experiment rations and methods were the same for all flocks, and it is reasonable to assume that if attention had been given to adapting conditions to the special requirements of fowls in confinement their egg yield would have kept up fully to the production of the range flock. In other words, constant confinement need not prevent good egg production.

As a concrete example of how the confined back-yard flock may be handled and of the results that may be secured, the following interesting report is given. This report first appeared in an extension circular of the University of Missouri. It gives the results secured by Professor H. L. Kempster, head of the Poultry Department, with his own back-yard flock.

## The Story of a Back-Yard Flock

**A Practical Demonstration of the Profit To Be Realized From Fowls Kept in Constant Confinement—Can Be Duplicated by Anyone Who Has Any Back-Yard Space at All**

By PROF. H. L. KEMPSTER, University of Missouri

WHILE neighbors were paying from 35 to 40 cents a dozen for eggs during the early months of 1917, ten White Leghorn pullets in the writer's back yard were demonstrating the efficiency of a small poultry flock in reducing living expenses. These hens were purchased as immature pullets November 1. Only two were old enough to lay before January 1. At the end of seven months, May 31, the flock had produced 749 eggs at a feed cost of less than 14 cents a dozen. The average retail price of eggs in Columbia during this time was not less than 35 cents a dozen. Thus, on the basis of that price, the hens returned a labor income of \$1.32 each.

**The House.**—The house was made of packing boxes and covered with roofing paper. It is 5½ feet square, 5 feet high in front and 3½ feet high in back. Six feet

square and a foot higher would have been more convenient. The door is 2 by 5 feet. Ventilation and light are provided by a space 2 feet by 3½ feet. In the lower two-thirds of this space is a window sash with six 8- by 10-inch panes. The actual cost of this house, not including packing boxes, was \$3.85.

**Method of Feeding.**—The method of feeding, especially the feeding schedule, was adapted to the convenience of the caretaker. This was because he did not get home at night until after the birds had gone to roost. In the morning a pail of fresh water was provided and dry mash was put in the hopper if necessary. Any available table scraps, a crumbly wet mash composed of some dry mash and milk or water, and a quart of the cracked corn were fed at noon. When the days became longer the grain was fed at night. So far as actual results were concerned, the effect was the same. The birds would eat the wet mash at noon and, when their hunger returned, satisfied their appetites with the grain.

**Egg Yield and Cost.**—The egg production by months was: Nov., 27; Dec., 15; Jan., 84; Feb., 116; March, 165; April, 169; May, 173; total, 749. The egg production during November and December was low owing to the fact that only two of the birds were mature enough to start laying before January 1. The back-lot poultry keeper is urged to get only full-grown pullets. Had this been done there is no reason why egg production during the first two months should not have more nearly approached the average. As it was, the feed cost of the 62 dozen and 5 eggs



PROFESSOR KEMPSTER'S \$3.85 BACK-YARD POULTRY HOUSE

was \$8.66 or 13.87c a dozen. Since the average price for eggs paid by the consumer has been at least 35c, it is thus seen that the hens returned a profit of \$13.18 or \$1.32 a bird for a period of seven months. No charge is made against the birds for depreciation. From the standpoint of their feed value they were worth more at the end of the test than they were at the beginning.

Professor Kempster's profitable experience with his back-yard flock is by no means exceptional. Numerous other reports of the successful adoption of this method will be found in other chapters of this book, many of these reports showing much greater average production. It will be appreciated that starting late with immature pullets is in no way a fair test of what may be accomplished, though even that handicap did not prevent realizing an excellent profit. What may be done by way of getting truly high egg production from fowls in close confinement, under favorable conditions and with the right kind of stock, is indicated in the following article:

### "Egg Factories" in Door Yards\*

Constant Confinement No Bar to Securing High Egg Production—Methods of Handling Record Layers at Vineland Contest Can Be Successfully Adopted by any Back-Yard Poultry Keeper

By GRANT M. CURTIS,

Editor of Reliable Poultry Journal

**I** OWN at Vineland, the last week of April, this year, we spent several hours on the plant of the Vineland International Egg-Laying and Breeding Contest, in company with Professor Lewis and Elmer H. Wene—the latter being resident superintendent of this contest. As we were filling our notebooks with the valuable facts Mr. Wene was giving us, based on the care, management and world-record production of the one thousand birds engaged in this contest, we wrote down the following, among other things:

"Last week our birds here—the entire one thousand—averaged better than 65 per cent production. Several of the Leghorn pens reached 70 per cent production. That means seven eggs a day from ten birds. The 'high peak' of production was attained two or three weeks ago when the entire one thousand birds reached 67.7 per cent production."

"No," continued Mr. Wene, "they have not been let out of these houses, not a day nor an hour, since November 1 of last year, on which date the contest started officially. Nor will they be let out until about May 15, or perhaps a little later than that—not until we find there is a perceptible drop in production. By that time broodiness probably will be getting in its work, which will cut down production. However, if as late as May 15 they are still laying 60 to 65 per cent, we shall not let them out in the yards until production actually drops to about 50 per cent.

"These houses are uniformly 8 by 10 feet in size and each house connects with an alfalfa yard or run that is 34 by 80 feet in size. During the three-year period of this laying and breeding contest we are carrying ten birds to each house, but starting next November 1, in our second laying and breeding contest, we are to place twenty birds in each of these houses. An 8 by 10-foot house gives us

80 square feet of floor space; therefore the 20 birds will each have 4 square feet of floor space, which is regarded as ample, in general practice."

Think about this for a few minutes! Here we find expert management of domestic fowl that has for its object maximum egg production, under what are believed to be highly favorable conditions. Professor Lewis and Mr. Wene are deservedly proud, are truly elated by the wonderful egg production they are obtaining this year in the Vineland Egg-Laying and Breeding Contest. These birds, under their care, are many thousands of eggs ahead of any similar contest ever held in this country. And under what conditions are these high egg records being made? Under exactly the conditions that easily can be duplicated in any dooryard!

The Vineland 8 by 10-foot poultry house is a simple affair—both simple and inexpensive. Such a house can be located in almost any dooryard and positively no runway is needed as regards the health of the birds or to secure high egg production, from the time that ready-to-lay pullets are placed in the house in the fall of the year until these birds start to molt the following summer and then can be disposed of one at a time on the home table as meat for the family, or sold in the local market. Said Mr. Wene further:

"Under no circumstances would we let these contest birds out in the runways until they have gone off in production and have dropped to about 50 per cent, as before stated. To let them out now (April 28) would be a serious mistake as regards egg production—would cause their production to drop 15 to 20 per cent in 48 hours or such a matter. Naturally they would like it, and if we were handling these birds as breeders with the intention of hatching their eggs, it might be a good thing for them. But our object is to get maximum egg production and it has been proved conclusively that to let these birds out in the yards would materially cut down their egg yield."

#### Suggestive Results in Time Past

At this point permit us to digress a bit—going back 15 to 18 years in hen history. Off-hand, without looking up actual dates, we think it was about 18 years ago that writer visited the poultry plant of C. H. Wyckoff, then located near Groton, New York. At the time of our visit he had 600 to 700 White Leghorns that he was keeping mainly for egg production—the eggs being sold for hatching purposes in season and on the market for table use the balance of the year. His houses, as we recall it, were 16 by 40 feet, each with a partition through the middle, making the pens 16 by 20 feet and each pen connected with a yard or runway two rods by five rods in size, or practically 33 by 85 feet. Mr. Wyckoff housed in each pen 50 to 70 birds.

One year, for the entire 12 months, Mr. Wyckoff kept 600 S. C. White Leghorns in these houses and yards, starting with an even 600 and losing only about a dozen during the year, which losses were replaced promptly from his surplus stock. Away back there, 16 to 18 years ago, he obtained the remarkable egg yield of 194 eggs per hen per year from this flock of 600 "business hens," kept under the conditions here described. These hens, except in winter, were allowed to run out in the yards, and green feed in the form of cabbages, mangels, etc., was fed to them regularly. However, one pen of these Leghorns, located in an end house, had free range in a three-acre apple orchard that, during the open season, was well

\*Reprinted from September, 1919, issue of Reliable Poultry Journal.

covered with grass—it looked like blue grass to us. Mr. Wyckoff at the time was quite puzzled about this pen because the egg yield from it ranged 15 to 20 per cent less than from the same kind and quality of birds in the other houses that had access only to much smaller yards from which they had stripped every vestige of grass or other green feed. Here was a clear hint that too much range will cut down the egg production rather than help keep it up to average or insure an increase.

Two or three years later we visited the home and poultry plant of Herbert N. Rollins (since deceased), at Woodville, Mass., at that time a leading successful breeder of Light Brahmas of exhibition quality, known as the Giant Strain, winners year after year at Boston, New York, etc. Here we found that Mr. Rollins had crossed White Leghorn males on Light Brahma cull pullets (pullets not up to top-notch grade in exhibition points) and we were much interested in his method of handling the progeny of this cross—meaning the pullets of course—for egg production. He had a long poultry house, a rather ramshackle affair, about 14 by 100 feet, as we now recall it, which he divided into pens of 12½ by 14 feet, or perhaps a little larger. Two-inch-mesh wire poultry netting formed most of the south or front wall of this house (roof sloped to the south, giving a low front, comparatively), but there was a muslin-covered frame that could be let down from the inside to cover the wired front in extra cold weather, also to prevent snow and sleet from blowing in.

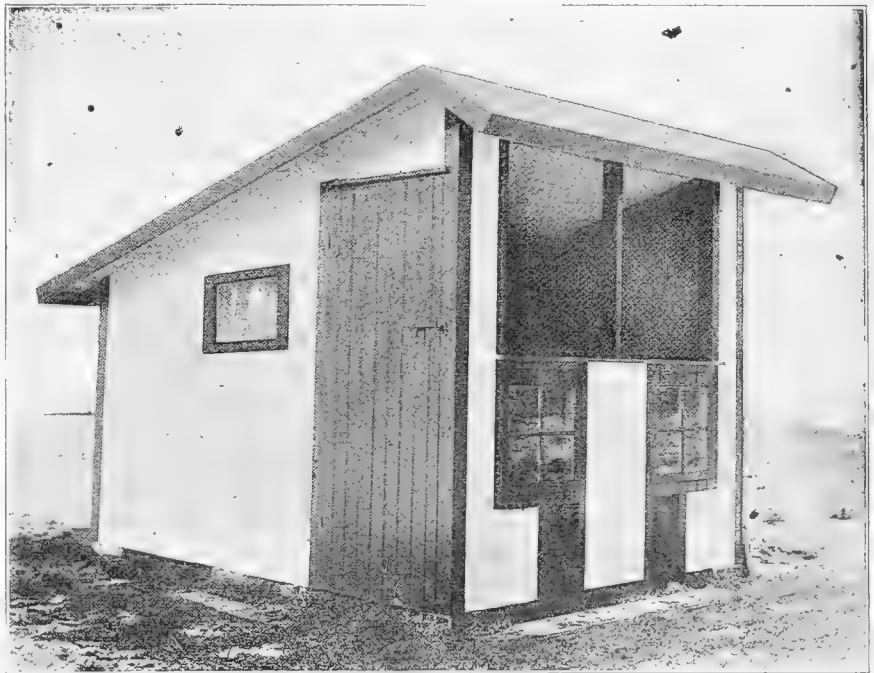
#### Confined Throughout Entire Laying Year

In each of these pens Mr. Rollins placed about thirty of the crossbred pullets (they looked like White Rocks with moderately feathered legs), quartering the birds there in late October when he took them off the range, and these birds were kept confined continuously in the pens here described throughout the winter and following spring, up to the time when they began to molt in the following June, July or August. Then they were sold on the market for table use. What was meant to be egg-forcing feed was given them, the definite plan being to obtain as many eggs as possible during their first year of production, then to market them promptly when they began to molt and had stopped laying.

We were at Mr. Rollins' place in mid-June, as we remember, and up to that time these crossbred pullets, closely confined as here described, had laid an average of 122 eggs per hen, which was not all bad for that "day and generation," yet here we had the same method of close confinement throughout the winter and following spring that now is being employed with such illuminating and convincing success at the Vineland International Egg-Laying and Breeding Contest!

In the "old days" everybody was taught to believe that hens, in order to be healthy, must have range. Also we were given to understand that unless hens had outdoor

range, especially in the springtime, they would not lay well. This meant an eternal conflict, so to speak, between the busy, thrifty hen and the home or neighbor's garden. Those claims now are found to be erroneous. They simply were not and are not now true. The conditions and results—in fact, unequalled results—at Vineland have clearly and fully proved this. Those hens at Vineland do their best work in confinement, as regards prolific egg yield, and it would be entirely practical to keep them confined straight through the spring and summer, until the different individuals go into molt, by which time they will have ended their first year of production as pullet hens. We have here, then, the solid foundation for a back-yard or dooryard branch of the poultry industry, for the location and successful management of a profitable "egg factory" in every house yard where a small coop, 8 by 10 feet in size, can be located, in which coop ten to twenty ready-to-lay pullets can be placed in the fall. And if a gasoline lamp is centrally located in



VINELAND CONTEST HOUSE SUITABLE FOR BACK-YARD "EGG FACTORY"

This house is 8 by 10 feet and at Vineland is used with gravel or sand floor. Fowls at the contest are kept indoors from the time the contest begins, November 1, until well along in the following summer. House will accommodate about 20 layers.

this coop, suspended from the ceiling, or if a twenty-five-watt electric incandescent lamp can be hung from the ceiling, the fortunate owner of each dooryard egg factory will be able liberally to supply his home table with new-laid eggs, from September or October of each season for a period of eight to ten months, in a profitable and satisfactory way not dreamed of half a dozen years ago. All the facts that fully support the foregoing statements are now at hand—have been furnished us in official form. That was one of the impressive lessons we learned at Vineland this last spring and we are glad to be able to present it in these pages with special and deserved emphasis. Without a doubt the location of ten to twenty-bird "Egg Factories" in tens of thousands of dooryards will benefit enormously the general public, and this branch of industry should therefore be encouraged in every practical way.

### Raising Day-Old Chicks in Confinement\*

Six Hundred Leghorn Day-Old Chicks Are Successfully Raised in Close Confinement—In the Fall the Best Pullets in the Flock Are Selected and Kept an Entire Year in the Same Quarters

By G. WEBSTER MOORE, New York

**EDITORIAL NOTE:** The author of the following article goes a step farther than recommended in the preceding article, not only keeping his pullets in confinement throughout the laying period, but making his start with day-old chicks which are raised in the same close quarters that the pullets are to occupy when they reach maturity. An itemized account of receipts and expenditures, accompanied Mr. Moore's article, but is omitted for lack of space.

**I**N ORDER to satisfy himself as to the profit in back-yard poultry keeping under present conditions the writer undertook and has recently completed the following tests:

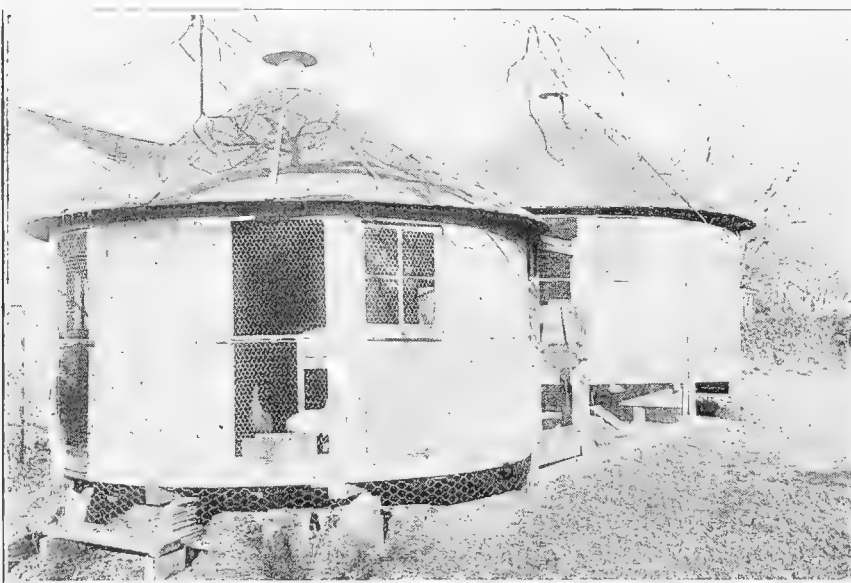
1. Can day-old chicks be reared in large numbers to maturity and at a profit, when confined to the limits of a back-lot house?

2. Can pullets be reared with sufficient stamina to stand the strain of the first laying period if confined to the house, and made to pay a profit?

The two round houses shown in accompanying illustration were used in these tests, being set up on the back lot of my home. May 15, 1917, 600 Single Comb White Leghorn day-old chicks were put in the 16-foot house, the fixtures provided for the laying flock being removed, and the interior heated with a standard stove brooder.

The first three weeks they were fed Pratt's Baby Chick Feed. This feed was gradually changed to a mash composed by weight of one part each of bran, middlings, corn meal and ground oats, which was constantly before them. Their grain was fine cracked corn with a small per cent of pinhead cats fed in the litter to compel them to exercise.

\*Reprinted from February, 1919, issue of Reliable Poultry Journal.



THE TWO ROUND POULTRY HOUSES USED BY MR. MOORE

These houses are blocked up off the ground, providing a run underneath. Here Mr. Moore raised the chicks from which he selected the 160 pullets which formed his winter laying flock. From the time the pullets were hatched until the end of the first laying season they were never allowed outside these houses and the space underneath them.

They were fed all the sour skimmed milk they could eat from the end of the first week until they were five months old. Once each day they were given a moist mash composed of the dry mash wet with hot water. Fine oyster shell was given for grit. There was always before them a generous supply of lawn clippings. At four weeks of age the cockerels were separated from the pullets, put underneath the house and at eight weeks sold for broilers.

At eight weeks of age 80 pullets were put into the 12-foot house. The remainder of the pullets were given the 16-foot house with the run underneath. Ninety-seven pullets were sold at three and one-half months old, the remainder—160 pullets and 3 cockerels—were grown to maturity. The first egg was laid October 5—at 4 months and 21 days—by a pullet that weighed 5 pounds. Account herewith gives the financial report of the first test. Out of the 600 chicks 67 died during the test.

**Account with Chickens, May 15 to October 14**

Receipts (value of stock sold and on hand).....	\$ 408.20
Expenditures (including cost of chicks and interest on investment).....	352.49
Net profit.....	\$ 55.71

**Pullets Kept Without Yards**

The second test was begun October 15, 1917, with 160 pullets at 5 months old, and continued one year to October 15, 1918. Sixty pullets were put in the smaller house, 100 in the larger.

Their grain feed consisted of bolted fine cracked corn until June, when it could no longer be obtained. A commercial mixed grain feed was given the remainder of the year. About 14 lbs. were fed each day, an hour before dark, in deep litter. A dry mash was kept before them at all times, made of one part each, by weight, of bran, corn meal and ground oats, until April, when bran was obtainable. From April 1 to the end of the year the mash was made of 4 parts Shumaker's Stock Feed and one part buckwheat middlings.

Each day about 3 p. m., a moist mash was fed, made of 1½ lbs. alfalfa meal soaked in hot water during the day, to which was added 4 lbs. of meat scrap, a little salt and sufficient of the dry mash to make a crumbly mixture. Occasionally in this feed some poultry tonic was given. For grit they would eat nothing but oyster shell. Fresh water was always before them and given hot in cold weather. Sprouted oats were fed during the winter and lawn clippings in summer.

Six pullets died from unknown causes and eleven were killed. These birds were never pampered, but the attendant never neglected to give them their feed and water on time and kept the houses properly cleaned. The eggs and poultry were sold at the door to a shipper who paid the regular price for shipping to the wholesale market. Grain and mash feeds ranged in price from \$4.00 to \$4.60 per 100 lbs.

**Account with Pullets, October 15, 1917 to October 14, 1918**

Receipts (value of stock on hand).....	\$1,249.76
Expenditures (including interest on investment).....	902.39

Net Profit.....	\$ 347.37
Total profit on chicks and pullets.....	403.03
Eggs laid.....	25,295
Average per hen.....	175.45



## CHAPTER XI

# Profitable Markets for Surplus Poultry Products

Information on How to Produce Eggs of Superior Quality and How Successfully to Market Them at Home or by Parcel Post—What It Costs to Produce Table Fowls—How to Special Fatten and When and Where to Sell—Complete Directions for Home Canning of Chickens



THE back-yard poultry keeper who is producing a surplus of eggs or table fowls has a distinct advantage over other producers in that he usually is able to get full retail price for everything he has to sell. As a rule, also, the cost of packing and marketing is reduced to the minimum since most sales are made at home, customers coming to the door for their supplies, or deliveries being made in person as convenient. There rarely is any trouble in finding sale for poultry products, since in every community there is always a demand for fresh eggs and fresh-killed fowls. However, those who are looking to their sales as an important source of income will find it well worth while to give the subject of marketing their careful attention in order to realize as good prices as possible.

The town poultry keeper has an exceptionally good opportunity to work up a select trade in table eggs, doing this on the basis of quality, freshness, etc., and often being able to secure premium prices for what he has to sell. It should be understood, however, that to do this often calls for a good deal of salesmanship. Whatever may be the case in city markets, the average small-town buyer must be educated to the point where any advance over the regular retail price will be cheerfully paid, no matter how superior may be the quality of the product offered. It should be clearly understood, also, that premium prices are conditioned fully as much upon confidence in the producer as on the quality of the article supplied.

No particular class of customers can be depended upon to provide a market for premium-priced eggs. Frequently, persons whose incomes are comparatively small are truly appreciative of quality, while others with much greater incomes develop a most extraordinary streak of parsimony when this question is raised. The only practical plan for those who are seeking to get the best prices for their products is to see to it that their eggs are always of unquestionable quality and attractive in appearance—that is, scrupulously clean and neatly packed—and then simply to try out their customers, adding the premium gradually and dropping, without argument, those who are not willing to pay.

### Quality in Eggs

All eggs are of good quality when first laid but all are not equally good, as condition and flavor are determined to some extent by the ration fed. Fowls that have a normal, well-balanced ration will lay eggs of the best quality, but those that are fed too much mash, too much sloppy kitchen waste, too much succulent green feed, large quantities of onions or other highly flavored feed-stuffs, etc., will not produce eggs of the best flavor, nor, in some cases, will the eggs have the proper firmness and consistency. The average buyer also wants eggs with rich yellow yolks, a character that is determined entirely by the ration. Some kinds of green feed, particularly grass, clover, alfalfa, etc., also yellow corn, supply an

abundance of the pigment which makes yellow yolks. Cabbage, milk, white corn and a ration lacking in corn of any kind, unless reinforced with pigment-bearing green feed, will produce pale-colored yolks.

It goes without saying that those who are catering to a select egg trade will produce only sterile eggs, as fertile eggs are subject to rapid deterioration in summer, even at ordinary room temperatures. The back-yard poultry keeper, of all others, has the least excuse for keeping males in his flock. They are of no value whatever in egg production, they add to the feed bill and, as a rule, their early-morning crowing is highly objectionable to the neighbors.

Special attention should be given to cleanliness, allowing no eggs to leave the premises that are soiled or stained, and of course no one will think of filling orders with small-sized eggs or those that are thin shelled, cracked or in any way abnormal in appearance. All such eggs should be kept at home. Those who pay retail prices or a premium are entitled to eggs that not only are of unquestionable quality but that are in every way attractive in appearance.

Producers living within easy reach of a city market are exceptionally well placed for working up a special retail trade. An excellent illustration of the way in which a city market may be developed and served is found in the experience of R. W. VanHoesen, a New York poultry keeper who has made his back-yard flock a source of considerable additional revenue. Mr. VanHoesen lives on a town lot measuring about 80 by 200 feet. Finding his home market unsatisfactory, he developed a private retail trade in Buffalo, fifty miles distant. The eggs from "Beauty Farm" were packed in attractively printed pasteboard cartons and carefully sealed. The eggs were scrupulously clean, and as they were gathered regularly, stored in a cool cellar and delivered twice a week, they were entirely satisfactory in quality. At first they were delivered in suit cases by messenger service; afterward they were shipped in regular thirty-dozen cases consigned to a schoolboy who was hired to deliver them. Monthly bills were sent by mail and not a dollar was lost through bad accounts.

Mr. VanHoesen secured his first customers by personal solicitation, taking pains to have them grouped for convenience in delivery. After getting started there was never any difficulty in finding customers, as the recommendations of the first ones secured increased his list faster than he could increase his production. Prices were based on an advance of five cents over the highest New York quotations. After getting established, however, it was not found necessary to follow market fluctuations closely, the price being changed only three or four times during the year.

During the broiler season surplus cockerels were disposed of to these customers, who took all that were offered them at \$1.25 to \$1.75 per pair, dressed (these were

prewar prices). From a back-yard flock of 150 hens handled in this businesslike way Mr. VanHoesen made an annual profit of \$300 to \$400. All the time, however, he kept improving his flock and studying problems of mating and breeding, until his reputation as a breeder secured for him a still more profitable market in filling



AN ATTRACTIVE CARTON FOR THE RETAIL EGG TRADE HELPS IN MAKING SALES

orders for eggs for hatching and stock for breeding, and the retail trade had to be given up.

Many find parcel post a practical way of serving city customers. Eggs may be shipped quite safely by this method, delivery is prompt, and the cost is not extreme if several dozens are included in a single shipment. The experience related in the following article will be suggestive and encouraging to those who are considering this method of marketing.

## Marketing Eggs Successfully at Retail By Parcel Post

Shipments Direct to Consumer by Parcel Post Go Through in Good Order When Properly Packed—Cost of Marketing in This Way Is Not Excessive if Returnable Cartons Are Used

By HAROLD W. GOULD, New York

**I**N LOOKING back over several years' experience in building up a profitable parcel post egg trade in New York City and Brooklyn, I find that the marketing problems present themselves in a fairly regular order, and that if these are carefully met and carried out in a businesslike manner, the marketing of his product will give the egg farmer little trouble, especially if he lives within 50 to 100 miles from a large town, city, or other good prospective market. Marketing problems may be listed in order as follows:

1. Securing a high-quality product.
2. Finding satisfactory customers and keeping them satisfied.
3. Finding a shipping box that will carry the eggs at small cost and without breakage.
4. Keeping accurate records and making collections.

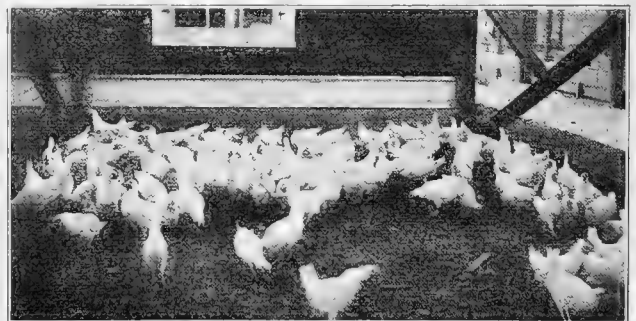
Naturally, only high-quality eggs will satisfy a high-price market, and every egg farmer can easily produce that quality if he will systematize his work. All it requires is to have the fowls kept in clean houses, fed upon clean feed free from anything that will give the eggs an objectionable flavor—such as onions, garlic, etc. The eggs should be laid in clean nests, should be gathered twice daily, cleaned, graded as to size and color, candled, packed, and sold when not more than two days old. It should be the pride of every egg farmer to sell eggs of as good quality as it is possible to produce.

When we can honestly feel that no one can produce

better eggs than we offer, we are ready to approach problem 2—that of finding satisfactory customers and keeping them satisfied. This problem has been the stumbling block of many otherwise successful farms. I have tried several methods with varying degrees of success, and failure. Complete success hinges on getting in touch with the right class of people—people who know and appreciate what a good egg is, and who have the means to pay what the eggs are worth. My most fruitful lead, and the one from which I have secured as many customers as I could possibly serve, has been through obtaining from some person (high-class tailor, perhaps a ladies' shop selling high-priced gowns, etc.) dealing with a class of people whom I wished to reach, a list of his customers whom he could recommend. Another means is to buy a list of names of the best people. Still another way is to advertise in the daily papers of the town in which you wish to sell. Send your prospective customers a neatly typewritten letter stating plainly exactly what you have to offer, the conditions under which your birds are kept, the wholesomeness of the rations fed, and the care used to safeguard the high quality of the egg from the time it is deposited in the nest until it reaches the customer. Tell him as briefly as possible just what YOU would like to know if you were the prospect instead of the salesman.

After you secure a few customers of the right type your troubles in marketing will be over. If your eggs are what they should be—always of the same high quality and freshness, always of a uniformly fair size and even color, always full bodied, absolutely new laid and wholesome, delivered without breakage and on time—you will not only hold your old customers, but they will tell their friends, who in turn will tell their friends, and it will not be long before your sales at good prices will be limited only by your ability to produce the eggs. This class of people will pay well for a product in which they can place absolute confidence. The price will not make much difference if it isn't unreasonably high.

The next problem is that of finding a parcel post shipping box that will carry the eggs at small cost and without breakage. This detail gave me a great deal of trouble for a long time. Sometime ago, however, I succeeded in finding two types of boxes which have practically ended my troubles along that line. The boxes which I prefer for steady customers are made of metal. They come in several sizes and are made of light but strong material. They take no more postage than paper boxes and when eggs are properly packed in them it is almost necessary to throw a trunk on them to cause breakage. Instead of using the regular fillers, I use, in most of my boxes, a regular 1-doz. egg carton. These fit the metal



A FLOCK OF LEGHORN BROILERS ON POULTRY PLANT AT MANITOBA AGRICULTURAL COLLEGE

boxes perfectly and, with a layer of excelsior on top and bottom, carry fully as well as with the regular fillers, and can be packed much more rapidly. Reversible address cards are supplied with these boxes and the boxes can be used almost indefinitely. For customers who do not care to return the shipping boxes I use a box made of corrugated paper.

Our last problem, and one which must be properly handled if we are to make a success of parcel post marketing, is the keeping of accurate records and making collections. It seems strange that so many otherwise progressive poultrymen will continue to slip along year after year with no definite method of keeping accounts, no accurate idea as to whether their business is operating at a good profit or a lean one, no data in black and white to tell them just where they stand at all times. No up-to-date business men in other lines would think of trying to manage their affairs without records, and likewise no egg farmer can afford to neglect record keeping.

**MARKETING TABLE FOWLS**

The poultry raiser is fortunate in having a market for his fowls at practically all stages of growth from the time they are salable as squab broilers, at a weight of three-fourths to one pound each, until they are fully grown. He need not carry his chickens to any given size regardless of cost or probable future market, but can sell them whenever, in his judgment, they will command the largest profit upon his investment of capital and labor or when it best suits his convenience.

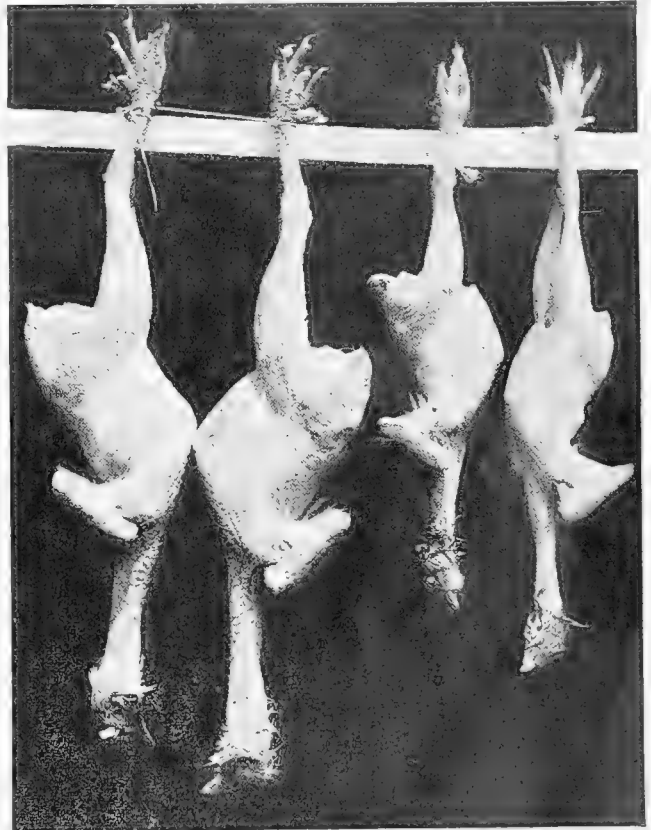
Whether the supply of table fowls is produced primarily for table use, or simply represents surplus cockerels and cull pullets in broods annually provided for renewing the laying flock, much of the poultry keeper's profit will depend upon the judgment he shows in marketing. Many persons who raise fowls make a mistake in carrying them too long, while others, under different conditions, suffer equal loss of possible profits by placing them on the market when partially grown instead of keeping them until they reach larger size. It is not practicable to lay down definite rules for determining when to sell but it ought not be a particularly difficult matter for the individual to decide this for himself, taking into consideration the amount of feed required to produce additional gains, cost of feed, the probable selling price, and the room available for accommodating the fowls.

**Four Pounds of Feed to One Pound of Gain**

The amount of feed required to produce a pound of gain varies with the season, the breed and the conditions under which the chicks are kept, but speaking generally, from three to four pounds of grain will be required for each pound of gain. For example, in some experiments made at Cornell University, the feed consumed per pound of gain in chicks up to six weeks of age, varied from 3.27 to 6.12 pounds, with an average of 4.21 pounds. During the next six weeks, or from six weeks to twelve weeks of age, from 3.4 to 4.1 pounds were required to produce a pound of gain, averaging 3.8 pounds. These weights represent "dry matter" and should be increased by ten to twelve per cent to get the ordinary weight of feed used. The chicks in this experiment were Leghorns kept in comparatively close confinement and probably represent maximum feed consumption for gains secured. At Guelph (Ontario) a mixed lot of 345 chicks, consisting of Orpingtons, Wyandottes, Rocks, Leghorns, etc., consumed an

average of 3.2 pounds of grain for each pound of gain, the fowls being grown practically to adult size. Another lot of 733 chickens, similarly handled, made an average gain of one pound of weight on 3.34 pounds of grain. The statement is also made that "several years' figures show that 4 pounds of grain will produce a pound of gain in live weight." At the Pennsylvania Experiment Station, mixed lots of chicks, six to twelve weeks old, confined to yards, consumed 3½ to 4¼ pounds of feed to one pound of gain.

On the farm, where the fowls have free range and where a good part of their living is picked up in the form of waste grains, weed seeds, green feed, bugs, worms, etc., the amount of grain required will be lower than in the foregoing statement, and for that reason farm-



**SUPERIOR-QUALITY BROILERS AND ROASTERS**

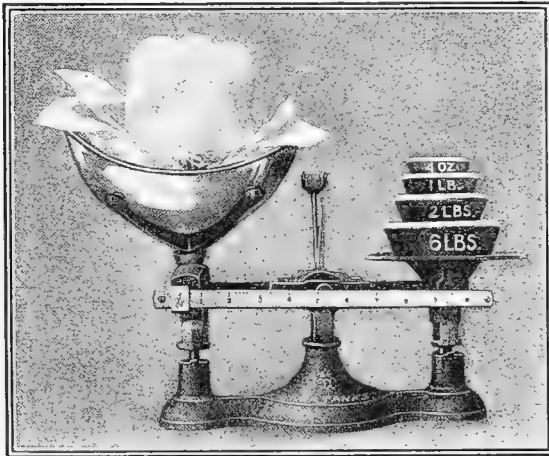
The two fowls on the right are two-pound broilers, 8 weeks old. The two on the left are fancy, small soft roasters 4½ months old, weighing 3 pounds each. The back-yard poultry raiser will find his best profits in producing table fowls of quick growth and "fancy" grade.

raised fowls can be sold at a lower price than back-yard producers can afford to accept. As far as our information goes, the amount of feed required to produce a pound of gain does not appear to vary greatly from chickhood up, so long as growth is rapid, though it naturally increases as the fowl approaches adult size and gains are more slowly made. The first pound is necessarily much more expensive than succeeding ones, since to the cost of feed must be added the value of the eggs from which the chicks were hatched and the incubating and brooding cost. Moreover, much more expensive feeds are commonly used at this stage of the chick's development. In the case of Leghorns, it is generally conceded that the sooner the poultryman can get rid of his cockerels the better off he will be though, as a matter of fact, Leghorn cockerels

with proper handling can be brought to a weight of two pounds without the use of any more feed per pound of gain than is required with chickens of the larger breeds.

#### When to Sell Broilers

Growing chicks are marketed as squab broilers, meaning chicks that will dress from  $\frac{3}{4}$  to 1 pound each, regular broilers dressing from 1 to 2 pounds each, and fryers dressing  $2\frac{1}{2}$  to  $3\frac{1}{2}$  pounds. The greatest demand for squab broilers is in late winter, at which time they command extremely good prices. The principal market for



FINE ROASTING FOWL WEIGHING NINE POUNDS, FOUR OUNCES AT SEVEN MONTHS

them is in hotels, restaurants and, to a limited extent, in private families. Since the additional feed required to grow these chicks to full broiler size is so slight, many prefer to do this, and comparatively few dispose of their chicks as squab broilers aside from those who have Leghorns or who must sell off the cockerels in order to make room for later hatches, or to give the growing pullets more room.

Regular broilers are in great demand in the spring and early summer and command excellent prices, these gradually falling off as the season advances and farm-raised stock makes its appearance on the market, until late in the summer they usually reach a low level. Under backyard conditions and for average markets, it seems safe to say that so long as broilers will bring 25 to 30 cents per pound live weight they can be sold as such to better advantage than if raised to larger size.

Fryers or springers include the great bulk of the young chickens used on the home table. Early broilers generally are regarded as an extravagance, to be indulged in only infrequently. When farm-raised chickens begin to flood the market, however, prices go down and size increases to  $2\frac{1}{2}$  to  $3\frac{1}{2}$  pounds, and almost any American family can afford, now and then, to have "fried chicken."

#### When and How to Special Fatten

Growing fowls, as they run at large, rarely are fat, and to put them in best condition for marketing, with tender, juicy flesh and carrying a fair amount of fat, it is necessary to confine them and supply special rations. Young fowls kept in close confinement for a couple of weeks and heavily fed will make rapid gains in weight and will improve greatly in quality of flesh, especially if "milk fed," in which method buttermilk forms an im-

portant part of the fattening ration. Such fowls usually command a good premium over the price paid for poultry of ordinary quality. Remarkable gains in weight often are secured in special fattening, 30 to 50 per cent increases frequently being secured in the ten days to two weeks which usually are occupied in the process. In fattening a double profit is realized since, in addition to the rapid gain in weight, the entire carcass of the fowl is worth more, pound for pound, than before it was put through the special-feeding process. There is no comparison between the tough, stringy flesh of ordinary fowls and the tender, juicy flesh of one that is properly fattened.

Confinement is an important detail in special fattening, the fowls being either closely confined to house pens in flocks of twenty-five to fifty, or placed in specially designed fattening crates. So far as gains are concerned, it does not matter greatly which method is followed with broilers, though Leghorn cockerels will do better in small yards or roomy pens than in crates. Pen feeding is simpler for the inexperienced feeder, while crate feeding saves greatly in houseroom and produces somewhat better quality of flesh.

#### Pen Fattening

Because it reduces the activity of the fowls to the greatest practical extent, also for other reasons such as economy in houseroom, labor, etc., crate fattening is preferred by commercial fatteners, but pen feeding undoubtedly has its place in the production of good-quality table fowls. Rations and methods of feeding should be practically the same in crate feeding. Provide suitable feed troughs into which the fowls cannot put their feet, and keep the pen floor covered with coarse sand or planer shavings to absorb the moist droppings that are characteristic of fowls when fed on sloppy rations such as are demanded by this method of feeding. Keep the house clean enough at least to be free from offensive odors. Pen-fattened fowls, if neglected, will soon become quite filthy and in this condition cannot reasonably be expected to make profitable gains.

#### Crate Fattening

In crate fattening the fowls are confined to especially constructed coops or crates, generally of a type similar to the one illustrated herewith, which has a capacity of twelve to eighteen fowls, depending upon their size. Where small numbers only are to be fed, the crates may be quite simple in construction. The bottom should be slatted to permit droppings to fall through to the pen floor and the crate should be elevated about two feet. The crate here shown has two partitions, dividing the fowls into three lots of four or more. It seldom is desirable to have more than eight or ten in one lot.

The composition of the fattening ration usually is limited to locally available meals, whatever these may be. Fortunately, corn meal can be secured almost everywhere, and is the one indispensable ingredient. In case of necessity, fair results can be secured with corn meal alone, mixed with milk. Much better gains and better quality of flesh will be secured, however, if more variety is provided. A good fattening mixture for crate feeding is 60 per cent of fine corn meal and 40 per cent of red dog or white middlings. Another good ration consists of equal parts by weight of corn meal, red dog and oat flour. Finely ground oats with hulls sifted out, oat flour,

barley flour, buckwheat middlings or almost any fine meal may be used, though in rather limited amounts except in the case of oat flour which can be used in any desired proportion when the price is favorable.

The ground grain mixture, whatever it may be, should be mixed with buttermilk or sour skim milk until it is quite thin, or so that

it will drop from the mixing spoon or paddle, but will not run. Fowls are given all of this gruel-like mixture they will eat in twenty minutes, and the surplus then is promptly removed. If the feeding does not continue more than ten days to two weeks it is not necessary to supply grit, green feed or water during this time, but for longer feeding periods better gains will be made if these are provided.

If milk is not available and the mash must be mixed with

water, add about 5 to 10 per cent of meat scrap to the mixture. There are a number of ready-mixed fattening rations on the market much better suited to the purpose, frequently, than any that can be prepared at home, and certainly more convenient. The gruel-like mixture just described is especially recommended for crate feeding. For pen-fattened chickens it is better to make the mixture somewhat stiffer.

The length of the feeding period will depend somewhat on the age of the fowls, their general condition, and the market in which they are to be sold. Chickens of broiler size will make their best gains in about ten days and seldom can stand more than two weeks of feeding. Larger fowls will continue to make good gains and to improve in quality and flesh for three weeks, or even four if carefully handled. It is impossible to soften the flesh of well-grown fowls in a short feeding period, though if the market is one which does not demand the highest quality it may not pay to carry the feeding beyond two weeks. Other things being equal, pen feeding may be continued several days longer than crate feeding, without injury to the fowls.

In special fattening, either in pens or crates, the fowls should always be fed lightly the first day or two. Heavy feeding from the start, on a ration to which the fowls are not accustomed, is apt to cause digestive disorders. Throughout the feeding period the attendant should keep a close watch on the droppings of the fowls. The condition of these will indicate the first stages of indigestion more quickly than they are likely to be detected in any other way.

When the appetites of the fowls begin to fail, which should not be before the end of the second week if properly handled, the feeding should be discontinued. Leave the birds without feed for twenty-four hours, then kill and dress them and send to market.

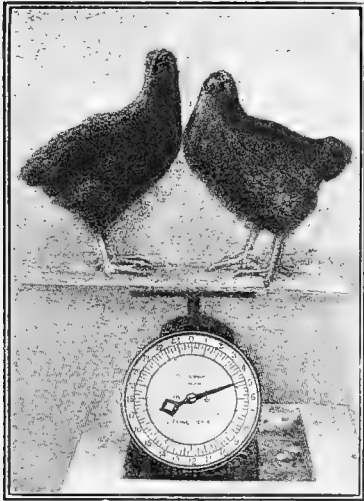
### How to Sell Table Fowls

Without doubt, the producer who is in position to sell his fowls to a select private trade will get better prices than can otherwise be secured, and if he is producing them in sufficient numbers he will find it profitable to cultivate this trade. Many broilers and roasters are required in the hotel and restaurant trade, but few producers are able to establish satisfactory connections of this sort. The average hotel is an extremely close buyer and storage stock appears to be given preference chiefly because of the ease, regularity and certainty with which supplies can be secured from this source.

The preference of the market must be considered in deciding whether fowls should be dry picked or scalded. It is impossible to get top prices for scalded fowls in a market which prefers dry picking. If to be sold to select retail trade, broilers should be fully dressed—that is, they should be picked clean and split down the back with a sharp knife or a pair of heavy shears, and the entrails removed. If shipped to city markets they usually are killed and plucked, but not drawn. In plucking scalded broilers, the removal of pinfeathers is made easier if they are rubbed off rather than picked. This is done by getting the hand well covered with feathers and lightly rubbing the pinfeathers the wrong way, when they come out quite readily. Extreme care in removing pinfeathers may not be profitable where the chicks are sold at wholesale, but for select retail trade it will pay to have them reasonably clean.

### Special Fatten Fowls for Home Use

Those who are willing to give a little attention to proper fattening of fowls provided for home use will find that they can readily have poultry meat of exceptional quality. In spite of the great number of special-fattened or "milk-fed" fowls produced in this country, few persons outside of the large cities ever find them on the market. So far as the average consumer is concerned, his only chance to know what first-class table poultry is, is to do his own fattening. It is not much trouble to do this, and it pays in money as well as in improved quality.



R. I. RED BROILERS

These two S. C. R. I. Reds weighed 4½ pounds when 12 weeks old. To secure rapid growth chicks must be strong and must have first-class care.



A CRATE FOR SPECIAL FATTENING TABLE FOWLS

Chickens intended for the table gain rapidly in weight and their flesh improves noticeably in quality if special fattened in close confinement.

### Canning Chicken For Home Use

The average producer will find it to his financial advantage to use many of his surplus fowls on his home table and should provide amply for his own needs before seeking a market. Even where most of the fowls must be disposed of in late summer, as is usually the case with back-yard poultry keepers, it is possible to have poultry for use on the home table a good part of the year by canning the surplus birds.



CANNED CHICKEN IN MASON JARS

It is just as practical to put up chicken, turkeys, ducks, etc., as fruits or vegetables. The same methods are used and equally good results should be secured.

to do any other kind of canning if proper care is taken.

Especial attention should be called to the fact that soup stock may be put up as successfully as meat. Instead of buying canned soups which not only are comparatively high in price but, as ordinarily supplied, contain a minimum of meat in any form, and only a limited amount of nutrition, the poultry raiser can put up chicken soup, chicken broth with rice, chicken gumbo, etc., which not only will be much more wholesome, nutritious, and palatable than purchased soups, but can be provided at a fraction of their cost.

In preparing poultry meat for canning, no vessels are required which are not available in any household. The cooking (sterilizing) is done in what is known as the waterbath canner—any kind of a metal vessel that can be placed over a stove, range or gas burner. A bucket, lard can, wash boiler or any similar vessel having a tight-fitting lid may be used. It must be deep enough so that the water will be at least an inch above the tops of the jars, and a false bottom should be provided to keep the jars from coming in contact with direct heat, also to provide a better circulation of the water, and a more even temperature.

#### Canning Directions

The following instructions for canning chicken are given by the Missouri College of Agriculture. The methods here described are substantially those adopted by Canning Clubs, Home Economic Departments and practical housekeepers generally, and if followed carefully should insure complete success.

**"Method No 1.** Dress the chicken and leave whole or cut into pieces as preferred. Cover with boiling water and simmer until the meat can be separated from the bones. Return the bones to the liquid and boil it down

The home canning of poultry meat is not an experiment. The experience of thousands of housekeepers, as well as the work done by the canning clubs in all parts of the country, has shown beyond question that the method is entirely practical besides being comparatively simple. As a matter of fact, it is no more difficult to can chicken than

one-half. Pack the meat closely in hot glass jars, add one teaspoonful of salt to each quart and fill the jar with hot liquid. Adjust the rubber and top, leaving the latter slightly loose. Sterilize 3 to 3½ hours in a waterbath canner. Remove and tighten the tops immediately. The liquid remaining may be placed in a jar, sterilized 90 minutes, and kept for soup or gravy. Two pounds of dressed fowl should make one pint of solid meat and a pint of thick stock.

**"Method No. 2.** Cut the dressed, raw chicken into convenient sections. Pack into glass jars, add one teaspoonful of salt to a quart, fill the jar with boiling water, adjust the rubbers and tops as above and sterilize in a waterbath canner 3½ to 4 hours."

Following are some further suggestions on the subject from Farmers' Bulletin No. 839 of the United States Department of Agriculture.

**"Spring Chicken Fried.** After cleaning and preparing spring fries, season and fry as though preparing for serving directly on the table. Cook until the meat is about three-fourths done. If a whole spring chicken, break the neck and both legs and fold around body of chicken. Roll up tight, tie a string around the chicken, and drop this hot, partially fried product into a hot quart glass jar or enameled tin can. A quart jar will hold two to four small chickens. Pour liquid from the griddle or frying pan into the container over the chicken. Place rubbers and caps into position but not tight. Cap and tip tin cans. Sterilize for 90 minutes—see Method No. 1.

"In a similar way any fowl or wild game may be prepared by frying, oven-baking, roasting, or stewing. All may be packed after cooking three-fourths done in any desired way. Hot glass jars or enameled tin cans may be used. When the products are packed while hot in the containers, the hot liquids, gravies, dressings, etc., or hot water should be poured over them. Put rubbers and caps of jars in position, not tight. Cap and tip tin cans. Sterilize 90 minutes—see Method No. 1.

**"Chicken Soup Stock.** Place 30 pounds chicken in 10 gallons of cold water and simmer over fire for 5 hours. Remove meat from bones, then strain. Add sufficient water to make 10 gallons of stock. Fill hot glass jars or enameled tin cans with the hot stock. Partially seal glass jars. Cap and tip tin cans. Sterilize 90 minutes.

**"Chicken Gumbo.** Cut 2 pounds of ham into small cubes and boil 30 minutes. Mince 3 pounds of chicken and chop ½ pound of onions fine. Make a smooth paste of ½ pound of flour. Add above to five gallons of chicken soup-stock. Then add ½ pound of butter and ¼ pound of salt and boil 10 minutes; then add 3 ounces of powdered okra mixed with 1 pint of water. Fill into hot glass jars or enameled tin cans. Sterilize 90 minutes."



A JAR OF CANNED CHICKEN

This is a popular type of glass jar used in home canning of chicken. Jars should be wrapped in paper on shelves to keep contents from bleaching. Tin cans, which are cheaper, are successfully used by many.

## CHAPTER XII

# What the Back-Yard Poultry Keeper Wants to Know About Breeds

**Practical Values of Different Breeds Frankly Stated, With Suggestions on How to Choose Breeds to Meet Individual Requirements or Conditions—Brief Descriptions of Numerous Popular Breeds—Possibilities in Breeding Standard Fowls for Exhibition and Developing Special-Quality Strains—Importance of Striving to Combine "Fancy" and "Utility" Qualities**



PROBABLY no question is asked more frequently by the beginner than "what is the best breed for me to keep?" So far as inherent capacity for production is concerned, however, it is doubtful whether any important difference exists between what are known as the "popular" breeds. Many of the lesser known breeds whose "fancy" points have been developed at the expense of or with indifference to their productiveness, are apt to make a comparatively poor showing at the nest, but such breeds as the Plymouth Rock, Rhode Island Red, Wyandotte, Leghorn, etc., are on more or less of an equality in this respect. For illustration, at the New Jersey Experiment Station the average number of eggs laid by all hens of four popular breeds entered in several egg-laying contests has been compiled and found to be as follows: Plymouth Rocks, 155; Wyandottes, 163; Rhode Island Reds, 157; White Leghorns, 165.

It is probable that there are other breeds that would make equally good breed averages if represented in laying contests in equal numbers, but lacking such proof the beginner will do well to use caution in considering the claims of those whose relative standing is not definitely established, or that are known not to be in favor among commercial poultry keepers. Speaking generally, the relative popularity of any breed or variety is a fairly good index to its practical value—not perhaps to what that value might be if its qualities were developed by careful breeding, but what it is at present.

Of vastly more importance than differences between breeds, are the differences within the breed, due to the extent to which the egg-laying ability of various strains has been developed by careful breeding and selection. At the Vineland Contest the best and poorest averages in the different popular breeds were as follows:

Breed	Average Per Hen Highest Pen	Average Per Hen Lowest Pen
Plymouth Rock.....	222.2	99.7
Wyandotte.....	222.5	118.
Rhode Island Red.....	243.1	132.6
Leghorns.....	222.89	127.7

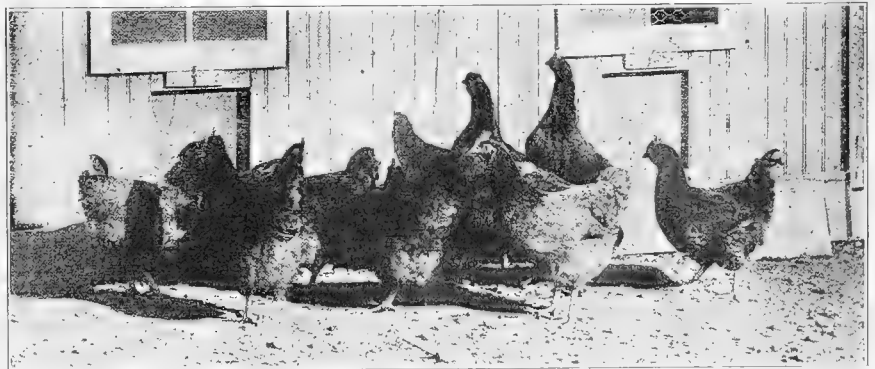
Just how much of the wide margin between the high and the low pens in each breed here represented is to be attributed to differences in inherent egg-laying ability, and how much to condition or age at the time the birds entered the contest, it is impossible to say, but obviously "breed" is of comparatively little importance.

Neither in adaptability to close confinement is there much to choose between the breeds. Large fowls are more

docile in disposition and accept the conditions of close confinement more readily than smaller and more active ones, but unless special attention is given to compulsory exercise they are apt to become overfat and to acquire the various diseases that accompany this condition. This is particularly true after they have passed the pullet year. Fowls of the smaller breeds, on account of their natural activity, are less apt to become overfat and diseased, and will keep in good laying condition with much less attention to exercise. They are more liable to become restless in close confinement, however, and to acquire the vices of egg eating and feather pulling.

### Special Points to Consider in Selecting a Breed

Before deciding on a breed the beginner should determine whether he is going to keep fowls exclusively or chiefly for breeding purposes, for egg production, or for the production of table fowls as well as eggs. If he purposes concentrating attention on breeding exhibition fowls his own personal preference as to "fancy" points will



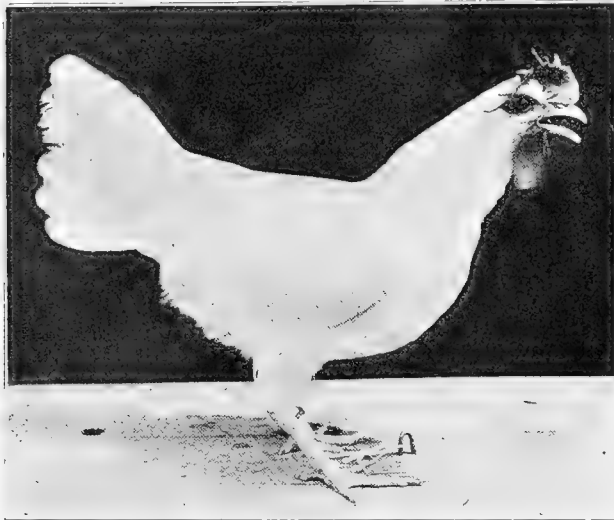
A PEN OF HIGH-PRODUCING R. I. REDS AT VINELAND CONTEST

This pen of 10 Reds laid 1,966 eggs in pullet year, or an average of 199.6 eggs per hen. Individual records range from 148 to 243. Photo from New Jersey Exp. Station.

largely determine his choice. If egg production is the object, undoubtedly a given number can be secured at lower cost from small fowls than from large ones. The former not only consume less feed (about ten per cent less on the average), but they require less houseroom and cost less to buy or raise. The surplus young stock from such breeds is of little value for table use, however, and the adult fowls also are unpopular in poultry markets. If table poultry as well as eggs are wanted, fowls of the larger breeds must be selected. They will average to weigh nearly twice as much at maturity as Leghorns, for example, but with good management their egg production will be fully as great.

There is some advantage in keeping nonsitting-breeds, though it is a matter of convenience rather than of results.

The production averages previously given show that fowls of the larger breeds average to lay practically as many eggs as Leghorns, which would indicate that the time lost in broodiness is more apparent than real. In other words, while Plymouth Rock hens are going through broody periods, Leghorn hens may be taking a "rest" that will occupy as much or more time but which is not noticed simply because there is nothing in the conduct of the birds to indicate it. Much can be done to prevent loss of production through broodiness by giving the hens proper attention. If they are broken up promptly they can be brought back into laying again in a comparatively short time. It is well to bear in mind, however, that in most flocks some hens are much more inclined to broodiness than others, and these should be eliminated from the



A FEBRUARY-HATCHED LEGHORN PULLET LAYING  
AT AGE OF 129 DAYS

This pullet was hatched February 25 and laid her first egg July 4, just 129 days after hatching. Early maturity is one of the poultry breeder's interesting problems. Photo from Missouri Experiment Station.

flock, as it is not desirable to perpetuate extremes in this character if only on account of the trouble caused.

Choice in color of plumage is largely a matter of personal preference. White fowls are objectionable to many town poultry keepers because their feathers almost always present a soiled appearance, which detracts greatly from their beauty. A practical objection to dark-feathered fowls is their discolored skin when dressed. This may not be a serious matter unless the intention is to specialize in broilers, in which case white, buff or red fowls should be selected.

#### Influence of Climate

There are many profitable Leghorn flocks as far north as Canada, but speaking generally, fowls of this breed, with their large combs and tight feathering, are not as well adapted to cold-weather conditions as many of the larger breeds. On the other hand, Leghorns usually stand hot summers much better. For example, during 1916-17 the average production by breeds at Storrs (Conn.) and Vineland (N. J.) Laying Contests was as follows:

Breed	Storrs Average Per Bird	Vineland Average Per Bird
Plymouth Rock	161.	155.
Wyandotte	165.	141.3
Rhode Island Red	152.3	150.6
White Leghorn	107.5	169.7

While average egg yields were not materially different, the relative productiveness of Leghorns and Wyandottes (for example) at Vineland, with its mild winters and hot summers, was not the same as in the colder climate of Connecticut.

There is an indirect way in which the question of breed concerns the back-lotter who buys a new laying flock each fall and each time must negotiate the annual shortage in early-hatched pullets, being compelled regularly to choose between extreme prices for these (if obtainable at all) or more moderate prices for comparatively immature pullets or yearling hens, neither of which can be expected to lay without several unproductive weeks of heavy feeding, with which delay the average backyard poultry keeper is apt to be decidedly impatient. Under such conditions, Leghorn or Ancona pullets have a decided advantage owing to the fact that they come into laying at an earlier age than pullets of larger breeds, hence a higher average of maturity can usually be secured when buying in the open market. This means not only a saving in feed, but more fall eggs. Leghorn pullets, being comparatively small, should be cheaper than pullets of other breeds.

#### Superior Merit of Standard Fowls

Even though the poultry keeper may have no intention of attempting to realize the largely increased revenue that always is possible to him through the sale of breeding stock and eggs for hatching from a well-bred flock, he cannot afford to take up even commercial poultry keeping with nonstandard fowls. Whether the basis of comparison is the productiveness of hens, cost of feeding, or uniformity of characters, external or hidden, the advantage invariably is with standard fowls.

It is not denied that among fowls of inferior breeding there may be some that will possess desirable characters in a marked degree, or that will prove good layers. The proportion of such is small, however, and the uncertainty as to ability to transmit characters to offspring makes their use in the breeding pen invariably disappointing. It is only by mating fowls whose ancestors have been bred for generations towards a definite ideal, that there can be reasonable certainty of securing uniformity in appearance, productiveness, or any other desired character. And granting that many breeders have been more interested in developing and fixing special markings of feathers or other superficial characters than in developing size or productiveness, the fact remains that the commercial poultry keeper who makes his start with fowls of mixed or mongrel breeding deliberately handicaps himself, cuts his possible financial returns in two, or worse, and definitely sets himself back one, two, or more years as a successful poultry keeper.

#### Brief Description of Popular Breeds

**Leghorns.** Among commercial egg producers Leghorns are highly popular and, as has already been stated, where eggs alone are desired they are much more efficient producers than fowls of the larger breeds. Storrs (Conn.) Bulletin 100, in analyzing five-year averages for the International Laying Contest, states that the number of eggs produced from each 100 pounds of feed consumed is 158 for Plymouth Rocks, 159 for Rhode Island Reds, 182 for Wyandottes and 195 for White Leghorns. "In a similar manner the number of eggs required to pay for the feed for a pen of ten birds has been for the same breeds 721, 695, 645 and 627 respectively. It will thus



be apparent that when one considers the returns from 100 pounds of feed rather than the return per individual, Leghorns are exceptionally efficient in the matter of egg production."

If the comparison is on the basis of value of eggs returned for each dollar spent on feed, "Wyandottes and White Leghorns have been practically equal with \$2.53 and \$2.58 respectively. Likewise, Plymouth Rocks and Rhode Island Reds have been very close together with \$2.15 and \$2.18 respectively."

The standard weight of the Leghorn cock is 5½ pounds and of the hen 4 pounds, though in average flocks weights usually will run somewhat below these. There are six varieties of Single Comb and three varieties of Rose Comb Leghorns recognized in the Standard.

Anconas are practically mottled Leghorns and are becoming quite popular in recent years. There are strains of this breed that are highly productive, and to many the mottled plumage is especially attractive. The standard weight of the Ancona cock is 5½ pounds, hen, 4½ pounds. There are Single and Rose Comb varieties.

Minorcas are distinguished for the extra-large white eggs produced, and many who have a special egg trade which enables them to secure good premiums, find it profitable to keep fowls of this breed. There are six varieties of Single and Rose Comb Minorcas. The standard weights of all varieties, except the Single Comb Black, are 8 pounds for the cock and 6½ pounds for the hen. The Black weights are 1 pound heavier in each instance. The large size of the Minorca is some advantage when fowls are sold for table use but the white skin and black shanks of the Black Minorca are much against them, while their extremely large combs make them comparatively unpopular where cold winters are to be expected.

Wyandottes have always been greatly in favor with practical poultry keepers. Their fine bones and plumpness, even as broilers, make them highly acceptable for market, especially among those who want table fowls of moderate size. At the Storrs Laying Contest Wyandottes were next to Leghorns in comparative efficiency in utilization of feed, and practically equal to them in value

of eggs returned for each dollar spent in feed. There are eight varieties. The standard weight of the cock is 8½ pounds, of the hen, 6½ pounds.

Rhode Island Reds have the same standard weights in adult fowls as the Wyandottes. The typical Rhode Island Red is a longer fowl than the Wyandotte and is somewhat closer feathered. This breed is highly popular in all parts of the

country and probably is more generally kept in the South than any of the other general-purpose breeds. The rich color of good Reds is most attractive, and young fowls of this breed, when dressed, are largely free from discoloration due to dark or black pinfeathers.

**Plymouth Rocks** are the largest of the American class, the cock weighing 9½ pounds and the hen 7½ pounds. Seven varieties are recognized in the Standard. Nothing, apparently, can shake the general popularity of this breed, particularly on farms and among those who want large market

fowls. The cockerels make good broilers and as roasters and capons they are popular in practically all markets. At the First, Second and Third Vineland Contests Plymouth Rocks ranked next to Leghorns in productiveness. Fowls of this breed are apt to become overfat in their second year and thereafter when heavily fed, particularly in confinement, and for that reason require careful handling. Where they receive proper treatment, however, just as good results can be secured with them as with the smaller breeds.

**Orpingtons** are quite popular in England and Australia as well as in this country. At numerous laying contests they have made excellent records, particularly in Australian contests. The world's record at present, to the best of our knowledge, is held by a Black Orpington hen that laid 335 eggs in 365 consecutive days in a recent Australian contest. Four varieties are recognized in the Standard and there are several nonstandard varieties. The average weight of the cock is 10 pounds, while that of the hen is 8 pounds. Where white skin and legs are not objectionable Orpingtons are highly popular.

**Brahmas and Langshans** are not in great favor among back-yard poultry keepers. There are strains in both of the breeds that are highly productive but, as a rule, if bred to standard size they are not particularly good layers, and the fowls require rather expert handling in order to give best returns. These fowls are striking in appearance and are great favorites among those who are more interested in breeding for exhibition than for production. The standard weight of the Light Brahma cock is 12 pounds; hen, 9½ pounds. The standard weight of Langshans is 9½ pounds for the cock and 7½ pounds for the hen, being the same as for Plymouth Rocks.

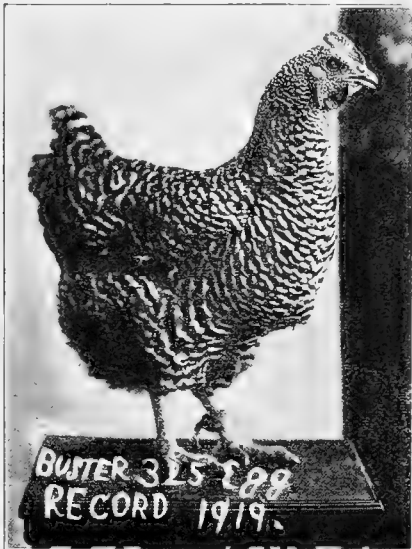
#### POSSIBILITIES IN BREEDING STANDARD FOWLS

Because of their beauty and the uniformity with which they can be bred within definite lines, and, on the other hand, the promptness with which changes or improvement in character may be secured, the breeding of standard fowls is a fascinating pursuit. Thousands of men and



BLACK ORPINGTON HEN WITH RECORD OF 335 EGGS IN ONE YEAR

This remarkable hen made the above record at an Australian Egg Laying Contest. To the best of our knowledge this is the world's record. Her eggs averaged 26.5 ounces to the dozen.



PARKS' STRAIN PLYMOUTH ROCK WITH SWORN RECORD OF 325 EGGS IN 12 MONTHS

women in all parts of the country are giving their earnest attention to the particular breeding problems in which they are interested, which may be the improvement of barring or other markings in the feathers, securing a correct and attractive carriage, approaching more closely to the Standard's description of shape of body, increasing size, securing earlier maturity, developing greater egg production, etc. All of these qualities are capable of being transmitted to succeeding generations and of being further developed and intensified. Just in proportion as the breeder is able to accomplish such results he becomes recognized as a skillful and successful breeder.

#### How to Start

Roomy quarters and ample range afford ideal conditions for breeding fowls, especially where large flocks are kept. Fortunately for the back-yard poultry keeper, however, it is possible to take up poultry breeding successfully even in quite limited quarters. In point of fact, many of the greatest breeders the country has ever known have



A BACK-YARD FLOCK OF PARKS' STRAIN PLYMOUTH ROCKS WITH REMARKABLE RECORD

The pen of fowls illustrated above is owned by Prof. E. F. Grundhofer of State College, Pa. Practically every hen in flock has a record of 200 or more eggs in 12 months. Hen in middle, third from either right or left, has record of 313 eggs in that time.

acquired their skill, established their strains, and produced some of their greatest prize winners within the limited space of a back yard. The beginner, therefore, need have no fear of making a start even though he may have to do so under similar conditions. He will find that with a small flock he has one distinct advantage in being able to give closer attention to the breeding of individual birds.

#### "Fancy" and "Utility" Breeds

The prospective fancier has a much wider range of choice in selection of breed and variety than it is advisable for the commercial producer to exercise. Within reasonable limits he can and should consult his personal preference, keeping the breed in which he is mostly interested. Only by so doing is he likely to bring to the work the absorbing interest and enthusiasm that makes the highest success possible. If without special preference, it is well to look into the home market requirements, also to learn what fowls are most successfully kept in the beginner's own locality.

Among the 121 varieties of fowls now recognized in "The Standard of Perfection" there are a number that are regarded as having little value in commercial poultry keeping. In some of these, color combinations and uniformity of feather markings have been carried to a truly wonderful extreme and simply as examples of the breeder's art they fully justify their existence. They usually

are known as "fancy" breeds, it being commonly believed that their peculiar characters have been secured at the expense of practical qualities, such as size, vigor or productiveness.

If the beginner has a genuine interest in any of these breeds he should not hesitate in his choice because of their comparative unpopularity. He should, however, avoid the common error of selecting a new or comparatively unknown breed or variety merely because of the expectation that there will be less competition than in older or more popular ones. Occasionally this step proves to be successful when the breeder is able to establish himself quickly as a leader in his line. Generally, however, while there may be less competition there is also a limited market. For most persons it is more practical to develop a strain of superior quality in one of the "useful" breeds. The best opportunity for profit that the average breeder has today is in doing this, choosing the variety which most appeals to him, either on account of its color or other characteristics, and then striving to develop a strain which will be distinguished not only for its showroom qualities but also for its commercial value in the production of eggs or superior-quality table fowls. In general, the beginner will make no mistake in selecting any of the breeds that answer the foregoing description, though location, climate, market, etc., must be considered. Fowls of the different breeds have qualities that often fit them peculiarly for meeting certain conditions. Whatever breed is chosen, the beginner should get the best foundation stock that he can afford to buy. If not able to spend a large sum, the start may be made with only a small breeding pen or even a few eggs for hatching, or with day old chicks. But whatever is bought, it should be of superior quality. To start with inferior stock means years of lost time and, in the end, much greater expense than to start right at first.

The beginner who is starting to breed systematically for improvement in "utility" qualities needs to be constantly on guard against the tendency to allow these to overshadow in importance, the true standard qualities that are the foundation of permanently successful breeding in any breed. It is proper and highly desirable that productiveness, weight of body, etc., should receive especial attention in utility breeds, but it is not desirable to let this lead to deterioration in standard qualities. The breeder who concentrates his efforts solely on egg production is no more "practical" than the one who goes to the other extreme and breeds for color or feather markings regardless of the productive capacity of his fowls. Both will fail in establishing desirable permanent strains, and both stand in their own light as to financial returns.

That a combination of showroom qualities and high productiveness is possible has been demonstrated so often that it is no longer a debatable question. The individual breeder may or may not wish to make the effort; he may or may not have the breadth of vision or the interest necessary to grasp both sides of the problem; but it can be done and has been done, not once but in hundreds of flocks. The beginner who aims at a practical combination of standard quality and high productiveness will succeed in proportion to the skill and persistence which he employs. And for good stock of such breeding there is a never-failing demand.

## CHAPTER XIII

# Mating and Management of Breeding Flock

Relative Advantages of Different Methods of Breeding and Mating Briefly but Clearly Explained—Why Inbreeding Is Recommended and How It Should Be Practiced—Instructions for Handling Breeding Fowls in Summer, and Special Methods of Caring for Growing Stock Intended for the Breeding Pen



IT IS IMPOSSIBLE to give in these pages full details regarding the numerous questions relating to the mating and everyday management of the breeding flock. All that can be attempted here is to explain breeding methods commonly used and give some general instructions in management so that the beginner may start right and may continue the development of his flock with a reasonably clear understanding of what should be done and how he may go about doing it. He should proceed without delay, however, to secure more complete information on all the various phases of this branch of the industry, if he hopes to be truly successful. In *Reliable Poultry Journal Company's* new book, "Fundamentals of Poultry Breeding," will be found complete information on all branches of this subject and we can do the earnest breeder no greater service along this line than to direct his attention to this invaluable work.

### Methods of Breeding

**Breeding Unrelated Fowls.** The simplest and most common form of breeding, especially among beginners, is that in which unrelated males and females of standard quality are mated on their general appearance. This system of breeding is comparatively simple and easy, and if the fowls "nick" well excellent results may be secured. However, unless the breeder happens to have an exceptional breeding male, one that is characterized by "prepotency" and thus capable of stamping his characters upon all or most of his offspring, the result of such a mating will be more or less uncertain so far as high exhibition quality is concerned. Where the breeder is satisfied to have a standard-bred flock of good quality, but with little prospect of producing high-class exhibition stock, this method of breeding is safe and practical. It is the way in which the majority of fair to good standard flocks have been developed.

**Line Breeding.** The term line breeding means or should mean that breeding is restricted to the selection and mating of individuals of a single line of descent—in other words, the mating of related fowls. When line breeding is carried to the extreme and CLOSELY related individuals are mated it then becomes inbreeding. It is true that poultrymen are not agreed upon definitions for line breeding and inbreeding and by many the two terms are used more or less interchangeably. The definitions that have just been given are substantially as found in Davenport's "Principles of Breeding," a textbook in use in practically every agricultural college in the United States, and they represent the common use of these terms among live-stock breeders generally.

Line breeding, judiciously employed, enables the breeder to perpetuate indefinitely the good qualities of an especially desirable individual and to develop a definite strain strongly marked by ability to reproduce its peculiar characters and to intensify and improve them. While line breeding usually starts with close inbreeding, most

breeders get away from close relationship matings as quickly as they can do so without weakening the characters they wish to perpetuate or develop.

**Inbreeding** is popularly believed to result in rapid degeneration, and where it is practiced without careful selection and proper safeguards the results often justify this belief. So far as poultry breeding is concerned, however, there is no "curse" on inbreeding and nothing mysterious about the results secured, whether good or bad. Inbreeding simply intensifies the characters common to both male and female, weak characters as well as desirable ones. Hence, if male and female have a common weakness or tendency to disease, as is apt to be the case in closely related birds, inbreeding may and often does prove disastrous. If breeders are careful to cull their breeding flocks, however, discarding every fowl that is not in first-class breeding condition, they can practice inbreeding indefinitely without injuring the health and vigor of their fowls.

It is not necessary here to go into the practical details of inbreeding, or its dangers and how to avoid them. It is enough for the present need of the beginner to get these facts clearly fixed in his mind:

If he has fowls of exceptional quality the best way of perpetuating them is to breed them back to their own offspring, as sire to daughter or dam to son.

If the fowls mated are strong and vigorous, their offspring will also be strong.

Inbreeding carelessly practiced will sooner or later justify the popular prejudice against it.

**Indiscriminate Inbreeding.** There is one method of inbreeding, which may be called indiscriminate inbreeding for lack of a better name, that is entitled to more serious attention than it often receives from the beginner. This method, which has the approval of some well-posted breeders, consists simply in confining breeding operations within a given strain or "line" but entirely ignoring the degree of relationship—that is, mating the fowls to the best apparent advantage, regardless of whether they are closely akin or not. In a flock of fair size such a method will result in a limited amount of close inbreeding, but there is no reason to believe that, in the long run, fowls so produced will necessarily be inferior in vigor to the most elaborately line-bred fowls.

It is not to be expected, of course, that any other method will produce fowls equal in quality to those secured in painstaking line breeding. But not every one will care to secure high quality at such a price, and there are thousands of beginners who, when confronted with the complications of that method, will throw up their hands in despair. It should be encouraging to these, therefore, to realize that they can keep their strains pure, and can realize many of the advantages of inbreeding without endangering the health of their fowls and at the same time may greatly simplify the details of care and management.

Perhaps as fair a statement of the relative values of the two systems as can be given is to say that for the highest development and improvement in fowls—for definite strain building—line breeding is indispensable. But for those whose ambitions are more modest indiscriminate inbreeding may fully answer their purpose. In fact, it may be doubted whether the average beginner will have anything more to show for the labor and involved record keeping of systematic line breeding than he could achieve with much less trouble and expense by simpler methods. At the risk of repetition, however, it should be clearly



HEAVY-LAYING EXHIBITION-QUALITY  
S. C. RHODE ISLAND RED

That heavy-laying ability may be successfully combined with standard qualities is clearly illustrated by the hen shown above, which won first prize, shape and color specials, and was champion female at Rochester Show in 1917. That year she laid 298 eggs, the following, 311 and the third year, 289, a total of 898 eggs in three years. Sire and dam were both New York winners. Is property of Lester Tompkins, Conn.

stated that, in either method, slackness in selection or carelessness in using fowls in any way inferior in vigor will soon bring loss and disaster.

#### Methods of Mating

It would not be fair to the beginner to represent mating of fowls as an easy or simple matter. On the contrary, if he can do so, it will be much better for him to secure the help of an experienced breeder rather than attempt to do it himself. Correct mating is vitally important to his future success, and at no other point does the beginner need expert advice as he needs it here. If he can secure such assistance he will find that the expert, after carefully looking over his fowls, will definitely discard such as have marked or conspicuous defects and which therefore should not remain in the breeding pen under any condition. The description of ideal fowls given in the "Standard of Perfection" will be his guide in doing this.

**Compensation Matings.** If he does not find it out before, the beginner discovers when he comes to mate his fowls that the best he has fall short of measuring up to the ideal for the breed. This should not unduly discourage him, however, as the 100-per-cent fowl has never yet been produced. In the finest flock there are only a few that get very close to standard requirements, and all breeders, leaders and beginners alike, have the same general problem to solve—how best to mate up the fowls they have, so that some improvement will be effected year by year, or so that at least there shall be no falling off in quality.

Practically all breeders, therefore, make more or less use of "compensation matings," which consist, in brief, in "matching" the fowls so that certain defects in one will be balanced by corresponding strength in another. It

is expected that the effect of such mating will be to "strike an average," making the offspring nearer to standard description, in these respects, than either sire or dam. This method is most successful where the defects to be negotiated are of minor character. Where strongly marked defects are matched the stock produced will include individuals of both types, with others showing more or less imperfect blending. Therefore, the experienced breeder matches slight differences but avoids strongly contrasted characters.

**Pen and Flock Matings.** A single male mated to a selected flock of females gives what is generally termed a pen mating. This is regularly practiced in careful systematic breeding, whether line breeding is followed or not. The method requires a separate pen for each small flock and, where many fowls are to be mated, involves a relatively heavy labor cost in caring for them. It also demands comparatively expensive housing. For this reason, where only medium quality is aimed at, as in commercial poultry breeding generally, it is customary to mate up regular laying flocks, numbering from fifty to several hundred females, providing males in about the proportions indicated in the table presented herewith and allowing all to run together. This is flock mating. Obviously, it must be inferior to pen mating in quality of the stock to be produced, but it is practical and desirable where low-cost production is important.

**Single and Double Mating.** The term "single mating" is applied to the method of breeding practiced where males and females of equal quality can be produced from the same mating. For example, a pen of White Wyandottes, if properly mated, should produce equally good standard quality in both males and females. In the case of some breeds and varieties, however, equal quality in males and females cannot be produced by one mating. To use the classic illustration of Barred Plymouth Rocks, the offspring from a pen of what are known as "standard" fowls of this variety will rarely be of standard color, but the females will regularly be darker than the ideal and the males lighter. To produce cockerels of "standard color" in this variety it is customary to mate darker-than-standard females with a standard-colored or medium-dark male. This is what is meant by a "cockerel mating." To get standard females, a decidedly light male may be used on standard-colored females. This is termed "pullet mating." The general system is termed "double mating," since two matings or pens always are required in order to produce a standard-colored pair, as described in the "Standard of Perfection."

#### Propotency

As compared with the results secured in breeding average or nonstandard flocks, standard-bred fowls regularly show a high degree of uniformity in characters, especially as regards general appearance. To the closely observant breeder, however, even standard fowls exhibit a tendency to a good deal of irregularity in this respect. Especially in breeding unrelated fowls, there always is some uncertainty in regard to whether a good percentage of their offspring will closely resemble either sire or dam. This is because fowls are not equal in ability to transmit qualities, good or bad. The results of various matings display wide variations in this respect. Certain individuals appear now and then, however, that show remarkable capacity for stamping their characters upon their offspring. The ability to do this is called "prepotency." The nature of

prepotency and the methods by which it may be secured and intensified, are by no means clearly understood. It is believed, however, that purity of breeding is an important factor; hence line-bred fowls in which purity of breeding is most marked, are thought to be particularly prepotent, thus explaining the uniformly better results secured with them.

**Trap Nesting**

In all line breeding, and in the production of pedigree stock generally, it is necessary for the breeder to be able certainly to identify the eggs laid by each hen, at least during the breeding season. Where fowls are bred for increased egg production, the eggs laid by each pullet or hen must be identified the year around. To do this the breeder provides trap nests. These are so arranged that only one hen can enter at a time and, once in, she cannot get out until released by the attendant who, in doing this, marks the egg with the hen's leg-band number. By keeping each hen's eggs separate at hatching time and suitably banding the chicks, the breeder is able to keep an accurate record of the ancestry of each individual in his flock. Such information is indispensable in systematic breeding.

Whether a given individual should practice trap nesting or not, depends largely on the character of his breeding operations. Aside from satisfying one's natural curiosity as to the productiveness of his hens and affording opportunity to discard the poor layers, it is doubtful whether trap nesting is of any special value to the average breeder, since the use that he will be able to make of the information gained will rarely be worth what it cost him to acquire it. Each breeder must decide this for himself, but it should be clearly understood that trap-nesting large numbers of fowls is decidedly expensive, also it is worthless from a practical standpoint unless it is regularly and systematically carried out.

**Constitutional Vigor**

The importance of constitutional vigor in fowls has already been briefly referred to, but those who contemplate inbreeding or line breeding must give especial at-

tention to it. Whether inbred or not, fowls are generally kept under highly artificial conditions and subject to treatment tending directly to undermine their health. Vigor, therefore, must receive constant attention in the breeding flock, if good sound health is to be maintained. Large hatches, strong chicks, reduced losses in brooders and on range, capacity to digest large quantities of feed and turn it into market eggs in profitable numbers—these and numerous other important factors in real success are dependent almost directly upon the attention given to securing high constitutional vigor in the flock. Much can be done to conserve vigor by proper feeding of the breeding stock, providing abundant exercise and seeing to it that the eggs are hatched and the chicks brooded under the most favorable conditions, but the best efforts that can be put forth along these lines will bring but a moderate degree of success if the breeding stock is naturally deficient in this important character.

**Proportion in Which to Mate**

The number of females that can be mated with a male, with reasonable assurance of securing good fertility, will depend on the breed, the season and the individuality of the male. In the natural breeding season and with the fowls on open range, excellent fertility has been secured in flocks of forty or more hens and pullets mated to a single cockerel, even in flocks of the larger breeds. On the other hand, with fowls in close confinement and using old males, it often is found necessary to reduce the number to 5 or 6 in order to secure high fertility. In general, the proportions given herewith may be accepted as fair averages. It may be necessary to reduce these numbers under some conditions, particularly with fowls in close confinement in cold weather, while they may be increased in exceptional cases where it is desirable to do so.

**NUMBER OF FEMALES TO ONE MALE**

General-purpose breeds in confinement	Mate	8 females with cock
General-purpose breeds in confinement	Mate	10 females with cockerel
General-purpose breeds on range	Mate	10-12 females with cock
General-purpose breeds on range	Mate	12-15 females with cockerel
Leghorns in confinement	Mate	12-15 females with cock
Leghorns in confinement	Mate	15-20 females with cockerel
Leghorns on range	Mate	15-20 females with cock
Leghorns on range	Mate	20-25 females with cockerel



SCENE ON BACK-YARD PLANT WHERE SEVERAL BREEDING PENS ARE KEPT

### Production of Hatching Eggs and Day-Old Chicks

Assuming that the beginner has successfully negotiated the various questions in regard to the mating of fowls, he still has a few problems of a practical nature to consider before he will be ready to begin saving eggs for hatching, either for his own use or to fill the orders which he expects to receive from the public.

#### Fertility

Strictly speaking, an egg is fertile when the female germ (present in every egg) has formed a union with the male sperm. From that time on we have to deal with an embryo—of microscopic proportions until the egg has been incubated for some hours, but an embryo nevertheless. In this sense fertility is a general character in eggs produced by properly mated fowls, where no organic defects are present on either side. That is to say, practically all eggs laid by such fowls are fertile, regardless of the season and regardless also of whether they will hatch or not.

Not because it is an exact way to classify them but merely as a matter of convenience, it generally is assumed in practice that eggs are not fertile unless, when ex-



THE WHOLE FAMILY FINDS INTEREST AND PLEASURE IN A WELL-BRED FLOCK

posed to proper incubating temperature, the embryos develop to a point where they can be detected by the use of an egg tester. Many eggs that are fertile, strictly speaking, never make such development. Failure to do this may be due to a variety of causes ranging from physical weakness in the breeding stock through every kind of improper handling of the eggs or exposure to injurious temperatures, up to and including the first stages of incubation. In some instances total infertility is due to organic defects, sterility in males being more common than is generally realized.

#### Hatchability

This has to do with the vigor of the fertilized germ or embryo. Not all fertile eggs hatch. The percentage that do so is determined by a number of factors. Some fowls regularly produce eggs of a higher hatching power than do others in the same pen. This is due to the fact that hatchability is an inherited character, like the capacity for heavy egg production. This fact has been so clearly established that many careful breeders consider it worth while to test out and remove from the pen females that produce eggs of marked inferiority in this

respect. Low hatchability also may result from keeping the breeding fowls under unfavorable conditions, or may be due to poor rations, insufficient exercise, mating too many females with one male, also to improper handling of eggs before or during incubation—to anything, in fact, that may weaken or injuriously affect the embryo.

#### Management of Breeding Pens

During the regular breeding season there is comparatively little difference in the general feeding and managing of breeders as compared with that given the laying pens, aside from the fact that the former should have more house-room or floor space per bird and should, in general, receive the caretaker's best attention. About the same rations should be given to breeders during the breeding season as the laying flock receives, but feeding for heavy production should be avoided, particularly if it is intended to save eggs for hatching from the flock throughout a long season. In a general way, the breeders should have conservative treatment and feeding, but at almost any cost see that they have an abundance of exercise—probably the most important detail in their management. With the right kind of stock properly mated and brought to the breeding season in prime condition, good production and high fertility are practically assured.

#### Summer Management of Breeding Stock

Breeding fowls often suffer serious injury through neglect during the nonproductive period. When the hens are laying heavily and their eggs are selling at good prices, enthusiasm runs high and it is a pleasure rather than a task to give them the care and attention necessary to keep them in first-class condition. But when the breeding season is over and production falls off or entirely stops, too often the birds are left to shift for themselves under highly unfavorable conditions, so that instead of building up health and vigor they become still further weakened, losses are heavy and results realized from the survivors the next season are disappointing and unprofitable. It is not necessary to make the care of breeding stock a burden, but fowls that for several months have been supplying valuable hatching eggs and are expected to do so again the following year, certainly are entitled to something more than neglect during the rest period.

After the breeding season is over the fowls should be given free range if it is possible to do so. Exercise is, beyond question, the best conditioner for fowls, and breeding birds cannot have too much. If they must remain in their regular quarters and be confined to yards, at least make their quarters as comfortable as possible. It is not advisable to feed for egg production after the breeding season, though if the hens persist in laying on ordinary rations do not try to stop them by starving or by making violent changes in the feeding. Males that are not to be kept over for the next season's use should, of course, be disposed of immediately at the close of the breeding season. The desirability of isolating the males that are to be carried over depends upon the conditions under which they are to be kept. Where there are a number of these and they can be properly cared for, it is well to separate them from the hens. But if isolation means that they are to be closely confined to uncomfortable, unsanitary houses with small, bare yards, and neglected in their feeding and general care, as is far too often the case, then it will be a great deal better to let them run with the flock.

## Successful Methods of Breeding Exhibition Fowls

Experienced Back-Yard Breeders Tell How They Breed Standard Fowl of Exhibition Quality—Useful and Ornamental Breeds Alike Can Be Kept—These Reports Show that from Partridge Cochins to Leghorns Complete Success May Be Realized Where Proper Care Is Given



THE EXPERIENCE of George W. Mitchell, veteran breeder of Partridge Cochins, is an excellent illustration of what may be done within the narrow limits of a back yard in producing superior-quality standard poultry. For forty years Mr. Mitchell has been a leader in breeding Partridge Cochins and during all of this time, up to 1910, his breeding operations were conducted within a yard 100 feet square. Since 1910 the space available for his poultry flock has been limited to only 40 by 100 feet. Naturally, he does not try to raise large numbers, but his stock is of unsurpassed quality. For example, during 1919 he raised 60 birds from which number he picked out a string for exhibition at the Boston Show that captured all but two of the top prizes, his winnings being cock 1, 2, 3; hens 2, 3, 4; cockerels 1, 2; pullets 1, 2, 3; first old pen; first young pen. These winnings were made in good-sized classes in strong competition. In a personal letter from Mr. Mitchell to the writer the following details are given in regard to the conditions under which his fowls have been kept and bred.

"From March, 1887, until the spring of 1910, were the years covering the time when we were most actively engaged, and making annual exhibitions at both New York and Boston. My birds were all housed and raised on my home lot in the heart of our city and only about five minutes walk from the railway station, post office and business center, and during all this time only occupied space 100 by 100 feet, on which were the main house of 16 by 60 feet and five houses 8 by 12 feet, together with a brooder house and incubator cellar, each of the latter being separate from each other, and the necessary runs for each house. The main house, 16 by 60 feet, was two stories in height, the upper story being fitted into a complete exhibition and training room, having single wire coops the entire length on the north side. On the south side, with suitable aisle between, were pens about 4 by 8 feet where exhibition pens could be trained and the others used to give the birds in the single coops a chance to exercise as seemed necessary. This room, like the lower story, was provided with electric lights and was arranged so that it could be heated. Both the lower and upper floors were piped with running water and had every convenience for handling and feeding, and under the single coops were pens 2½ by 4 feet with gates opening outward, for sitting hens. These worked very nicely as the coops were placed the same height as at New York and Boston Exhibitions. From 1910 until the last season we bred in a very quiet way and not until the last Boston Show did we exhibit extensively.

"In the spring of 1910 the lower part of the main house, 16 by 60 feet, was converted into a garage and from that time the birds have had 40 by 100 feet, the brooder house and incubator cellars being done away with, and we have since used but the five smaller houses together with the exhibition room over the main house.

I am quite sure that the quality of our birds at the late Boston Exhibition was of such a nature as to show that they can be successfully bred, raised and suitably matured on a city back-yard poultry lot, our success being wholly owing to the attention we were able to give to each chick, carrying out my idea that 'the most essential thing to understand is the necessary handling of each individual bird.'"

### Prize Stock Produced on City Lot\*

Used Lot 75 by 132 Feet in Residence District of City of 86,000 Inhabitants—Invested in High-Class Exhibition Stock and Produced Blue Ribbon Winners

By M. L. DUDLEY, Iowa

I LIVE on a lot 75 by 132 feet, where there are no vacant lots, in one of the principal residence districts of Des Moines, Iowa. During the fall of 1910, I began to think of buying some chickens. I made the chicken business a study and determined to have as good a lot of birds as could be procured. After looking the field over I decided upon White Plymouth Rocks as being the best for all purposes, and concluded to raise them.

I bought eleven pullets from a strain that had taken 17 first and 16 second prizes at recent Iowa State Fairs and had carried off the laurels at numerous winter shows. This strain is of unusual egg production. I then found a male bird from a strain that had carried off the principal prizes at the World's Fair in Seattle in 1910, and that came from a trap-nested hen that had laid 225 eggs per year. Chickens of this grade cost more money to begin with than inferior ones, but after the first outlay they are no more expensive. The owner has birds of which he is proud and, when properly handled, they may be made highly profitable.

I bought these chickens in January, 1911, and placed them in a small double-deck house, which I built. Early in the spring I fenced off a chicken yard, 35 by 35 feet, and built an open-front house, 10 by 20 feet, with cement floor, using four feet of one end to keep feed in. I bought a 70-egg Cyphers Incubator and hatched 110 chicks, raising 107 of them to maturity.

In the fall I divided the open-front house into three apartments, providing yards for each, and built another yard, 8 by 12 feet, back of my first house. In January I bought three male birds of excellent quality, which, with the one I had, I mated with my pullets, giving me four good breeding pens. The eggs from these matings hatched well and produced vigorous chicks.

During the fall and winter of 1911-1912 I sold 35 cockerels for breeding purposes at prices ranging from \$2.50 to \$5.00 each, and during the hatching season of 1912 made satisfactory sales of eggs at \$2.50 to \$3.50 per sitting of fifteen.

\*Condensed from "Reports of Successful Poultry Growers."

**Birds Were First Prize Winners**

I exhibited one pen of 4 pullets and 1 cockerel, a single cockerel and a single pullet at the Iowa Poultry Association Show at Des Moines, Iowa, in January, 1912. While I did not get a good wash on them, it being my first experience, out of 7 pens exhibited I took third and seventh prizes on cockerels (eighteen cockerels competing), and a cockerel I sold the previous fall took first. In February, 1912, I hatched 210 chicks with equally as good results as in 1911.

In August, 1912, I exhibited at the Iowa State Fair some of my March and April hatch of pullets and cockerels and took 1st on pen, 1st on cockerel, and 1st on pullet.

The latter part of August, 1912, I sold 8 hens at \$2.75 each, two April-hatched cockerels at \$2.50 each, five April-hatched pullets at \$2 each and one cock at \$14. I now have left 160 old and young chickens, which are worth on an average at least \$2.50 each. I have kept an account of all receipts and expenditures, as follows:

Receipts	
For chickens and eggs.....	\$ 391.06
Value of house and equipment.....	153.98
160 chickens at \$2.50 each.....	400.00
Total.....	\$ 945.04
Expenditures	
Cost of chicken house, fence and equipment.....	\$ 153.98
Fee for exhibit at Iowa Poultry Association Show.....	5.00
Chickens bought.....	61.94
For scoring chickens.....	6.75
Exhibit at Iowa State Fair.....	9.00
Advertising and postage.....	26.05
Feed to Sept. 10, 1912.....	242.01
Total.....	\$ 504.73
Net Profit.....	\$ 440.31

**Poultry Breeding As a Side Line Yields \$1,000 to \$1,800\***

**Well-Known Breeder of White Wyandottes Tells How He Started and How His Success Was Achieved—He Had the Right Kind of Stock and Gave the Birds Proper Quarters, Feed and Care**

By J. W. Andrews, Massachusetts

**M**Y EXPERIENCE with poultry covers more than thirty years and I have bred White Wyandottes for over twenty years. Since I was a small child I have been interested in poultry. When but ten years of age, my

\*From March, 1915, issue of Reliable Poultry Journal

father built a small house for me and gave me ten hens, with the warning that if they did not receive good care, I would lose them.

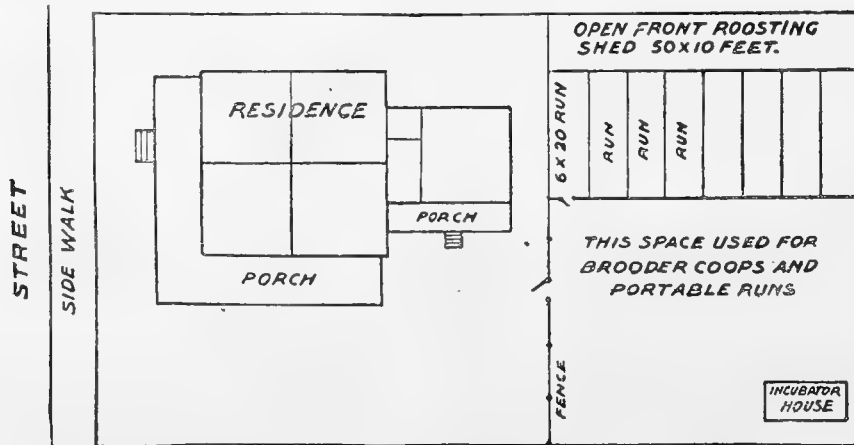
They were a lot of mongrels, but from the beginning they laid well and paid me a good profit. Needless to say, they received the very best of care, for I did not want to lose them. I was dissatisfied with these birds however, and wanted a flock all of one kind. Finally I bought from a well-known breeder, thirty White Wyandotte eggs for \$5, and have never regretted my choice.

My parents thought I was spending money recklessly when I first bought eggs and paid such a price, for no one at that time paid over fifty cents a sitting for eggs around where we lived in Massachusetts. When I bought a cockerel and paid \$10 for it, they said I needed some one to look after my money for me. However, it was money that the hens had earned for me and I thought I had a right to invest it to improve my poultry. The extra prices paid for my stock and eggs soon proved it to be a paying investment. I decided to do a little advertising and inserted a four-line advertisement in one of the poultry papers, asking \$1.50 for 15 eggs or \$8.00 per hundred, and sold all the eggs I could spare, receiving for them about \$160.

The next fall some of my birds were shown at the R. I. State Fair, which was one of the largest, and I won first prize on a cock bird which I traded for a very white bird that did not get a ribbon on account of a black feather in his hackle, but he was of the stay-white kind and was great in shape. Real white birds at that time were very scarce and this male having this quality which my flock lacked, proved to be a great help to me at that time. My fowls, while very good in shape and size, were creamy and brassy. The male mentioned above proved to be a great breeder of very white birds and as there were not many white ones being shown, it helped me a great deal when I showed my stock again, for my birds were white. The following season I showed at the Bristol County Fair, The Rhode Island State Fair, Providence and Fall River, and won nearly all the first prizes.

**The Demand Increases**

My stock and eggs now began to be in demand and I had no trouble in getting \$3.00 for 15 eggs and sold breeders at good prices, being offered \$25 for a cockerel which won first at Providence, but I refused the tempting offer, though it was a long price for a male at that time. He proved to be a great breeder and helped to sell eggs for me on account of being in my yards. That year I made a profit of over \$400 from about 45 breeders, and I raised nearly 100 chicks. My birds were exhibited at the shows mentioned above every year and continued to win well. Since 1897 I have shown at Boston every year but one, and have never failed to win a good share of the prizes. As my Boston winnings began to increase, the demand for my strain of birds began to increase and I have been able to realize good prices for my birds and have had no trouble



LAYOUT OF A FLORIDA POULTRY KEEPER'S BACK-YARD PLANT

The owner of this plant, while holding his regular position as telegraph operator gradually built up a well-bred flock of R. I. Reds in his back yard and developed a profitable trade in baby chicks and eggs for hatching. Net profits in one year amounted to over \$650. He began with less than \$100 capital, and at no time had more than 100 hens on his plant. Illustration reproduced from "Reports of Successful Poultry Growers."



in selling all my hatching eggs for more than three times the sum I received at first. I have also several times sold cockerels at \$150 each and last year thirty show birds brought me \$1,500, averaging \$50 each. For the past seven years I have realized a profit better than \$1,000 a year and one year it went as high as \$1,800.

The fancy poultry business is not my main business, as I am connected with a retail grocery and keep poultry as a side line. I have two acres of land and generally keep about 70 females to breed and I raise from 125 to 150 chickens, besides having a few raised on a farm for me. I do all the work myself, except that I have a boy to clean the houses.

## A Woman's Success With Standard Fowls

Has Been a Successful Raiser of Fowls in Ornamental Class for Many Years and Finds the Work Both Pleasant and Profitable

By ALICE CLEVELAND GARDNER, Massachusetts

**T**WENTY years ago I did not know one hen from another, but think I must have had an inherited love of poultry. About a dozen years ago I had a very frail little son who did not take kindly to milk and the next best thing was chicken broth, so I kept a few hens so as always to have fresh fowls and eggs for table use. Also, the outdoor interest was good for both the little boy and myself.

Very soon I became interested in purebred poultry and poultry shows. From the very first I secured many prizes, beginning with small shows. Now I have over one hundred ribbons, including Boston and Madison Square. When I kept more fowls than I could care for I hired boys who were trying to earn their way through school. From my years of bookkeeping I should say that if one depends on hired help at least all of the money from fancy sales is clear profit. To make a profit from utility poultry alone one must do most of the work unless carried on on a large scale.

Like most beginners I tried several breeds, always having some bantams, especially the Japanese. At present I have the Japanese Silkies. As the care of fowls and careful culling year after year have had more to do with the profits than any special breed, I could not advise any particular breed. Personally, I find the Silkies profitable for they are small eaters, lay a good-sized egg, and many of them, also as sitters and mothers for chicks from fancy eggs, they are invaluable.

The Salmon Faverolles are the breed I have kept year after year. I like their odd appearance and they are always singing and contented in the worst weather conditions. I have letters of inquiry for stock and eggs from Maine to California, also Canada, and could always sell more than I have to spare at fancy prices.

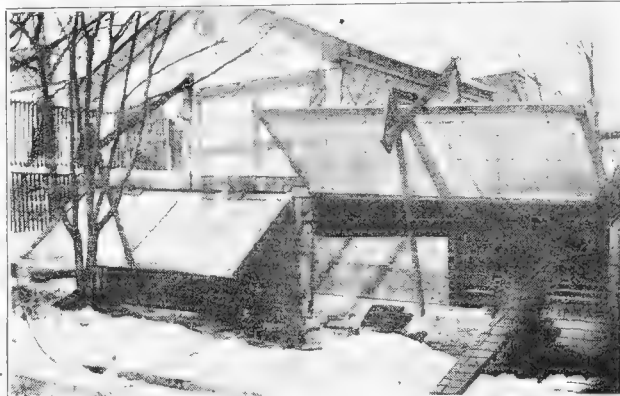
As I have done tutoring, Sunday School work and Red Cross work in addition to my housework, chickens have been a side line with me. As such I know they are profitable if one has a love for them and patience enough to give proper attention to details. I have faith enough in it to plan for more and better poultry, for I believe there will be a great demand, now the war is over. My specialty will be bearded and crested fowls.

## Back-Yard Poultry Plant Yields \$3,800\*

Nearly Four Thousand Dollars in One Year From a Back-Yard Flock of Standard-Bred S. C. R. I. Reds Proves That Money Can Be Made Breeding Standard Fowls in Close Quarters

By MRS. E. W. MAHOOD, Missouri

**F**OR SEVERAL years we kept poultry on a suburban lot 150 by 180 feet in size, with good success. It has occurred to me that I may be able to make some suggestions which will help those who are now beginning to keep a few chickens on town or city lots, in response to



MRS. MAHOOD'S BACK-YARD POULTRY HOUSE

House here illustrated is described by Mrs. Mahood and is one that was occupied by breeding fowls the year her poultry operations yielded \$3,800.

their country's appeal to produce as much meat and as many eggs as possible, as well as from motives of economy.

To begin with, it is not necessary to build a fancy or expensive poultry house. Almost any outhouse can be converted into a practical poultry house. The main things to insist on are plenty of light and fresh air and a house that is closely enough built not be drafty or damp. A house with all of these qualifications is a good and practical poultry house.

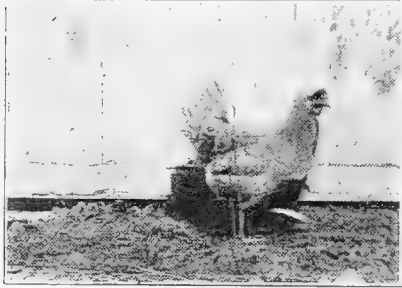
Many building a poultry house make the mistake of building one too high. We did this with our first house and as a result the animal heat of the birds was not retained when on their roosts at night and the male birds' combs were badly frozen. Also, we soon learned that a floor in the poultry house for laying or breeding stock is an unnecessary expense. The chickens are really better off with a dirt floor and plenty of litter. Often, however, it is necessary to raise this floor by throwing in more dirt, in order to have it dry.

If you have no outhouse which can be used for your chickens the most economical one to build is a low house. I will describe one which we and some of our neighbors used with success. These houses were two feet high in the back and four feet in front, seven feet wide and anywhere from 12 to 16 or 17 feet long. It should not be any longer, however, unless partitions are used, as too long a house is always drafty. If one is buying new lumber it is more economical of lumber and labor to have the house just the length of the lumber used in building it. As the boards are all nailed on lengthwise and covered with rubber roofing materials on back, sides and roof, one can utilize any scraps of old lumber one may have and yet have a presentable house.

A one-foot-wide board is nailed to the bottom of this house across the front, and at each end is a door, consisting

\*Reprinted from February, 1918, issue of Reliable Poultry Journal.

of a muslin-covered frame. Between these doors the opening is covered with poultry netting so that the chickens can be confined when desired. This opening is provided also with a muslin-covered frame, hinged to the 2 by-4 supporting the roof in the front. This frame is raised or lowered by means of a pole hinged to the frame. The roosts are at one end of the house and can



BUFF LEGHORN PULLET WITH RECORD OF 163 EGGS IN SIX MONTHS

See accompanying article by R. E. Sims.

be cleaned through the door at the end. At the other end the nest boxes are nailed and these can easily be reached through the other door.

For the encouragement of those who are ambitious to build up a business in fancy poultry on a small lot, Mr. Mahood and I have decided to divulge a business secret. The last year we kept poultry on the suburban lot of 150 by 180 feet, which we have mentioned, we sold \$3,800 worth of stock, eggs for hatching and day-old chicks. Since then our expanding business has made it necessary to move to a larger place so that we might be better able to handle our increasing trade in S. C. R. I. Reds. The results that we were able to secure on our back lot, however, should encourage others similarly to utilize whatever space may be available, even though comparatively small.

## Remarkable Laying Strain Developed on City Lot

In a Space Measuring 35 by 75 Feet Buff Leghorns Have Been Bred With Remarkable Success—Pullet Lays at Age of 3 Months and 20 Days

By R. E. SIMS, Arkansas

**EDITORIAL NOTE:** The successful experience of R. E. Sims, as recorded in the following article, should be an inspiration to breeders and back-yard poultry keepers generally. Mr. Sims' article was accompanied by sworn statements covering the record of the ten pullets that laid 2,547 eggs in 12 months and the record of Bidly Buff Grand—163 eggs from December 1 to May 31. We regret that through lack of space it is impossible properly to reproduce this documentary proof of these splendid results.

**O**UR GROUND space is 35 by 75 feet. Here 36 breeding hens—Single Comb Buff Leghorns—have given us 4,831 eggs in the seven months (this was in 1918). In the same period I sold \$426.65 worth of eggs and birds, besides supplying my home with all the good fresh eggs we could consume, and had 135 extra-fine youngsters on hand, quite a number of them of true show quality. Caring for my birds is not much trouble—in fact, I regard it as a pleasure, as well as being profitable. Does it pay? Just read the above figures over again.

One secret of our success is that we are sticklers for quality, as all stock on hand are direct descendants from 227, 262 and 283 egg-record blood. It costs a little more to start that way, but once you have them, they pay a thousand-fold and are an asset to your business, not only in production, but from an advertising point of

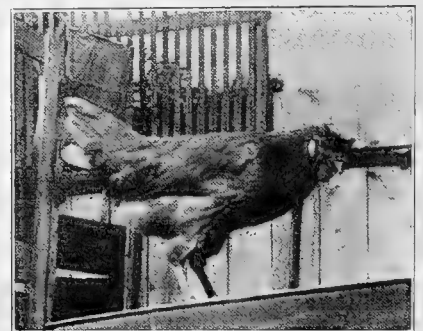
view. Our pens are 10 feet wide by 35 feet deep, and the birds are never out of them.

Greater egg production has been our aim. Ten years ago, if we had a pullet to lay in five months we felt we were doing fine, but year after year we kept our earliest-to-lay pullets and each year we had several that would lay 5 to 10 days earlier than before and last year we reached the record of 3 months and 24 days, which we thought must be the limit of early-laying possibilities. That year a pen of 10 pullets, hatched February 14, 1919, commenced to lay June 9, 1919, and for the year ending June 8, 1920, made a record of 2,547 eggs. At the end of this period the birds were only 16 months old and still laying. From June 9 to 30 inclusive, following the conclusion of this 12-month record, these ten pullets laid 183 eggs, making a total of 2,730 in 12 months and 22 days, or an average of 273 each.

This year, however, we have again broken our early laying record. Our first brood was hatched February 18, 1920, from eggs from this pen of 10 pullets. One of the pullets raised from this brood gave us the first egg on June 7, at the age of 3 months and 20 days, exceeding last year's record by 4 days. Of 10 specially selected pullets of this brood, 4 are now laying (June 13) and we believe that all 10 will be laying by the time they are 4 months old. Any one who will start with good foundation blood can win as we have, by careful breeding and proper care and feeding. While these pullets have thus shown wonderful laying ability they have not lost their exhibition quality. Many have the very best show type and color—in fact are superb in these respects. Breeding and selecting for early maturity have not unfavorably affected size, as is proved by the fact that our Buffs are larger than most of their Leghorn cousins. The 10 selected pullets, hatched February 18, 4 of which are now laying (June 13), average three pounds each.

We are particularly proud of the record made by Bidly Buff Grand. From December 1, 1919, up to May 31, 1920—just 6 months—she laid 163 big, perfectly shaped white eggs, average weight 2 ounces each. This pullet was hatched February 14, 1919, and commenced to lay June 19, 1919, when but 4 months and 5 days old and was a very heavy layer through July, August and September. On October 1 we took her out of the pen to condition her for our State Show at Magnolia. Notwithstanding faded beak and shanks, due to heavy laying, she scored 94 points. She continued to lay every day in condition pen so took her out and put her in back yard and commenced to trap her on December 1 with results as above stated. Bidly Buff Grand

is a granddaughter to our Bidly Buff with record of 283 in one year and a total of 1,152 in seven years. I am sorry now that I did not trap Bidly Buff Grand from the start as I feel sure she is better than a 300-egg hen. Blood will tell!



BUFF LEGHORN PULLET LAYING WHEN 3 MONTHS AND 20 DAYS OLD

Was hatched February 18 and laid first egg June 7. See accompanying article by R. E. Sims.

## Culling Methods for the Back-Yard Poultry Keeper

There Are Great Variations in the Productive Capacity of Hens and Best Results Are Only Secured When the Unprofitable Members of the Flock Are Culled Out—Simple, Easily Learned Methods of Culling Are Here Given—How to Detect Cull Hens in the Market



HE poultry keeper who does not begin in June systematically to cull the nonlayers and the poor layers from his flock is losing money. This loss may be comparatively slight in some cases, but in others it may mean all the difference between success and failure in the year's operations.

It does not seem to be as clearly understood as it should be that there are wide differences in the productive capacity of hens which cannot be overcome by any known method of feeding or management. In every flock, regardless of breeding, there will be found at least a few high-record layers; usually there will be a fair proportion of good layers; and there will also be a number that will be productive for a limited time, chiefly in summer when prices are low, but whose total yield for the year will fall far short of paying their board bill. Also, there usually will be found some delinquents that will produce no eggs at all, or so few that they are scarcely worth considering. It is chiefly the last two classes that pull down the yearly production of the average flock to its present comparatively low level.

### How to Keep the Egg Yield up to 50 Per Cent All Summer

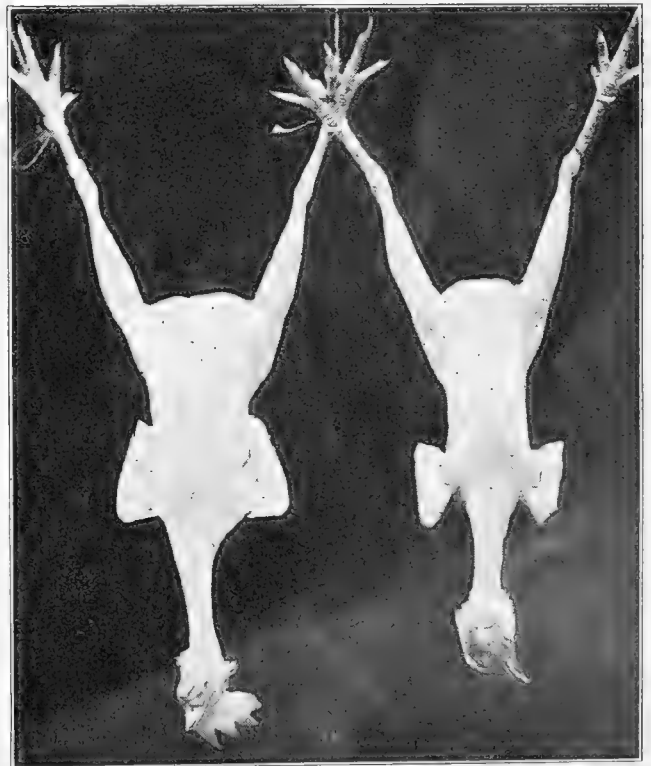
According to Professor H. R. Lewis of the New Jersey Experiment Station, an average production of 50 per cent can and should be secured during the summer season. If the average falls below this point it is proof that there are some hens in the flock that are worse than poor producers—they are not laying at all. Professor Lewis estimates that for each point below 50 per cent production there are two idle hens in the flock. That is, if 100 hens average to lay only 45 eggs a day there are 10 nonlayers in the flock. If the average number of eggs is down to 35 a day, then there are 30 hens that are making no returns for their feed. It should be understood that these estimates are for well-managed flocks and are based largely upon data secured at the Vineland Egg-Laying Contest, hence may not apply exactly to the average flock though they probably are approximately correct.

It is not at all difficult for the back-yard poultry keeper to keep his summer production up to a 50 per cent average where modern methods of culling are adopted. These are now so definite, so simple, and so readily applied that anyone can easily eliminate the unprofitable members of his flock. It is not meant by this to convey the impression that even the expert can infallibly select the nonproducers or the poor producers, or that he will not sometimes include good layers among the culls. The chance of error is slight, however, where proper methods are followed. Moreover, it is a simple matter to "check

up" on results simply by confining the culls separately for a few days. This is frequently done at culling demonstrations when proof of the accuracy of the tests is desired.

For example, one poultry keeper had a flock of 166 Rhode Island Reds from which 70 were culled out as "slackers." During the four days previous to culling he secured an average of 34 eggs each day from the 166. For the first six days after culling he secured an average of 32 eggs each day from the 96 hens that were left—and he had 70 fewer hens to board. Another, before culling, was getting an average of 7 eggs a day from 70 hens; 38 nonlayers were culled out and the 32 that were left, having the field to themselves, reached an average of 12 eggs per day—5 more than the entire flock had been laying. Still another flock was divided into 32 layers and 19 culls; from the first lot the owner received 66 eggs during a given time, and only one egg from the culls.

In the face of such results as these, and similar results have been reported from practically every section where special attention has been given to this subject, it scarcely seems possible to overestimate the practical importance of culling.



GENERAL APPEARANCE OF GOOD AND POOR LAYER

Hen on left was a poor layer. Was beefy in type, her abdomen being covered with fat and hard to the touch. Smaller bird on right had little fat in the abdomen which was soft and flexible. On opening these two birds, reproductive organs of one on left appeared similar to those in jar 10 shown in cut on page 90. The egg organs of the hen on right closely resembled those in jar 8.

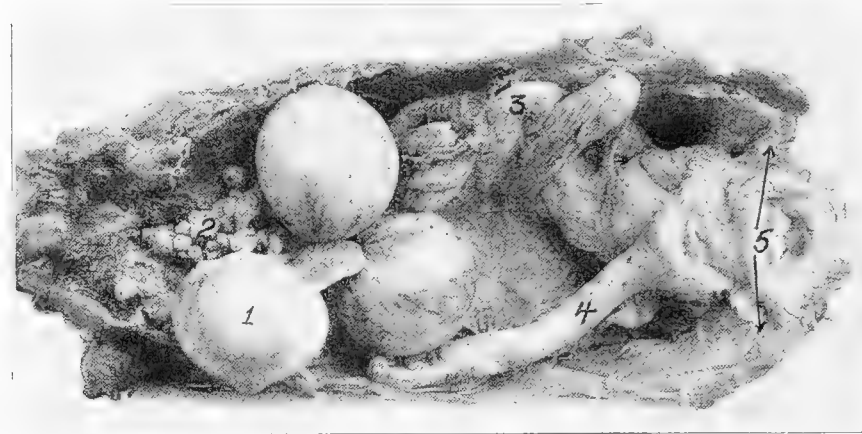
Note.—The importance of culling and the best method of doing it are necessarily presented very briefly in this chapter. The information on this subject made available in the last few years by the painstaking investigations of both scientists and practical poultry keepers, has become far too extensive to be treated in detail within the space here available. The interested reader is referred to "Profitable Culling and Selective Flock Breeding," in which book will be found practically everything on the subject of culling that is now known or is available for publication—see page 104.

The numerous advantages of culling are thus set forth by Professor Rice of Cornell University:

"By culling out unproductive fowls and selling them when they cease to lay for the year, we accomplish a number of profit-making things.

"First, we release a large amount of valuable feed for productive purposes.

"Second, we place upon the market immediately an important supply of poultry meat.



EGG ORGANS OF FOWL IN LAYING CONDITION

1—Fully formed yolk. 2—Ovary with partially developed yolks. 3—Oviduct. 4—Rectum. 5—Line indicating spread of pubic bones. Photo from Dr. B. F. Kaupp, N. C. Exp. Station.

"Third, we keep only profit makers, thus increasing the average production and profit per fowl retained.

"Fourth, we decrease the amount of labor required by reducing the size of the flock earlier in the year, instead of waiting until late in the fall.

"Fifth, we secure a higher price for the culled stock by avoiding the overstocked late-fall markets.

"Sixth, we secure more efficient production because of less crowded conditions and better care given to the stock that is retained.

"Seventh, we get more satisfaction because of the intellectual incentive which always comes with larger profits and greater knowledge."

#### What Is Meant by Culling

This term includes all methods of discriminating between layers and nonlayers in the poultry flock, the tests being based upon consideration of external characters. Culling can be done to some extent at any time of the year, but for a number of reasons it may be done more accurately in summer and early fall than at any other season. One advantage in culling at this season is that the poultry keeper who wants to carry his fowls over for another year can make practically certain that he is keeping only the most productive members of the flock.

Culling methods are based upon the fact that high egg production results in certain changes in the external characters of fowls, also in their body conformation. These changes are so definite that the skillful observer is able to tell not only whether the hen is laying or not, but can also make a close estimate of her past production.

Following is the outline for examining fowls for egg production as approved by the American Association of Instructors and Investigators:

#### Outline for Examining Fowls for Egg Production

In order to lay well, a bird must have a sound body. As a first consideration, the bird must be vigorous and healthy if it is to be able to lay well. Vigor and health are shown by a bright, clear eye, a well-set body, a comparatively active disposition, and an indication of good blood circulation. Further, the bird must be free from physical defects, such as crooked beak; excessively long toenails; eyelids that overhang, so that the bird cannot see well; excessively scaly legs, or anything else that would keep the bird from seeing or getting an abundance of feed.

#### Loss of Fat and Loss of Color of Fat Due to Laying

**Pigmentation Changes.** A laying fowl uses up the surplus fat in the body. Especially, it removes the fat from the skin. In yellow-skinned breeds, this loss of fat can readily be seen by the loss of the yellow color. The different parts of the body tend to become white, according to the amount of fat which is being taken from these parts, depending, of course, on the amount of fat which has been stored up in these various parts, and the circulation of blood through

them. It should be recognized that all yellow color changes are dependent on the feed, the coarseness of skin, and the size of the bird. A large bird fed on an abundance of green feed, or other material that will color the fat deep yellow, will not bleach out in color in these various parts as quickly as will a smaller bird or a bird which naturally has a pale yellow coloring.

The changes occur in the following order:

**Vent.** The vent changes very quickly with egg production, so that a white or pink vent on a yellow-skinned bird generally means that the bird is laying; while a yellow vent means that the bird is not laying.

**Eye Ring and Ear Lobe.** The eye rings—that is, the inner edges of the eyelids—bleach out a trifle more slowly than the vent. The ear lobes of Leghorns and other white-lobed varieties, bleach out a little more slowly than the eye rings, so that a bleached ear lobe means a longer or greater production than a bleached vent or eye ring.

**Beak.** The color leaves the beak, beginning at the base and gradually disappearing until it leaves the front part of the upper beak. The very tip of the beak is usually white before the bird is making eggs, and should not be confused with the loss of pigment, due to production. A very small ring just on the crest of the curve of the beak very often is the last part of the beak to lose its color. The lower beak bleaches faster than the upper, but may be used where the upper is obscured by a horn, or black color, such as in the Rhode Island Reds and Plymouth Rocks. On the average-colored yellow-skinned birds, and on the average-sized bird, a bleached beak means fairly heavy production for at least the past four to six weeks.

**Shanks.** The shanks are the slowest to bleach out, and hence indicate a much longer period of production than the other parts. The yellow color leaves the outer

ring of the scales, then leaves the entire scale, on the front of the shanks first, and finally leaves after a longer and greater production, from the scales on the rear of the shanks. The scales on the heels of the shank—that part of the shank just below the back of the hock joint—are the last to bleach out, and for this reason may generally be used as an index as to the natural depth of the original yellow color of the various parts of the bird. A bleached-out shank on an average-sized bird with an average yellow color, indicates that the bird has been laying fairly heavily for at least from 15 to 20 weeks.

**Reappearance of Pigment.** The yellow color comes back into the vent, eye ring, ear lobes, beak and shanks and in these individual parts in the same sequence as it left, when the bird stops laying, only the color returns much more quickly than it went out. A vacation or rest period can sometimes be determined by the end of the beak being bleached and the base being yellow, or a longer vacation, or rest, can be determined by the shanks being pale or somewhat bleached and the beak showing a fair amount of yellow pigment. In other words, if the degree of yellow color in a bird gradually increases in density from the vent to the eye ring, to the lobe, to the base of the beak, to the point of the beak and to the shanks, it shows that the bird has laid continually without rest for a period indicated by the amount of yellow present; whereas, if the bird shows more yellow in any preceding part of the sequence as outlined, it indicates a rest period depending on the difference of the yellow color found in these parts.

#### Body Changes Due to Laying

**Vent.** A laying hen has a large, moist vent showing a dilated condition and looseness as compared with the hard, puckered vent of nonlaying hens.

**Abdomen.** The abdomen is dilated as well as the vent, so that the pelvic arches are widespread and the keel is forced downward away from the pelvic arches, so as to give large capacity. The more eggs the bird is going to lay in the following week, the greater will be the size of the abdomen in proportion to the size of the bird. The actual size of the abdomen is, of course, greatly influenced by the size of the bird and to a certain extent, by the size of the egg laid.

**Quality of Skin.** Heavy production is shown by the quality of the skin. Fat goes out from the skin and body with production, so that the heavy producers have a soft, velvety skin that is not overlaid by heavy layers of hard fat. The abdomen, in particular, is soft and pliable.

**Pelvic Arches.** Heavy production is shown by the quality and the thickness and stiffness of the pelvic arches. In heavy producers these are apt to show high qualities by being thin and pliable rather than stiff and thick; so that the thicker and blunter the pelvic arches, and the greater the amount of fat and meat covering them, the less production or the longer time since production.

**Lateral Processes.** These, like the pelvic arches, should in a bird of good production or in a bird which is producing heavily, show good quality by being soft and pliable, prominent and generally bent outward.

**Head.** One of the finer indications, yet one of the most valuable in picking the high layers, is the fineness of the head. The head of a good layer is fine. The wattles and ear lobes fit close to the beak, and are loose and flat. The face is clean cut. The eyes are full, round, clear and prominent, especially as seen from the front.

**Feathering.** The high layer is trimmer and always apt to be somewhat more angular, that is, the feathers lie closer to the body than on the poor layers, and after a heavy production the oil from the base of the feathers does not keep the plumage relatively so sleek and glossy as on a poorer layer; but the plumage on the other hand, becomes worn and threadbare.

**Comb, Wattles and Ear Lobes.** The comb, wattles and ear lobes enlarge or contract, depending on the activity of the ovary. If the comb, wattles and ear lobes are large, full and smooth, or hard and waxy, the bird is in full lay. If the comb is limp, the bird is only laying slightly, but is not laying at all when the comb is dried down, especially at molting time. If the comb is warm, it is an indication that the bird is coming back into production.

#### Molting

When a bird stops laying in the summer, she usually starts molting. The later a hen lays in the summer, or the longer the period in which she lays, the greater will be her production, so the high producer is the late layer and the late molter. The length of time that a hen has been molting, or has stopped laying, can be determined by the molting of the ten large feathers at the end of the wing, or in other words, the primary feathers. It takes about six weeks to renew completely the primary feather next to the middle feather of the wing, and an additional two weeks for each subsequent primary to be renewed.

#### Temperament and Activity

A good layer is more active and yet more easily handled than a poor layer. A good layer shows more friendliness and yet elusiveness than a poor layer. A



COMPARISON OF BODY CAPACITY IN GOOD AND POOR LAYER

Skeleton on the left is that of a high producer. Note wide distance between pubic bones indicated by scale, and wide span between these bones and the keel; also wide-spread lateral processes. Compare these with corresponding dimensions in the skeleton of the poor producer on the right. Photo from Connecticut (Storrs) Experiment Station.

poor layer or a bird which is loafing is apt to be shy, staying on the edge of the flock, and will generally squawk when caught.

#### How to Cull Fowls of Heavy Breeds

The suggestions that have here been given regarding culling, apply to fowls of all breeds but more particularly to Leghorns. In the case of fowls of the larger breeds, the distinctions as a rule are not so readily made, though of equal value so far as they can be applied. Large fowls do not lose their yellow pigment as rapidly as small ones. In hens having a horn-colored beak, as is the case with Rhode Island Reds, the fading of the underbeak may be used as a test, while in white-shanked fowls such as Orpingtons, also those with black shanks, pigmentation tests

flocks of up-to-date farmers and commercial poultry keepers who now quite generally cull their fowls carefully at this season, keeping for another year only those that have been good layers, and sending the nonproducers to market. In every case, when buying fowls of unknown quality it is wise to apply the tests for layers as described in this chapter, which should be carefully studied by the beginner. As a means of summarizing the tests to be made it may be said that the person who is buying hens about October 1 should avoid those that show the following marks of the poor layer:

Complete coat of new feathers.

Bagging down behind.

All serious physical defects.

Any indication of weakness, poor flesh, etc.



JARS CONTAINING REPRODUCTIVE ORGANS OF FEMALE FOWLS AT DIFFERENT STAGES OF DEVELOPMENT

Beginning at the left, Jar No. 1 contains organs taken from a 3-month-old pullet; 2, from a pullet 4 months old; 3, 5 months; 4, from pullet with comb just turning red; 5, from pullet that had just laid her first egg; 6, from a bird that had laid for a period of from 2 to 5 weeks; 7, from a broody bird; 8, from bird 18 months old, at end of laying season; 9, from hen in full molt; 10, from bird in dormant condition at end of laying period; 11, from bird that had molted and started to lay. Photo taken at Cornell University.

are of little value. Here the poultryman must depend chiefly upon the condition of the vent, the position and pliability of the pubic bones, abdominal capacity as evidenced by the distance between pubic bones and keel, the condition of the comb and the plumage, etc.

In handling hens of every breed, note particularly the condition of the abdomen which will be soft and flabby in heavy layers, and hard and tight skinned in nonproducers. The face of the laying hen is fuller and the ear lobe full—not wrinkled. If molting has begun, the length of time devoted to the process (which will indicate approximately the date when the hen stopped laying) may be determined by the stage of the molt. Generally speaking, the body feathers are shed first, then the tail, and finally the wing, which molts from the middle outward.

#### How to Detect Cull Hens

The back-yard poultry keeper who finds it necessary to stock up in the fall with hens instead of pullets must be on his guard to avoid buying the inferior culls from the

Bright yellow legs and beaks.

Hard, tight-skinned abdomen.

Blade of comb sticking up in rear (instead of "rocker" comb following contour of neck).

Keel or breastbone that is short or tucked up behind, (thus reducing abdominal capacity).

If any of the hens offered show the following characters and are in good physical condition generally, by all means include them in the lot selected:

Old plumage retained, or early stages of molt.

Rocker comb.

Pale shanks and beak (in yellow-skinned breeds).

Loose-skinned, flabby abdomen.

Long keel, lower at rear than in front (to give ample abdominal capacity).

Clean legs (free from scales).

Bright full eye.

Active disposition.

Large, moist vent.

## CHAPTER XVI

# How Artificial Light Increases Winter Production

**Use of Artificial Light One of the Great Discoveries of Recent Years—Its Rapid Adoption by Practical Poultry Keepers and the Remarkable Results Secured—How Artificial Light Makes Increased Production Possible and Best Methods of Applying It—Special Rations for "Lighted" Flocks, and How to Feed Them**



THE DISCOVERY of the influence of artificial light in increasing winter egg production is one of great importance and the rapid adoption of the method by poultrymen in all parts of the country has been remarkable. Thousands now regularly follow the practice each winter, with practically no failures where a fair trial is given. In a single county of western New York, for illustration, over 150 producers are now regularly using "lights." Regarding the adoption of this practice in Canada, W. A. Brown, Chief of Poultry Division, Canadian Department of Agriculture, writes as follows: "In this part of Canada the use of artificial light in poultry houses is more or less taken for granted; in fact, in the section of the city of Ottawa in which I live, it has been more than once remarked when persons would step out of their houses on a winter's evening that the number of lights in chicken houses was almost as great as the number of lights in dwellings."

A number of our state experiment stations have tested out the use of lights in comparative experiments, and have scientifically demonstrated not only the advantages of their use but have shown clearly just what increased production may reasonably be expected. These reports are highly interesting and instructive. At Cornell University, for example, quite a number of such tests have been made and the increase in production during the short winter months has been truly remarkable. For example, in one test the per cent production of two pens of hens, one with and one without artificial light, was as follows:

	Per cent Production No Light	Per cent Production With Lights
Nov. 28—Dec. 25.....	1.7	20.3
Dec. 26—Jan. 22.....	5.	36.
Jan. 23—Feb. 19.....	18.6	33.4
Feb. 20—Mar. 19.....	31.3	46.6

A duplication of the comparison, using pullet flocks instead of hens, gave the following results:

	Per cent Production No Lights	Per cent Production With Lights
Nov. 28—Dec. 25.....	22.4	36.6
Dec. 26—Jan. 22.....	23.1	54.2
Jan. 23—Feb. 19.....	31.8	54.4
Feb. 20—Mar. 19.....	14.7	60.

Results of comparative experiments made by practical egg producers have been similarly clear cut and decisive. As an instance we may cite the records secured at Hillhurst Farm, New York, where 70 pullets were illuminated and 350 of similar age and breeding were kept without lights. Starting with lights on January 10 the production of the unlighted pen was 20.3 per cent while that of the lighted pen was 28.7. Ten days later the percentages of production were 14.6 and 32.9 respectively; on the 20th day the percentages stood at 14.3 and 78.6 and at the end of 30 days the average of the unlighted pen was 17.1 per cent as against 71.4 per cent for the lighted pen. The effect of illumination on egg production in this test is graphically illustrated in the chart shown on page 92.

A recent circular issued by the New Jersey Experiment Station gives the following illustration of the improvement in winter production, brought about by the use of lights:

"Artificial lighting of henhouses has been enthusiastically and profitably adopted by over 100 poultrymen in New Jersey, and more are joining the ranks daily. Are the returns really worth the trouble and expense involved? the skeptical ones ask. Here are a few figures compiled by W. H. Ellis, a Monmouth County poultryman, who in cooperation with the county agent has been running a demonstration on the use of electric lights in one of his laying houses. Draw your own conclusions.

"Without lights in October, November and December, 1918, 350 pullets laid 3512 eggs. During the same months a year later 365 pullets with lights produced a total of 6178 eggs. A pen of one and two-year-old hens without lights made a 24 per cent production in October, 1919; in November this had slumped to 7½ per cent and in December to 2 per cent. A similar pen with lights produced 28 per cent in October, 24 per cent in November and 15 per cent in December.

"With a 12 per cent increase in flock, Mr. Ellis by the use of lights made an 87½ per cent increase in production, the exact figures being as follows:

	1918 without lights	1919 with lights
October 1983 eggs.....	1983	4147 eggs
November 1973 eggs.....	1973	3400 eggs
December 2521 eggs.....	2521	3579 eggs
<b>Total</b>	<b>6477 eggs</b>	<b>11,126 eggs</b>

"But what of the expense involved in running a lighting plant? Figuring on the above three months, the total estimated increased expense amounted to \$76.00, the increase in money taken in was \$416, leaving \$340 to the good. Lastly, working under lights does not in any way injure the layers."

Instances like the foregoing could be multiplied indefinitely if room were available for the purpose. Those who wish to have further direct evidence as to the merits of lights in increasing production are referred to "Use of Artificial Light to Increase Winter Egg Production," a well-illustrated, down-to-date book, published by R. P. J. Publishing Company (see page 104).

To understand the reason why the use of artificial light produces the remarkable results realized it is necessary to consider the nature of the fowls and the probable effects of the enforced idleness of long winter nights. Fowls are highly active and under natural conditions are on the move most of the time hunting for food, scratching and digging and getting the exercise that is so essential to their health and physical well-being. It is hardly possible for them to get the amount of exercise that they require for best results in the short days that are characteristic of the winter season, when the number of hours of daylight are reduced until at the winter solstice, December 21, the day is only about 9 hours long, and in

cloudy or stormy weather the fowls may not be off the perches more than about 8 hours.

The poultry keeper, therefore, who is feeding for eggs during this short-day period of limited activity quickly learns that he must steer a careful course in order to supply his fowls with the large quantities of feed needed to make heavy production possible without having it diverted to the formation of body fat or resulting in digestive disorders—both tendencies being directly favored by limited activity.

There is an impression among many that the use of artificial light is a forcing measure, the ultimate effect of which must be to "wear out" the fowls or exhaust their capacity for egg production and possibly even to use up their reserves of health. Practical experience has shown, however, that fowls under lights, **IF PROPERLY HANDLED**, will keep in better health than those without lights. This is proved not only by superiority in production reaching over long periods, and by mortality records, but also by experimental tests showing that the use of lights on breeding stock gives better fertility. While it must be admitted that there is yet a good deal of conjecture in the explanations given for the remarkable results secured by the use of lights it seems quite probable that the chief factor is the better physical condition of the fowls.

Experience indicates that feed consumption is only slightly increased under light. In fact, many operators recommend that the proportion of bulky feed be increased where lights are used, thus suggesting that it is not a matter of getting the fowls to eat more, but of securing better assimilation of what is fed. In other words, fowls may eat all the feed they need for heavy production, even in the shortest winter days, but unless their physical condition is kept up to par by providing a normal amount of activity they will not fully utilize it in egg production.

Within reasonable limits, therefore, or as practiced by experienced operators, it may be said that the use of artificial light is not a forcing measure but one which

simply provides the fowls with more natural conditions, under which they will keep in prime physical condition, with better egg production as a direct and natural result.

It is true that the use of light enables those who wish to do so to go beyond this point and, by excessive use of lights and extreme feeding methods, actually to force the fowls, with the result that average production in mid-winter may be brought up to extraordinary percentages. This is most unwise however, as such practice is quite liable to injure the hens. Usually it throws them into a molt with a breakdown in production that may leave the total for the year much below what the fowls would reach without artificial lights. The usual recommendation is that the feeding and number of hours of artificial light be adjusted to hold production at not over 60 per cent, and it is not particularly difficult to do this.

Under some conditions the use of lights appears not to increase total production for the year, but merely to transfer production from spring to the winter months. In other words, birds under lights will lay in the wintertime the eggs that without lights they would lay in the spring. The sum total of the results secured with lights then is to get no more eggs from birds than would be secured without lights but to get them in the wintertime when the prices are highest. Many experiments, however, indicate that if the fowls are well handled it is possible not only to get high production during the winter months but also to secure a marked increase in the total production for the year. For example, in the case of the Cornell experiments already referred to on the preceding page the average production of the hens in the pen without lights was 100.73 eggs, while the pen with lights averaged 127.92. In the pen of pullets without lights the average production was 107.94, while the average of the pullets that had lights was 145.27.

#### Kind of Lights Used

Those who have current available naturally prefer electric lights because of their convenience and safety.

By the use of suitable equipment electric lights can be automatically turned on and off in the pens at the exact time desired, thus avoiding interference with the poultry keeper's sleeping hours or other engagements. Many who do not have access to a power line have installed private electric light plants, and where a large number of fowls are kept it is not unusual to have the revenue from the increased production pay for the entire plant in a single season. Those who do not have electric lights, however, are not on that account debarred from the use of this modern method. Poultry keepers in various sections of the country have reported the best results with gas lights, gasoline lanterns and even ordinary kerosene lanterns. Those who have only small flocks will find that lanterns can be used with excellent results, but in large houses incandescent gasoline lights are recommended.

It does not seem to matter materially when lights are used so long as the fowls have the necessary num-

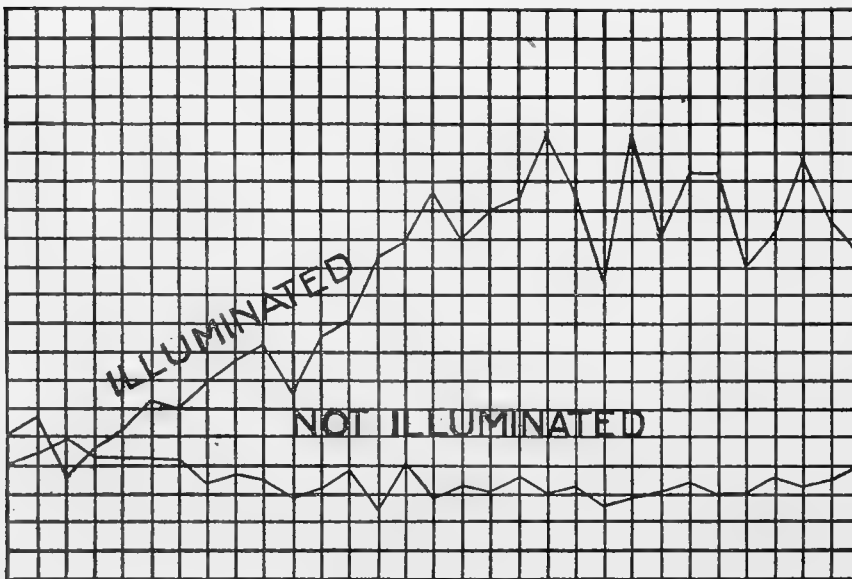


CHART SHOWING INFLUENCE OF ARTIFICIAL LIGHT ON EGG PRODUCTION

Upper line marked "illuminated" represents the percentage production line of a flock of 70 pullets under artificial illumination. The lower line marked "not illuminated" shows the production of a flock of 350 pullets kept under similar conditions but without lights. It will be seen from this chart that while the production of the pen that was not illuminated was around 15 to 20 per cent, the production of the pen with lights rapidly went up to 60 to 70 per cent and remained there throughout February. Illustration from "Use of Artificial Light to Increase Winter Egg Production."



ber of hours of light (12 to 14), hence the illumination can be adapted quite largely to the convenience of the caretaker. Many persons provide no lights in the morning but run them until nine or ten o'clock in the evening. Others turn them on at three in the morning and allow the birds to go to roost at the natural time in the evening, while others find it more convenient to turn the lights on for shorter periods both morning and evening.

There is one point that the beginner will want particularly to take into consideration in deciding when to use lights, which is the difficulty some report in keeping the fowls from going on the perches at the usual time in the evening regardless of the lights. It is possible to avoid this by resorting to special feeding methods. Usually it is planned to feed something at this time that the fowls like extra well in order to keep them down until the hour fixed as the one when the lights are to be turned out and the fowls left for the night. Turning the lights on early in the morning prevents this difficulty as the fowls then will promptly come down off the perches when it is light enough to see, regardless of the hour. It is not desirable, however, to turn the lights on early in the morning unless the fowls are promptly fed and watered. Where nonfreezing founts are provided, the morning grain feed scattered in the litter the night before, and a dry mash supplied in hoppers to which the birds can have access at any time, it is entirely practical to have all the artificial light in the morning, and this can be done without any inconvenience to the caretaker if automatic electric lights are used.

It has been general experience that the fowls most benefited by the use of lights are what may be called second-class birds—that is, hens and late-hatched or cull pullets. Obviously, early-hatched pullets that are in laying condition by October 1 and that may readily be made highly productive without lights will not be especially benefited by artificial illumination, since they will be laying approximately up to their capacity at any rate, but the inferior pullets that under ordinary conditions would lay but poorly, and hens one year old or over that perhaps would not begin to lay until towards spring, will respond quickly to the influence of lights, and it is with such flocks as these that most marked results are regularly secured. As a matter of fact, experiments at Cornell and elsewhere have proved that it is possible to get as good or better production from late-hatched inferior pullets as can be secured with the best pullets without lights.

For example, at Sunny Crest Farm in New York, a flock of 2,100 pullets was sorted, 1,600 of the better ones being placed in a house without lights while 500 culls—"the weakest, smallest, and most unpromising of our entire flock"—were placed in separate houses provided with artificial illumination. At the time lights were installed (late in November) the production of the cull pen was running about 20 per cent while the production of the selected pullets was averaging 35 to 40 per cent. Within three weeks after the lights were turned on, the production of the best pullets had dropped to 20 per cent as the result of severe weather which came on about this time, while the cull pullets were averaging 65 per cent. These pullets remained greatly in the lead throughout the month of December at which time lights were also installed in the house where the best pullets were kept and in that way the latter were brought up to the satisfactory production being realized from the culls.

Reference has already been made to the fact that certain changes in methods of feeding are desirable where artificial illumination is practiced. At the Western Washington Experiment Station, Professor Geo. R. Shoup, who is a pioneer in the use of artificial illumination, recommends



HENS SCRATCHING IN LITTER BY ARTIFICIAL LIGHT

This flashlight photograph shows a flock of White Plymouth Rocks busily engaged in scratching in the litter for sprouted oats and dry grain at 7 p. m., the house being well lighted by electricity. Illustration from "Use of Artificial Light to Increase Winter Egg Production."

the following feeding methods which he has found thoroughly satisfactory under his conditions.

#### Method of Feeding Artificially Lighted Flocks at West. Washington Experiment Station

"Where artificial lighting is regularly practiced, the feeding method recommended by this Station for Leghorn pullets laying heavily, based on units of 100 birds, is as follows:

7:00 a. m.—8 lbs. of dry oats, germinated to very short sprouts.

3:30 p. m.—8 lbs. scratch grain.

5:00 p. m.—4 lbs. of a good dry mash mixture wet with water, to which fresh blood is added in proportion of 1 pint of blood to 1 gallon of water. In the absence of blood, 4 quarts of sour milk or buttermilk may be used, or blood meal, at the rate of about 10 per cent of the mash fed, mixing this with a suitable quantity of water.

7:30 p. m.—Kale.

"Dry mash is supplied in hoppers, and during the day one hundred birds will average to consume about four pounds of this, also about a gallon of clabbered milk, which is fed about 9:00 a. m. The kale, which is fed at 7:30, is greatly liked by the fowls, and when brought in after supper proves to be a good bait to bring the pullets off the roosts, where many of them go after filling up on the mash. Without a bait of some kind they will turn their backs to the brightest lights and the attempt at lighting will be a failure. After a few weeks of this practice the pullets refrain from roosting early and most of them are on the floor waiting when the kale comes in. After eating the kale they scratch industriously for grain in the litter, eat more dry mash, water and shell, and by 8:30 or 9:00 p. m. are filled to repletion again."

The Poultry Department at the New Jersey Experiment Station has taken a leading part in promoting the adoption of the use of lights and also has conducted a number of experiments at the station and also has superintended many practical tests on the plants of commercial egg producers. The method of feeding recommended by this institution is as follows:

**Method of Feeding Artificially Lighted Flocks  
Recommended by the N. J. Exp. Station\***

**Scratch feed (parts by weight)**

Cracked or whole corn.....	2
Wheat.....	1
Oats.....	1

**Mash feed (parts by weight)**

Wheat bran.....	1
Wheat middlings.....	1
Corn meal.....	1
Ground oats (heavy).....	1
Meat scrap or fish scrap (high grade).....	1

**Schedule for Feeding Scratch Feed**  
Pounds per 100 birds

	Early	A. M.	10 A. M.	Noon	Late P.M.	Total
September.....	3			2	5	10
October.....	3			2	5	10
November.....	3			2	5	10
December.....	2	2		2	6	12
January.....	2	2		2	6	12
February.....	3	3		2	5	13

The mash feed should be fed dry and in boxes or self-feeders kept constantly before the birds and available to them at ALL times. This system of feeding mash may be supplemented by feeding the same mixture wet and given during the middle of the day. But only enough

When this is supplemented with a wet mash it is best to give the mash just after noon. Following this schedule will be found to induce birds to work pretty well all day, and will do away with a great deal of the inactivity which is apt to develop during cold and bad weather.

**Method of Feeding Artificially Lighted Flocks at  
Sunny Crest Farm**

One of the first commercial poultry farms to adopt the use of artificial illumination in the East was Sunny Crest Farm at East Aurora, N. Y., where the method has been tested out on a large scale. Some of the results secured at this farm are referred to elsewhere in this chapter. The ration used at Sunny Crest, as given in "Use of Artificial Light to Increase Winter Egg Production," is as follows:

"At 7 a. m. give three quarts of grain to one hundred hens.

"At 9 a. m. scatter a good-sized handful for the one hundred hens in eight inches of dry litter and at this time give all the green feed the hens will clean up in one hour, giving them sprouted oats, cabbage or mangel beets.

"At 3 p. m. scatter another handful of wheat in litter for each hundred hens.

"Night: Feed all grain that the birds can practically clean up. A small quantity, however, left over at the time they go to roost will afford healthful exercise early in the morning.

"If sprouted oats are fed in large quantities in the morning or early forenoon, the grain fed can be cut down to two quarts for the morning ration.

"With us the straw is raked to the front of the laying pen where the windows are, each day or two, so that the litter will be evenly distributed

for exercise. Birds face the light when scratching for grain and therefore, as a rule, kick the litter to the rear of the pen.

"The winter dry mash at Sunny Crest Farm consists of the following:

- One hundred pounds bran.
- One hundred and twenty-five pounds corn meal.
- One hundred pounds red dog flour.
- Fifty pounds ground oats, heavy and ground fine.
- Fifty pounds ground barley.

Seventy five pounds of meat scrap if buttermilk is used, otherwise one hundred pounds meat scrap. Semi-solid buttermilk (a commercial article) diluted, one and one-half pints to ten to twelve quarts of water, is given both morning and afternoon—about one pailful per hundred hens a day—that is, half a pailful at each feeding.

"Our hoppers for two pens (built in the partitions) each hold 2,100 pounds of dry mash and are 12 feet long, thereby giving the flocks plenty of lineal space. If it is found at Sunny Crest that the birds lack appetite or appear lopy, the mash hoppers are shut down for a period of three or four hours in the forenoon."



HOW ARTIFICIAL LIGHT INCREASES NET RETURNS FROM THE FLOCK

The two circles shown above show the results of the use of light on 14 flocks of layers in New Jersey, September 1, 1918 to March 1-15, 1919. Where lights were used the egg yield was increased to such an extent that 32 cents out of each dollar of receipts paid for feed and lights, leaving 68 cents net. In similar flocks for the same period, without light, it would have taken 61 cents of each one dollar of receipts to pay for feed, leaving but 39 cents net. Courtesy of New Jersey Experiment Station; reprinted from "Use of Artificial Light to Increase Winter Egg Production."

wet mash should be given so that they will clean it up in half an hour at most. (This is important, as they usually get sick of wet mash if it is left before them any longer.)

The scratch feed should be given at least three times daily and in cold and disagreeable weather may well be given four times. The amount of mash the birds will eat is influenced greatly by the amount of scratch feed given, as they will consume a large part of their daily ration in the form of scratch feed if enough is supplied. Therefore, only a small part of this scratch feed should be given in the morning, thereby making the birds hungry for mash. The scratch feed given in the morning is more for the purpose of exercise than anything else, and it will be found that they will work as hard and scratch as hard for one pound as they will for ten pounds. When given too much, they eat only that which they find on the surface of the litter and then will be more or less satisfied and will not dig for the part that sifts to the floor. A good big feed of scratch should be given at night, because if they can be made to go to roost with a crop full of scratch feed, it will last them through the night much better.

\*From "Use of Artificial Light to Increase Winter Egg Production."

## Protecting the Health of the Back-Yard Flock

While Fowls and Chicks Are Subject to Numerous Diseases, the Percentage of Losses Is Small If Proper Care Is Taken—The More Common Disorders Which the Back-Yard Poultry Keeper Is Most Liable to Encounter Are Here Briefly Described and Simple Treatments Suggested

**L**OSSES from disease probably will run about 10 per cent per annum in the average flock. This relatively high percentage of loss is not due to any special liability to disease on the part of the fowls, but to the highly abnormal conditions under which they usually are kept and to indifferent methods of feeding and general care. It is possible, but rarely practical, for the average poultry keeper to provide such favorable conditions that the death rate in his flock will be reduced to extremely low averages. As a rule, he can better afford to accept some losses (though 10 per cent is unnecessarily high) than seek to avoid them by the extra floor space and more careful attendance required. A marked reduction in losses can readily be secured in the average flock, however, simply by giving a little more attention to the needs of the fowls.

Most fatal diseases of poultry develop from comparatively minor ailments which through sheer neglect have been allowed to become serious, and those who make it a practice to keep their birds under close observation, who familiarize themselves with them to such an extent that they are able to note the first symptoms of a departure from normal health, find that they can prevent development of fatal diseases to a great extent. On the other hand, those who are careless and indifferent and allow their fowls to become seriously ill before applying suitable remedies cannot hope to escape heavy losses.

### Cleanliness and Sanitation

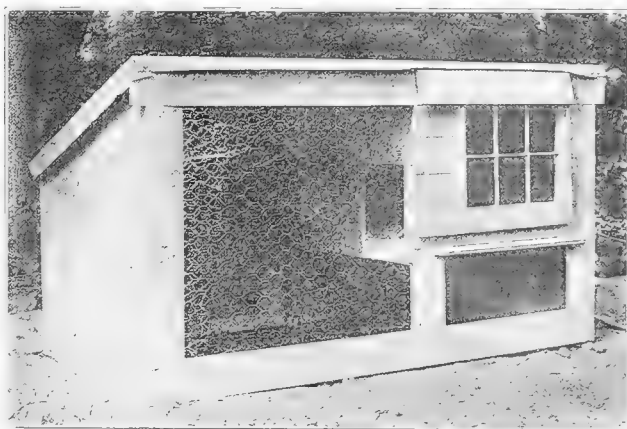
Cleanliness as applied to poultry keeping is a relative term and while practical requirements are only moderately exacting there are definite limits beyond which it is not wise to go in neglecting them. Speaking generally, a poultry house is clean as long as it is dry and free from odors, excessive dust, and too high a percentage of droppings in the floor litter. The back-yard poultry keeper whose fowls must be indoors a good deal of the time and who, in order to economize in floor space or in the quantity of floor litter used, makes use of droppings boards, will find that frequent cleaning of the latter is essential to keeping the house free from disagreeable odors. The ideal plan is to clean the droppings boards daily. Many find it convenient to do this, while many more do not.

As a matter of practical cleanliness, daily cleaning is not necessary, provided the droppings are covered with absorbent material, such as road dust, sand, sawdust, etc. In such cases the removal of droppings does not become a necessary act of cleanliness until the fowls begin to scratch the accumulation from the droppings board into the floor litter. The point is that an accumulation of droppings is free from odor as long as it is dry and as long as it is free from odor it is harmless to the fowls unless they scratch in it and pick it over. It is doubtful if they will do this to a harmful extent if their floor is well littered and if their ration is what it should be. Floor litter is dirty when it is damp, foul smelling or excessively

dusty, no matter what may be the length of time that it has been in use.

### Remove Sick Fowls From the Flock

The safest and wisest plan is always to remove sick fowls from the general flock and keep them isolated so that if the disease affecting them is a contagious one there will be less danger of it spreading. There are, however, two practical difficulties in the way of carrying out this policy generally. One is that most persons do not have a suitable place to put the ailing birds. The make-



ROOSTING COOP AND COVERED RUN FOR SMALL BACK-YARD FLOCK

Gives hens advantage of dirt floor and can readily be moved to new location, insuring cleanliness.

shift quarters usually provided are inconvenient and isolated from the rest of the buildings, and neglect generally finishes any sick fowls that survive the disease. Another difficulty is that where this advice is taken literally it often results in the flocks being kept unsettled and disturbed much of the time, to the great disadvantage of all the fowls, sick and well alike.

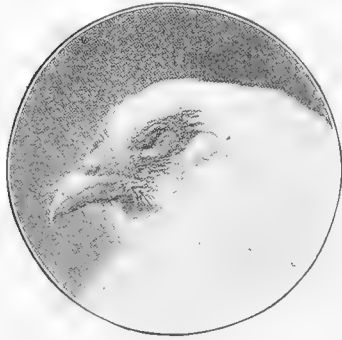
While the theory of isolation for sick fowls is a good one, when it comes to actual practice it is well to use a little discrimination. For minor ailments that do not appear to be of an infectious nature it certainly is undesirable to annoy the fowls by isolating them and later returning them to the general flock where they invariably will be treated as strangers and compelled to fight their way to a mutual understanding again. Where many fowls in the flock are affected at about the same time, it is safe to assume that infection is more or less general, in which case the practical thing to do is to treat all as sick, and give such general treatment as may be desirable in their permanent quarters. In this, as in many other details, the caretaker can save a lot of work and worry by using a little good judgment along with his "rules"—even the most authoritative of them.

At least until thoroughly familiar with the symptoms of ordinary diseases, the beginner should make it a practice

to dissect every fowl that dies from an unknown cause. If he will do this he will find it easy to determine the nature of the disease in a great majority of cases, and knowing the disease and its cause will be able to prevent the spread of the trouble or to apply treatment to new cases before they have reached so serious a stage that the use of remedies is of no practical value.

#### Disinfectants Are Needed

No matter whether there are any sick fowls in the flock or not, the house should be thoroughly sprayed with



HEN AFFECTED WITH ROUP

some good disinfectant, now and then. Instead of looking upon disinfection as a means of curing disease after it breaks out it should be employed while the fowls are well; as INSURANCE AGAINST DISEASE. Any good disinfectant may be used, spraying it on thoroughly. Every poultry keeper should have a spraying outfit, its size depending upon the amount of surface to be covered. A five per cent solution of crude carbolic acid may be used, though better results usually will be secured with some of the excellent commercial disinfectants on the market. These usually are more easily handled, dissolve more readily in water, and are thoroughly reliable and effective. As a rule, it is not advisable to attempt thorough applications of liquid disinfectants in damp or extremely cold weather. If possible, select a warm sunny day when the fowls can be allowed to run out and when the house will become reasonably dry again before the fowls have to return to it.

#### The Droppings Board As a Daily Health Bulletin

In many disorders the first indication of trouble will be found in the droppings. To the observant poultry keeper these afford a fairly reliable and easily read daily bulletin of the health of the fowls. Acute indigestion, inflammation of the intestines, liver trouble and many other disorders, both slight and important, usually can be detected in the droppings hours or even days in advance of other symptoms, if the caretaker is familiar with the appearance of normal droppings and with the causes of variations from normal. This simple guide to the general health of the fowls usually is almost completely overlooked. As a result, valuable time is often lost because the fowl does not "look sick."

Every poultry editor is called upon at frequent intervals to answer inquiries that read something like this: "My fowls suddenly become sick. They have diarrhea and die in a few hours." In point of fact, fowls do not as a rule "suddenly" become sick. On the contrary, they may be hours or even days in developing serious symptoms during which time their droppings progressively change from normal to abnormal in appearance, until finally the suffering of the fowls becomes so acute that it is able to force itself upon the attention of the caretaker who is too unobservant or too busy about other things to look at the droppings board or even carefully to observe his fowls until his attention and remedies alike are use-

less. Cultivate the habit of taking a glance at the droppings board every time it is passed. The droppings do not form a general index to poultry diseases, of course, but they give information so important that failure to note their appearance regularly is inexcusable.

#### TREATMENT OF COMMON DISEASES

In a general work of this character it obviously is impossible to give complete information in regard to poultry diseases. In the space here available it is possible only to indicate such general methods of treatment as will enable the beginner to keep his fowls in good health or to detect ailments at their first appearance and apply suitable corrective treatment, thus to prevent the development of serious diseases. At the risk of repetition we wish to say again that the poultry keeper will find it much easier to prevent losses by correct methods of feeding and care and by prompt application of simple correctives at the first appearance of trouble, than to cure sick fowls after clearly defined diseases make their appearance.

For our present purpose it is sufficient to classify the common diseases with which the back-yard poultry keeper will have to contend, as follows:

- Colds and roup.
- Diseases of digestive organs.
- Miscellaneous ailments.
- Diseases of chicks.

#### Colds and Roup

Fowls are more generally subject to catarrhal affections than other domestic animals, due in part to their physiological make-up, but chiefly, perhaps, to the fact that they usually are kept under more unfavorable conditions than other animals. Colds probably are infectious, and roup, which often results from neglected colds, certainly is. Where such diseases are present, the water vessel is a highly effective means of spreading infection. The fowls, in drinking, drop particles of infected mucus, scabs, etc., into the water, which later are taken up by the other fowls, and in a short time infection becomes general. This is the reason why, at the first appearance of any form of catarrhal disorder, some good disinfectant should at once be added to the water supply and its use continued as long as there are any sick fowls in the flock.

The most common causes of colds are drafts through cracks or other small apertures, which may permit cold currents of air to strike the fowls, particularly when on the perches; direct currents of air caused by doors or other openings that permit the wind to blow through the house at the floor level; dampness and foul air, to which fowls are very sensi-



ADULT FOWL WITH SOREHEAD

time; filthy litter which carries more or less infection to be taken up by the fowls in feeding, or through the lungs, if dry and dusty; crowding and sweating on the perches due to insufficient perch room or to their being placed too close together; wrong feeding methods.

There is comparatively little chance of the small back-yard flock being overheated by crowding on the perches, but it is just as well to keep the danger in mind. Perches should be spaced 12 to 18 inches apart, and 8 inches of perch room should be allowed for each fowl of the Mediterranean breeds, and 10 to 12 inches for fowls like Plymouth Rocks.

The feeding of hot moist mashes frequently is an indirect cause of colds. Hot feeds do no harm in themselves, but it is usual for fowls, after getting a full feed of such material, to huddle together in some corner and remain inactive for a considerable period—a combination which is quite apt to cause trouble.

Serious summer colds among adult fowls are not often encountered, but as cold weather comes on, cases of dirty nostrils, snuffling, and more pronounced symptoms become increasingly common. A simple cold or catarrhal condition, with some snuffling and accumulations about the nostrils, is not necessarily a serious matter, and if the exciting cause is removed the trouble probably will right itself without treatment. Such colds are quite common among fowls, both old and young, and it is doubtful whether there is any practical advantage in being constantly on the watch for these symptoms and keeping after them with some form of treatment, particularly in the way of internal remedies. Frankly, the writer's practice is to ignore simple colds, so far as special treatment is concerned, though if many fowls become affected no time should be lost in trying to find and remove the cause or causes.

Careless or slack methods are not here advocated, but from a practical standpoint the poultryman who gets anxious and worried over every light cold or catarrh that develops among his fowls will have little peace of mind the year around. The thing to do is to make sure that the fowls are not exposed to conditions which are known to cause colds, especially when they are on the perches, and to be on the watch for unfavorable symptoms, but it is not necessary to attempt to treat every light cold that develops.

About the easiest and simplest way to keep in touch with the health of the fowls in this respect is to go into the house at night, after they are on the perches. If no snuffling, wheezing, or "whistling" is heard the caretaker can rest easy. If any of these symptoms are noted the affected individuals should be found and examined. Whether they should receive special treatment or not will depend on circumstances.

#### No Trifling With Active Colds

In contrast with simple, inactive colds or ordinary catarrhal conditions, active colds, such as come on suddenly and are distinguished by excessive discharges from nostrils, watery eyes, or acute bronchial inflammation, indicated by a peculiar whistle made in breathing, must not be neglected. They may not always be serious in themselves, but they pave the way for roup—one of the poultry keeper's most dreaded enemies.

The best form of treatment for active colds will depend somewhat on the number of fowls affected and the seriousness of the trouble. If there are only a few, individual

treatment may be practical, since one or two treatments often are sufficient to stop the trouble. There are several excellent commercial remedies for colds and for roup in mild stages, that can be recommended with confidence, and better results usually will be secured where one of these is used.

#### Treatment for Colds and Roup

For a simple cold in the head, where a good commercial remedy is not at hand, an effective method is to dip the fowl's head in a two per cent solution of potassium permanganate. If the eyes or nostrils are covered with scabs or accumulations of pus, these should be removed by the use of warm water before the remedy is applied. It is a good plan to flush out the nostrils with some good disinfecting solution, using a rubber syringe for the purpose. When the eyes are affected they also may be



A WIDE EAVE OVER OPEN FRONT KEEPS FLOOR DRY

flushed with a solution of boric acid. Repeat the treatment in twelve to twenty-four hours.

Any good disinfectant that will mix with water may be used in the drinking vessels. Potassium permanganate is preferred by many, using only enough to color the water, renewing the supply two or three times a day, as this drug loses its efficiency quickly when in contact with any kind of organic matter.

In bronchitis, indicated by labored breathing, whistling, rattling in the throat, etc., ten drops of spirits of turpentine in a teaspoonful of castor oil are recommended. Dose may be repeated after five or six hours if necessary.

Where roup has definitely developed (distinguished by the peculiar odor that usually, though not always, accompanies this disease) extreme measures must be taken. This is a highly infectious disease and outbreaks should be treated accordingly. Affected birds should promptly be isolated from the remainder of the flock and may be given individual treatment if not too numerous. Disinfect all drinking water for both sick and well birds, as previously directed. Clean the poultry house thoroughly and disinfect with a five per cent solution of crude carbolic acid. Keep the house clean and well ventilated at all times.

Remember there is always a cause for outbreaks of these diseases, and it is scarcely worth while to attempt to treat the fowls if the cause is not promptly discovered and remedied. It may be foul air and dampness due to insufficient ventilation, drafts from cracks in the walls,

exposure to direct currents of air from open fronts, overheating at night due to crowding on the perches or elsewhere. Whatever it may be, it must be corrected if good results are to be secured from any treatment.

Another method of flock treatment that many have used with good results is to fill the house with a disinfecting spray. Do this at night after the fowls have gone on the perches and saturate the air thoroughly so that the fowls will breathe the spray into their lungs, thus treating the membranes of nostrils, throat, and bronchial tubes. One or two treatments often will effect a complete cure. If the house is too large to do this to good advantage it may be practicable to enclose the fowls while on the perches by means of temporary curtains of muslin or burlap, which will make the treatment still more effective.

#### Diseases of Digestive Organs

There are numerous causes for diseases of this nature. The feeding of sour or moldy material of any kind, lack of such important elements in the ration as green feed, grit, etc., are all liable to cause trouble, while even a theoretically correct ration may result in disease when fed to excess or given to fowls in such manner that they do not secure the necessary amount of exercise.

**Sour Crop** in poultry is indicated by gaseous or abnormally fluid contents. It is detected by distension of that organ, or by the escape of mucus from the mouth (a form of vomiting), gasping for breath, or in more advanced cases by staggering and convulsions (vertigo). It usually responds readily to treatment in early stages.

**Diarrhea** is not a disease but a symptom in various diseases affecting the digestive organs. Wherever this trouble appears proper correctives should be applied at once but do not rest until the specific cause of the trouble has been located and removed.

**Liver Disorders.** Liver disorders are the outgrowth of improperly balanced rations, lack of exercise, and lack of green feed. Diseases of this organ are rarely detected until they develop to a stage where medical treatment is of little value. However, it is always wise to give some simple treatment. If encouraging results are secured this may be continued until a cure is effected, otherwise the birds should be killed and burned or buried.

#### Treatment for Digestive Disorders

For practically all affections of the digestive organs the best treatment is a purgative dose of Epsom salts, which in the case of an adult fowl is a level teaspoonful. Dissolve the salts in a little water and in individual cases give with a teaspoon. If a number of fowls are to be treated, use 1½ pounds of salts to 100 fowls. Dissolve in water, mix with mash enough to form a light feed, and use troughs or trays enough so that all the birds may feed at the same time. This is best given in the morning before the fowls have had access to any other feed. Then correct the ration, keep granulated charcoal before the fowls in hoppers, look after the supply of green feed, and provide more exercise if the fowls are closely confined.

In case of sour crop it is advisable to keep bicarbonate of soda in the drinking water, using no more than can be without making the water unpalatable. Where liver disorders are suspected give individual birds calomel in 1-grain doses and follow with salts in 6 hours. Treatment may be repeated in 24 hours if necessary. It is not advisable to give calomel in such doses for more than two consecutive days.

Less fattening rations, in some cases less meat scrap, and in practically all cases an abundance of green feed are indicated in digestive troubles and if the disease is not in too advanced a stage the foregoing measures will bring about prompt recovery. However, fowls that have once had serious attacks of this nature usually are apt to have the same trouble again and the poultry keeper's surest means of avoiding loss is to put all such birds on the market as soon as they are in good health again. There are a number of commercial remedies that are of great value in treating diseases of this class and, as they may be placed in the drinking water, are much simpler to give and generally more effective than home remedies as these usually are administered.

#### MISCELLANEOUS DISEASES

**Diseases of Egg Organs.** Where fowls are fed for extra-heavy production, derangements of the egg organs are naturally expected to appear in increasing numbers, though the percentage can be greatly reduced by proper management. Such troubles are always most common in fowls in confinement. Where the grain ration is fed in a limited amount of litter and the fowls able to secure it with little effort, the muscles of the abdomen become weak and flabby, and in this condition the functioning of egg organs is interfered with, particularly if, as is frequently the case, this condition is accompanied by the accumulation of masses of abdominal fat which further interfere with their normal action.

There is comparatively little that can be done to correct these diseases in advanced stages, but those who observe the ordinary rules of feeding and who see that their fowls are kept reasonably active will rarely have any occasion to resort to individual treatment. In the best managed flocks there will be occasional cases of prolapse of the oviduct, but the percentage should be small. The poultry keeper who has an undue proportion of such diseases can depend upon it that his feeding methods are not right. In prolapse of the oviduct (indicated by the protrusion of parts from the vent), the bird often may be relieved simply by pushing these back into place and keeping her in a quiet place away from other fowls, feeding a nonstimulating ration. Blood clots in eggs are caused by rupture of small blood vessels in the ovary or oviduct. They indicate an inflammatory condition the remedy for which is to reduce production for a time by lighter feeding.

Soft-shelled, or otherwise abnormal eggs, when they do not result from lack of shell material, are usually caused by an inflammatory condition. More exercise and a lighter diet are the only remedies required.

**Chicken Pox or Sorehead.** This is an infectious disease, similar in its character to roup, and by many investigators is believed to be caused by the same organism. The disease usually starts with the appearance of small blisters, pimples or warty growths which develop into crusts or scabs. These may increase rapidly in number and in size until the entire surface of the comb and other head parts are covered with the sores. Where the tissue about the eyes is affected, the eyelids may stick together and the fowl then dies from starvation. Chicken pox varies greatly in virulence, the attacks sometimes being of short duration and with practically no losses. In other cases large numbers of fowls succumb to the disease. It is most liable to break out in early winter among young pullets just as they are coming

into maturity, and in damp weather throughout the fall, winter and spring.

If the disease is taken in hand at the start, spread of the infection may be stopped by isolating the affected birds and giving them separate treatment. Remove the scabs and touch the raw surfaces with a swab saturated with a 5 per cent solution of creolin or a 1-1000th solution of corrosive sublimate, then dust with iodoform. In light cases no further treatment may be required, aside from daily use of a good disinfecting ointment such as carbolated vaseline. If the sores continue to show inflammation, dust with iodoform daily. Epsom salts is believed by many to be a help in preventing the spread of disease among the flock. The proper dose is one level teaspoonful to each fowl. Dissolve the salts in a little water and give it in a light feed of moist mash supplied in the morning before the fowls have had access to anything else to eat.

**Frozen Combs and Wattles.** While fowls with large single combs are especially liable to frostbites in severely cold weather,<sup>3</sup> few are entirely free from this danger. Even when the fowls have small rose combs, their wattles often are well developed and these are as sensitive to cold as the combs. There is comparatively little danger of the fowls having combs and wattles frosted while they have their heads tucked under their wings at night, though this sometimes happens. The injury more frequently occurs in the early morning when the fowls come down from the perches. Frozen wattles usually result from the fowls dipping them into the drinking water. For this reason many poultry keepers make it a practice to withhold water in severely cold weather, until toward the middle of the forenoon when the house has warmed up somewhat. It is better to do this than to risk injury to the wattles, but it is much better still to provide suitable drinking fountains so that the fowls can drink without getting their wattles into the water, or to have the water sufficiently warm so that injury is not likely to result.

Rubbing the combs and wattles with vaseline will help to protect them from the frost, though such protection is of only slight value. Where there is danger of frosting, the house should be kept as warm as possible without too greatly restricting ventilation and, if necessary, the number of birds in a pen can be increased by combining two or more flocks, thereby giving them the advantage of additional animal heat.

When it is discovered that there are frosted combs or wattles, treatment should be given promptly. Thaw the frozen parts and restore the circulation by rubbing them with vaseline, or at least keep the birds where the temperature will be high enough to prevent further freezing, but do not take them to a warm room, as it is quite important that the parts should thaw out slowly. An excellent ointment for use in treating frozen combs is composed of four parts of vaseline, two parts of glycerine, and one part of turpentine. It should be rubbed on once a day until recovery. If the parts are badly frosted, more or less of the tissue will turn black and slough off. This should not be removed, but should be allowed to drop off naturally as the injured parts heal.

**Egg Eating.** Egg eating is a vice usually resulting from idleness. Fowls that are closely confined and have nothing in particular to do are the ones that develop this habit, though it often owes its direct start to the presence of broken or soft-shelled eggs in the nest. Darken the

nests in any practical way, see that the birds have an abundance of shell material and give more attention to exercise. In most cases the habit can promptly be broken up by giving the birds one or two "doctored" eggs. Empty the contents of an eggshell through a small hole in the large end and fill with a stiff paste made of three parts of corn meal and one part of Cayenne pepper. Place this egg in the nest where fowls are accustomed to eating eggs and if necessary repeat once or twice.

**Feather Pulling.** One of the troubles that the poultry keeper often has to contend with where the birds are closely confined, is feather pulling. They appear to develop the habit more for lack of something to do than for any other reason and the male, if one is kept, is apt to be the first victim. As soon as the practice begins, however, it quickly spreads to the other members of the flock and if permitted to go unchecked will presently result in nearly all the birds being more or less denuded, with a most unfavorable effect upon the egg yield. The best remedy for feather pulling is exercise. If the birds are kept busily engaged during the day scratching for their feed in litter, or if they can be given greater liberty, they usually will discontinue the practice promptly, unless it has become too deep seated.

As a preventive measure it is a good plan to prepare a strong solution of bitter aloes and sponge the feathers about the denuded parts with this, which makes them distasteful to the birds. A lack of animal feed is sometimes held to be the cause of the development of the habit, and a regular and liberal supply of fresh meat is recommended. This is a good plan for almost any flock in confinement, though it is doubtful whether a deficiency in this part of the ration really has anything to do with feather pulling. If the meat is fastened to a string and hung high enough above the floor so that the fowls have to jump to get it, this will assist in keeping them busy.

#### PREVENTION AND CURE OF CHICK DISEASES

In many chick disorders the symptoms are more or less alike, though not so much so but that the caretaker can detect little shades of difference that point toward specific causes. The successful chick raiser does not feel easy in regard to any brood so long as there is one mopy chick in it. It may be constitutional weakness or some other matter affecting a single individual (not all chicks will live under even the best of conditions), but if there is one weakly chick in the flock there is reason to suspect that in another hour there may be two; and in a few hours there may be a dozen. Watch!

When chicks are noisy, when they huddle in corners or in the sunlight, when they stay under the hover for hours at a time, when they refuse to go out at mealtime and do not eat when they are out, there is every reason to fear serious trouble. Such conduct indicates weakness at least. It may not mean anything more serious than that, but study the chicks and review everything that has been done. Is the temperature of the brooder what it ought to be? Does the thermometer register correctly? Has the feeding been properly done? Have the feeds been wholesome and pure?

#### Digestive Disorders

The chick's digestive organs are peculiarly delicate during the first few weeks of its life and anything that unfavorably affects its health or strength is liable to result in some affection of these organs. A chick that

has been kept in an insufficiently ventilated nursery chamber in the incubator, that has been chilled either in the incubator or in the brooder, that has been fed too much, deprived of some needed element such as grit or green feed, given cold water to drink, permitted to get wet,



CHICK WITH GAPES

Treatment of chicks affected with this disease is difficult and results are uncertain. The most practical plan is to prevent infection.

ing distension and sometimes vomiting. Severe cases may be accompanied by gasping and this disease occasionally is mistaken for gapes on this account.

Use due care in feeding and keep the chicks liberally supplied with charcoal and these ailments will be almost wholly prevented. When the symptoms are first noted, give Epsom salts and change the ration. In giving Epsom salts, use the following dosage: For chicks 1 to 5 weeks old, 1 level teaspoonful to 8 chicks; 5 to 10 weeks old, 1 level teaspoonful to 5 chicks; 10 to 15 weeks old, 1 level teaspoonful to 3 chicks; 15 to 26 weeks old, 1 level teaspoonful to 2 chicks. Salts may be given most conveniently when dissolved in water and mixed with a little wet mash. Also give bicarbonate of soda (common baking soda) in the drinking water, making the solution as strong as the chicks will drink it readily. Individual doses of subnitrate of bismuth may be administered if desired, giving one-third of a grain 3 times daily to chicks under 5 weeks of age.

#### Catarrhal Disorders

Chicks exposed to unfavorable conditions in or out of the brooders, such as chilling, overheating, impure air, etc., are more liable to develop catarrh of the bowels than the various forms of nasal catarrh. Under some conditions, however, they may develop nasal discharges and "sore eyes"—forms of catarrhal inflammation. Keep the brooders clean and dry and at the proper temperature, and do not expose the chicks unduly to cold winds or rain. Whenever either symptom appears, give potassium permanganate in the drinking water, using enough to color the water well.

#### Gapes

Gapes is due to the presence of gapeworms in the windpipe of the chick. The characteristic gasping for breath is due in part to the presence of gapeworms and in part to mucus secreted as a result of irritation of the inner lining of the windpipe to which

the worms attach themselves. The gapeworm egg or embryo may be taken by the chick in various ways, as through the drinking water, or by being picked up directly from the ground. Earthworms are known to be instrumental in the spreading of infection, though they do not, of course, give gapes to chicks unless the worms are from infected soil.

crowded in brooder, kept confined to the brooder too long, or exposed to any one of a number of possible sources of bacterial infection, will almost certainly have digestive disorders. Chicks often suffer from sour crop resulting from the use of unsuitable feeds or improper feeding. The chief symptom is an accumulation of gas and liquid in the crop, causing

the worms attach themselves. The gapeworm egg or embryo may be taken by the chick in various ways, as through the drinking water, or by being picked up directly from the ground. Earthworms are known to be instrumental in the spreading of infection, though they do not, of course, give gapes to chicks unless the worms are from infected soil.

If gapeworm infection is known to be present the chicks must be kept away from the earth and from earthworms until at least four weeks old. Brood the chicks on board floors and never allow them on the ground, especially when it is wet, or in the early morning when earthworms come to the surface. If this method is followed, special care must be taken to prevent leg weakness, however, which usually results from close confinement. When there is sufficient room to do so, a better plan is to raise all chicks on land that has not been occupied by poultry for at least a year. If the chick grower can provide two or three chick parks or nurseries in which the chicks may be grown on alternate years, there will be practically no trouble from this cause.

Different remedies have been suggested for chicks with gapes but reports regarding them are not always satisfactory. Much the better plan is to prevent gapes rather than try to cure it. Infected soil should be plowed, cultivated, and heavily limed, and no chicks should be raised on such soil for at least one year. Get rid of the infection and then keep free from it by cleanliness, sanitation and the alternate use of different plots for brooding.

#### Leg Weakness

Leg weakness frequently occurs among chicks that are from one to four months of age. There are various causes of the trouble, such as lack of vigor in the breeding stock, bottom heat in the brooders, overheating and crowding in brooders, poor ventilation, special feeding for rapid growth, lack of bone-forming material in the feed, etc. Constant confinement on board or cement floors frequently causes leg weakness. Common symptoms are unsteadiness of gait, lack of activity due to inability to stand up, lameness, lying with legs stretched out behind or at side, etc.

The common practice of confining chicks indoors for long periods before they are allowed to run out, of providing insufficient litter on the brooder or house floor, and indifference to providing exercise, cause three-fourths of all cases of leg weakness. Medical treatment is useless. Correct the conditions that cause the trouble and the chicks will soon recover. The weakest, however, should be removed from the general flock and be given a separate brooder where they will not be trampled and abused by the healthy members of the brood.

#### Limberneck and Vertigo

Young chicks frequently suffer from limberneck, caused by eating decayed animal matter or the maggots that grow in such material. Do not confuse limberneck with congestion of the brain, or vertigo. When the chick is suffering from the latter disease its head may be drawn back over the shoulder or twisted to one side, and the neck may be turned so that the chick looks directly upward. Affected birds will stagger, run backward and make other peculiar motions, or may lie on one side. The trouble is caused by digestive disorders, sometimes by worms, and occasionally by injury. In well-developed cases of limberneck, the muscles of the neck are relaxed, allowing the



chick's head to droop until often it touches the ground. In the case of either disease give the chicks a dose of Epsom salts and see to it that the cause is properly removed.

#### Overgrown Wings

Frequently young chicks, particularly Leghorns, are found trailing their wings, which appear to be out of all proportion to the size of the chick. This trouble develops occasionally as a result of too high brooder temperatures, but, as a rule, it indicates a lack of strength which may result from a number of causes. In many instances the wings really are not overgrown, but are normal in length and only appear overlarge because of the relaxed position. When chicks are so affected it is a good plan to clip the wings and relieve them of the extra weight. Then restore the chick's health by proper feeding and brooding and there will be no further trouble.

#### Lack of Feathers

In many flocks there are found partially grown chicks that have failed to feather out properly, sometimes having no feathers at all except a few on the wings. This condition may be due to a lack of constitutional vigor or improper feeding, but more frequently to crowding in the brooder at night. Generally it is found that if these chicks are removed from the regular flock, warmly brooded in small numbers, and well fed, they will promptly feather out and make fair growth. Such chicks usually are stunted, however, and should never be retained in the flock either as layers or breeders.

#### Stunted Growth

This condition generally is the result of insufficient heat in the brooders, or crowding and poor ventilation in brooders or coops. The general tendency to discontinue supplying artificial heat before the chicks are properly feathered out is responsible for much lack of thrift and stunted growth. With hen-brooded chicks it usually is the result of overcrowding. Coops that appear to be amply large when the broods are first placed in them, become badly overcrowded as the chicks increase in size. Confining growing chicks at night to hot, stuffy quarters in which they scarcely have standing room, a condition altogether too common in late summer and early fall, can have no other effect than to stunt their growth and impair their health.

#### Toe Picking and Cannibalism

Young chicks, especially Leghorns, are quite liable to form the habit of picking at each other when kept in close confinement, the toes usually being the first object of attack. This sometimes goes so far as to result in the loss of a number of the weaker chicks that are literally torn to pieces by the stronger members of the brood. As a rule, this vicious practice is the result of idleness, though a lack of suitable animal feed sometimes appears to be responsible for it.

#### Diarrhea in Chicks

Almost anything which unfavorably affects the physical condition of chicks is liable to cause diarrheal discharges, and chick diarrhoea always is more or less white in appearance, owing to the presence of urates which, in fowls, are voided in a semisolid state instead of as urine. Because of the fact that the term "white diarrhoea" is generally applied to a particular disease, however, there

is a general and unfortunate tendency on the part of poultry keepers to jump to the conclusion that chicks showing any form of diarrheal discharge have the mysterious and much dreaded bacillary white diarrhoea. As a matter of fact, cases of this disease are few in number as compared with the other causes producing similar symptoms, and it is much safer to assume that the trouble is NOT bacillary infection, until all the more probable causes have been eliminated by thorough diagnosis.

It hardly needs to be said that for the cure of diarrhoea and the prevention of its spread throughout the flock, the direct cause must be discovered and removed. Where this is done and a few simple measures are taken to relieve the suffering directly resulting from diarrhoea, the chicks often may be restored to good health without any other treatment. In the earliest stages of the trouble it may be sufficient to use a digestive stimulant, such as Cayenne pepper, ground ginger, or mustard. Use only enough to make the mash slightly warm to the taste and discontinue as soon as no longer needed. An excellent soothing feed for chicks suffering from bowel trouble in any form is boiled rice, which should be cooked thoroughly and boiled as dry as possible, taking up all surplus moisture at feeding time by stirring in sufficient brown wheat middlings or wheat bran with all coarse particles sifted out. Let the chicks have all the boiled milk they will drink but keep the vessels clean.

Charcoal is an excellent corrective in all intestinal disorders and should be kept before the chicks all the time, placing it in any convenient waste-preventing hopper. They will eat it more readily if supplied in granulated form with the fine dust screened out. It is taken for granted that the chicks will always have a supply of grit crushed to suitable size. Clean, coarse sand will answer at first, but a good grade of commercial chick grit is better.

In all digestive troubles with chicks, a liberal supply of green feed is important. This should be tender and succulent however, and if the chicks are not accustomed to having all they want, only a limited quantity should be fed at first, increasing the amount as they get used to it and can be trusted not to overeat. It seldom is worth while to attempt medical treatment for diarrhoea, but if this is considered desirable, bichloride of mercury probably is as good as anything. Get this in tablets of 1-1000 of a grain and dissolve twelve in each quart of drinking water.



DIFFERENCES IN INHERITED CONSTITUTIONAL VIGOR EXPLAIN IRREGULAR GROWTH AND DEVELOPMENT

These three Barred Plymouth Rock chicks show how differences in inherited vitality and vigor affect their growth. Chick on left was a rapid grower; the one on the right a relatively slow one. Photo from New Jersey Experiment Station.

### Importance of Post-Mortem Examinations

There are few external symptoms that can be relied upon in distinguishing between different diseases, and examination of the internal organs of dead chicks is the only reliable means of doing this in many instances. The chick raiser, therefore, must overcome his dislike for this work and by repeated examinations thoroughly familiarize himself with the appearance of the organs of both normal and diseased chicks or he will never be able to identify diseases with certainty. It will prove a good investment for the beginner to sacrifice a few healthy chicks also, in order to learn exactly how their internal organs appear when in normal condition.

A good way to make the examination is as follows: Procure a shingle or board of white pine or other soft wood, into which tacks or push-pins can be easily driven. Place the chick on the board, breast uppermost, and stretch out the wings and legs, tacking them in this position. Slit the skin covering the breast and abdomen, then peel it back sufficiently to expose the breast and the muscular wall of the abdomen. With shears or knife make an incision below each side of the breastbone and remove the entire breast. This exposes the internal organs without disturbing them in any way.

### Liver Disorders

After removing the breastbone the liver will be in plain sight and should be carefully examined. The healthy liver has a uniform, dark chocolate color and is firm in texture. If it is abnormally dark in color, or pale with bright red edges or spots, suspect congestion or inflammation. A pale liver with streaks and patches of red is a symptom in bacillary white diarrhea, but is observed frequently when no trace of bacillary infection can be detected. When the gall bladder is distended and the adjacent parts are discolored, the ration probably is lacking in animal matter.

Congested livers frequently are due to a lack of green feed. Serious epidemics of diarrhea have been checked by correcting the ration in this respect. Congestion may be caused by insufficient exercise, supplying overstimulating feeds or condiments, or too much mash. If suitable feeds are used and proper methods of feeding are adopted it should be comparatively easy to prevent losses from this source.

### Aspergillosis and Congestion of Lungs

After examining and removing the liver, carefully examine the lungs. These should be light pink in color. If diseased they may be covered or filled with white cheesy nodules the size of a pinhead or smaller, or the lungs may be discolored and dark. If nodules are present the trouble is aspergillosis, sometimes called brooder pneumonia. Aspergillosis is caused by the growth of mold in the lung tissue—just the same kind of mold that comes on bread when it is kept too long in a can or box; the mold that is found in cellars and damp dark places generally.

The most common cause of infection is the use of moldy hay or straw for brooder litter. The general use of shatterings or chaff from the stable or haymow is responsible for a great deal of this trouble. Dusty shatterings often are quite full of mold spores and the chicks breathing this dust are infected.

There is no known cure for aspergillosis. If its presence is promptly discovered much may be done to prevent serious losses by at once removing the source of infection.

Use nothing but mold-free litter and feed; disinfect the brooder every time a new lot of chicks is placed in it, and be sure that it is absolutely free from mold.

When the lungs, instead of being full of nodules, are discolored and dark and appear to be filled with frothy mucus when cut open, the trouble is congestion or inflammation. This disease sometimes is called brooder pneumonia, and frequently appears in epidemic form. It is caused by improper brooding, impure air, also by allowing the chicks to become wet, chilled or overheated. Many heavy losses from this cause are reported by persons brooding chicks in fireless brooders, especially in cold or changeable spring weather. Inflammation of the lungs is practically incurable, but readily prevented by the use of brooders that provide an abundance of heat with a forced circulation of pure, warm air, and by carefully avoiding all exposure to chilling or overheating.

### Bacillary White Diarrhea

Bacillary white diarrhea is one of the most difficult chick diseases to combat successfully, though fortunately it is by no means as common as it generally is believed to be. In chicks dying from this disease the intestines are pale, showing a dirty white color, and usually are empty, but may contain a small amount of gray or brown matter. Unabsorbed yolk generally is present and has a stale odor, but is not necessarily putrid. In bad cases of infection the first deaths may occur before the chicks are taken from the incubator. Affected chicks are chilly, listless, and with little or no appetite and are "short backed."

There is no cure for bacillary white diarrhea so far as is now known. The only thing that can be done is to try to hatch chicks free from infection and then start them under the most favorable conditions, so that they will be strong enough to throw off infection if it occurs. Feeding milk—all the chicks will drink—is recommended, and the incubator and brooder should be thoroughly disinfected for each hatch or brood. Fine, absorbent litter that will take up all moist discharges so that the chicks cannot pick at them so readily, is especially desirable.

### COMMON PARASITES AND THEIR PREVENTION

Lice of different kinds are found on practically all parts of the fowl's body, being most numerous, generally, among the feathers below the vent. They are readily killed by any form of grease, or by fine dust which stops the pores through which they breathe, though different materials naturally vary in their effectiveness.

Insect powder, pyrethrum, tobacco dust, and various other articles or combinations of these, have been recommended, and they are more or less effective. Mercurial or blue ointment is highly recommended by many and undoubtedly gives good results. A particle about as big as a pea when rubbed on the skin below the vent usually is all that is required to eradicate lice from this part of the body. Where lice are distributed all over the body, it is necessary to apply the remedy to the various sections where the lice are found to insure reaching them all. Blue ointment is a poison, and when applied too freely will cause injury to the fowls. It is not recommended to use this material on young chicks or growing stock, but it is effective on adults.

Dipping the fowls in various lice-killing solutions is highly recommended by many, and under favorable weath-

er conditions is an economic means of treating badly affected fowls. It is not advisable to dip in cold weather, however. Almost any sheep dip or good liquid insecticide may be used for this purpose, but nothing should be employed that will discolor or gum the feathers.

Sodium fluorid, either as a powder or dip, is highly recommended by the United States Department of Agriculture, but must be used carefully to avoid injury to the fowls.

Hen-hatched chicks are the particular prey of large head lice, a few of which, at least, will be found on practically all sitting hens, but which leave them for the helpless chicks, almost as soon as they are out of the shell. Because hens are almost powerless to protect themselves against lice and mites, either on nests or when closely confined to coops, those that are to be used for hatching or brooding should have especially thorough treatment to rid them of lice, and all chicks should have their heads greased or treated with some good lice-killing remedy when taken from the nest or placed under the hens.

The poultry keeper who values his time, wants a properly compounded remedy that is easily and quickly applied, is sufficiently effective so that repeated applications will not be required to do the work, and that will eliminate the lice without danger of injury to fowls or chicks. There are various commercial lice-killing preparations on the market that exactly meet these requirements, and that are so much better and more convenient than the so-called "home remedies" that there is no practical reason for employing the latter, except in emergencies when nothing else is available.

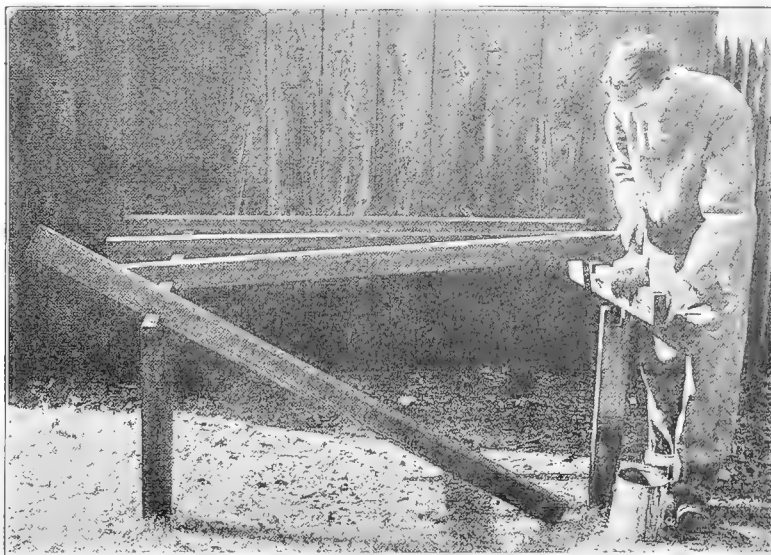
#### Treatment for Red Mites

Red mites are the small, gray or reddish insects found about the perches or perch supports. As only seven days are required for the hatching of the egg and the growth of the mite to adult size, it will be seen that these pests multiply with great rapidity when conditions are favorable to their development, as in hot summer weather. These mites can live for several months without food, and as they remain hidden out of sight in cracks, etc., in the daytime, their presence often is not suspected until they have multiplied so as completely to overrun the house. Where only a few are present, they will be found on the underside of the perch, between the perch and its supports, or in near-by cracks or crevices. When numerous they may be found almost anywhere in the poultry house, particularly on the droppings boards and nests.

Among the mite-killing preparations in popular favor are kerosene, crude petroleum, crude carbolic acid, coal-tar disinfectants, etc. Any of these will kill all the mites with which they come in contact, but as it is difficult to reach those that are hidden, it usually is necessary to spray several times in order to be sure of getting them all. Kerosene is highly effective, but as it has little body

its effect is not lasting. Crude petroleum is much more durable. Crude carbolic acid added to kerosene or crude petroleum in the proportion of 5 to 10 per cent, makes an effective and fairly durable spray. The New Jersey Experiment Station recommends painting the perches with coal tar and kerosene, fifty per cent of each, and it is claimed that one such treatment will keep the perches free from mites for many months.

What has already been said in regard to commercial preparations applies with equal force to remedies for combating mites. There are on the market much more effective, more permanent, and more easily applied remedies than the average poultry keeper is able to make up for his own use, and, except in emergencies, it is a waste of time and effort to use homemade preparations. In this and in most other respects, the practical poultry keeper



TREATING PERCHES AND PERCH SUPPORTS FOR MITES

Use any good liquid lice killer and put it on heavily with a paint brush, applying it to all sides of the perches. If there are any cracks see that these are filled with the solution.

finds that it pays to make use of the knowledge and the experience of others.

#### Scaly Leg

This is the work of a mite which burrows under the scales of the fowl's legs, thus causing the unsightly enlargement of the shanks, so familiar to poultry keepers generally. This mite readily succumbs to a thorough application of almost any form of grease or oil.

Where the legs are badly encrusted with scale, the most effective treatment is to soak them in lukewarm water until the scales are softened, when they can be removed with a stiff brush or tooth pick, after which the legs should be greased with lard, carbolated vaseline, etc., or treated with a good lice-killing preparation. Since these mites often burrow deeply into the scales and tissues of the leg, it sometimes is necessary to repeat the treatment two or three times to effect a complete cure.

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