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FARM-POULTRY SERIES No. 8.

FOURTH EDITION.

FIRST LESSONS
— IN —
POULTRY KEEPING.
FIRST YEAR COURSE.

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First Lessons IN Poultry Keeping

FIRST YEAR COURSE.*

Introductory.

BEFORE taking up the regular work of this course every reader who intends to follow it through the year should consider carefully a few propositions about poultry keeping. These may not be in accordance with some ideas about it which he has absorbed, he knows not where; but if he is to get much benefit from these lessons he must accept them, at least provisionally, and pursue his study and carry on his work on the assumption that they are correct.

The first of these propositions is this:

(1). *Poultry keeping is a simple occupation in that it requires no great knowledge or ability.*

Among successful poultry keepers we find men and women of practically all grades of intelligence and all degrees of general capability.

Why then are there so many failures in poultry keeping? The answer to this question is suggested in our second and third propositions.

(2). *Poultry keeping is an occupation involving a variety of simple operations.*

(3). *Successful poultry keeping depends upon the regular, faithful, and general accurate performance of many small tasks.*

People fall in poultry keeping because they take hard and laborious ways of doing things that may be done easily; or because they entirely omit some necessary though simple feature of the work; or because they are irregular and spasmodic in carrying out a routine which theoretically is all that it should be.

Nine out of ten who have read this far will be ready to say: — "Why, that is all very easy; anyone can do that from the start."

It is right there that nine out of ten go wrong. An occupation involving many simple operations becomes complex if one and the same person has to carry on many of these operations simultaneously; and that is just the condition we have in poultry keeping. After one has learned these simple things and practiced them until the doing of them becomes almost mechanical, they come easy, but they have to be learned one by one, and time is required to become proficient in them through practice.

* These Lessons first appeared in serial form in FARM-POULTRY, 1905, in a course designed to run through several years, and are issued in pamphlet form for those who desire to preserve them in more compact form than in files of the paper; and for later subscribers to the paper who desire to do the first year's work either before or with the later course.

In this course of lessons we are going to take up the many different things that have to be considered as nearly as possible at the time when the poultry keeper has to think most about them in his work with poultry; and in this first year's work we are going to discuss them only as far as is necessary to make it plain what ought to be done—what general practice, or the best practice, indicates as best to be done.

The reader who will be content to let each lesson pass after he has got that much out of it will, I think, be the one who will get most actual value out of the lessons for the year.

Remember that these lessons are but one part of the course; the other part is the work each one is doing in his poultry yard. The purpose of this course is to supplement practical work, to help each one to form his plans and apply his energies for practical results, and to give him a better insight into the teachings of his own experience.

As we proceed there will be propositions laid down and rules given that a good many will at the time think extreme, but the great majority of beginners will find it to their advantage to accept these propositions and conform to the rules, for they will be based on what the experience of many beginners has shown is safe for the average beginner.

I know that there are few beginners who do not think they are going to be the exceptions, but the beginner makes a mistake when he assumes that. The better way is to take it for granted at the start that at the best one is likely to get only average results, and to stick to conditions that are safe, and to methods that make the work as easy as possible.

Here are three more things to think about:

The thing of prime importance is to make a success, however small, by some method, however simple.

A small success by safe methods is better, as far as learning from it goes, than strikingly good results by unsafe methods.

One can build safely on such a small success, while the longer he plans on the unsafe basis the more likely he is to fail beyond his power to redeem the situation.

Almost all readers will accept these as abstract propositions, but what I want of those who follow these lessons is that one and all keep their poultry keeping on a safe basis, and take only the unavoidable risks. If they will do that they will avoid many (I hope most) of the small losses that discourage the beginner. All should go slow in fact, as we will go in these lessons, on paper.

Remember we have plenty of time. This is not to be a ten lesson course, or a one year course. The first year course is only the beginning. We expect to take three full years to complete the course, digesting and assimilating facts, principles, and rules as we go.

There may be people who can learn faster than that, but a course of instruction should proceed at a pace adapted to the average, or, better, the slow student. Then the brighter and quicker ones can put their superiority to good use by doing better and more thorough work. You know the common fault of smartness is that it goes too fast for its possessor as well as too fast for others. In these lessons we want a pace all can hold, and that will hold all to their work.

I don't want to discourage anyone from reading as much about poultry and poultry culture as his interest in the subject may tempt him to read, and his time allow; but I urge every student in this course to make a thorough mastery of the particular facts presented in the current lesson, his first object throughout the year, and let all other poultry interests be secondary.

It will take but a little time — only a very few minutes a day — to learn the lessons in the paper. It will take hours of thinking and trying every day to put them into practice, and it is practice that makes perfect. The student can learn his lesson by rote in a very short time, but applying it in profitable practice is a very different matter. It is experience and experiment in the poultry yard day by day that gives him a real understanding of what he learns or reads. One can learn theoretically as much faster than he can acquire judgment and skill practically, as one can think faster than he can put his thoughts in good language. Keep this in mind. Reading increases one's information very rapidly, but thinking and working the same things over and over, make one thorough and skillful. In this is the true science of poultry keeping.

LESSON I.

Winter Rations For Laying Stock.

IN this lesson we consider methods of winter feeding of fowls kept for laying purposes.

Let the reader note first, that the food while an important factor, is but one of several factors in egg production: hence it is possible for hens that are properly fed on a suitable ration to fail to produce eggs, or to give a very unsatisfactory yield. Other matters affecting the egg yield will be considered, each in its proper place. In this lesson we confine ourselves to the treatment (1) of the properties of the principal staple articles of poultry food generally available at this season; (2) of the methods of feeding; (3) of a few good specific rations.

Principal Poultry Foods and Food Accessories.

The articles included under this heading may be grouped into seven classes, as follows:

- I. **Whole Grains.**—Corn, wheat, barley, oats, and millet.
- II. **Cracked Grain and Mixtures.**—Cracked corn and the prepared “scratching feeds.”
- III. **Ground Grains.**—Corn meal, corn chop, ground oats, wheat bran, wheat middlings, “mixed chop” (corn and oats ground together), “provender,” (a mixture of ground corn, oats, and bran), and the various brands of mixed ground feeds.
- IV. **Green and Vegetable Foods.**—Cabbage, cut clover or clover meal, cut alfalfa or alfalfa meal, and the common root vegetables.
- V. **Meat Foods.**—Green cut bone, beef, pork and mutton scraps, meat meals, and animal meals so-called.
- VI. **Food Accessories.**—Shell, grit, charcoal, and condiments.
- VII. **Drinks.**—Water and milk.

Considering these classes separately:—

I. **Whole Grains.**

Whole corn is to be fed very sparingly because the grains are so large that fowls fed it freely and often get too much of their ration without exercise.

Wheat and barley may be fed very freely.

Oats and millet are generally used in small quantities, as light midday meals. Ordinary lots of both contain so much unfilled grain that there is little advantage in using them.

II. **Cracked Grains and Mixtures.**

Cracked corn may be fed in winter as freely as wheat and barley. At usual prices it is the most economical grain food, and should be the major part of the grain ration in winter.

The various brands of mixed grains are composed generally of cracked corn, small and broken wheat, barley, oats, buckwheat, millet, etc. The economy and advantage of using them depend upon ease or difficulty of getting the needful variety of unmixed grains of local dealers, and upon whether the keeper gives the necessary attention to variety when buying his grains separately.

III. Ground Grains.

The corn products, corn meal and corn chop, are the most important of these, and one or the other is almost universally used as the basis of the mash. Corn chop being coarser is preferable for stock food, but in many places only meal can be obtained.

Mixed chop is a valuable food article, as also is coarsely ground oats, often purchased separately and used with corn meal and other stuffs in the mash.

The by products of wheat flour, bran and shorts or middlings are valuable and almost essential articles in making mashes. There is an unfortunate confusion in the use of the names of these stuffs, the term shorts, which is properly another name for middlings, is in many localities applied to bran, while the shorts are known as "white middlings" or "red dog," (sometimes red dog flour) according to color. White flour of quality unfit for household use is often used in mashes, and when obtainable at about the same price is to be preferred to middlings.

A number of mixtures of ground feed stuffs are on the market, and many users of them report good results; but it is better for the beginner who wants to learn his business to learn to mix stuffs before buying mixtures, then if a mixture needs to be altered to suit his purpose or the rest of his ration he will soon discover that fact.

IV. Green and Vegetable Foods.

The best of these, all things considered, is cabbage, but it cannot always be obtained at a satisfactory price. Indeed unless a poultryman has laid in a supply in the fall he is very uncertain of getting it. Then cut clover and alfalfa, and clover and alfalfa meal make excellent green foods, and can generally be obtained at reasonable prices. Potatoes, turnips, beets, carrots, onions, apples, etc., are useful when on hand or procurable at low prices.

V. Meat Foods.

While it is difficult to estimate relative values of meat foods exactly, and the quality of articles of the same name or brand is not always the same, green cut bone is generally considered the best of the meat foods, and would probably be used in preference to any and all others if it could be obtained in ample supply at a price which would not too much increase the cost of the ration.

Most poultry keepers use more or less of the prepared meat scraps, meals, etc. There are many brands of these, and they are of widely different feeding value.

VI. Food Accessories.

Shell seems to be indispensable for laying stock. Ground oyster shell is most commonly used.

Grit is generally given with shell, both being kept before the fowls, but while considerable quantities of it are often consumed, it does not seem to be absolutely essential to fowls supplied with shell.

Charcoal used as a corrective and blood purifier is kept before the fowls in granulated form by most poultrymen.

Of condiments, egg powders and foods, there are many, and they are very generally used by novices, and in a great many cases seem to contribute enough to results to justify their use. Their virtue is in tonic and stimulating properties. They help correct the novice's faults in feeding.

VII. Drinks.

Fowls should be liberally supplied with good water. So large a proportion of their diet consists of concentrated foods that an abundance of liquid is necessary to keep the digestive organs working freely.

Milk — sweet, sour, or clabber — may be given them as a drink, or mixed in the mash; but as a drink, milk is but a partial substitute for water, which should always be supplied.

The Food Supplies for a Flock.

For economy, and a simple system of feeding, the poultryman should use as few articles as is consistent with an attractive variety in the ration. For his mash he needs corn chop or meal, bran and middlings, or flour. Then if he supplies his hens with green food and meat food, as

he should, one grain will do, and if only one grain is used, cracked corn is to be preferred both for its feeding value at this season, and on the score of economy. If wheat or barley can be had at little more than the price of corn, one adds to his variety without materially increasing the cost of feeding, by using one or both, either with the cracked corn in a mixture or separately as one meal, preferably the noon meal.

For green food he should have either cabbage or cut hay, (clover or alfalfa), and consider one of these necessary. Such other vegetables as he can get at a right price should be used in addition.

For meat food, one article is enough if it can be had in constant supply, but because of the general variableness of supply of green bone, and the frequent occasions when it is inconvenient to prepare it, it is good policy to keep a supply of beef scrap or meat meal on hand for such emergencies.

Then of the accessories, shell is necessary, absolutely. The consensus of opinion among poultry keepers is that it is best to have grit and charcoal also constantly before the fowls.

To sum up. The necessities of life, when a mash is used, are corn chop or meal, bran, middlings, cracked corn, cabbage, or hay, (clover or alfalfa), one article of meat food, shell, grit, charcoal, and water.

To these may be added such other articles as are available for economical use.

Methods of Feeding.

Methods of feeding poultry may be classified as follows:

- (1). **The Mash System**, in which a wet, scalded, or cooked mash is fed once each day, grain being given once or twice.

The mash may be given:

- (a) In the morning — the common way.
- (b) In the evening — as an important minority prefer.
- (c) At noon — the practice of a very few.

There is no evidence that the time of feeding mash makes any difference to the hens. It is a matter of the convenience of the keeper.

- (2). **Dry Feed Systems.**

- (a) Dry mash, (ingredients same as in a wet mash), and grains.
- (b) All dry grains.

Dry feeding is used by many regularly where it is inconvenient to make and feed a wet mash, or when results from the use of mashes have been bad or unsatisfactory, as they often are when badly prepared, or ill balanced mashes are used, or when something in the rest of the ration does not work well with a mash. It might be used by many more occasionally to good advantage; as on an extremely cold day when a wet mash would freeze as soon as put down, or for a flock with mild chronic diarrhea.

The limits and scope of this lesson do not admit of a full discussion of feeding systems in the course of which it is necessary to consider the relations of the method of feeding to each and all of the many points affecting the welfare and productiveness of fowls, but the following condensed statement of the subject may aid the reader to decide what method will best suit him and his circumstances:

Advantages of the Mash.

The use of a mash serves these important purposes:

- (1).— As is indicated by the list of ground grains given, and as will appear more fully when recipes for mashes are given, the mash contains a variety of ingredients, and the proportions of these can be varied greatly, and the consistency of the mash also varied somewhat, thus making it possible to give considerable variety to the ration, as a whole, while using but one or two grains for the other meals.
- (2).— The mash being fed in troughs the feeder can gauge the quantities of it, and also of the other grains fed by the appetite the fowls show for the mash more accurately than in any other way.
- (3).— Through the mash the bulk of the ration may be increased, and the concentrated feed stuffs used diluted, (with hay and bran), and so rich foods used safely in larger quantities than if taken into the system undiluted.

- (4).— Small potatoes and other waste vegetable most generally available for poultry food can best be fed in a mash.

Common Errors to be Avoided in Mash Feeding.

Whatever may be the advantages of a method properly applied, faulty application of it always involves possibilities of trouble which may become serious. In mash feeding these are:

- (1).— Too concentrated mashes; that is, mashes containing too large a proportion of the richest food elements, as meals and meat preparations.
- (2).— Too light and bulky mashes, that is, mashes composed mostly of hay and bran, which fill the crop without supplying sufficient nutriment.
- (3).— Too wet and sloppy mashes; and sour or moldy mashes.
- (4).— Feeding mashes too often. Experience has shown that more than one mash a day to adult fowls almost invariably and quickly produces indigestion.

Advantages of Dry Feeding.

In estimating the advantages of dry feeding, we have to consider some of them as, in a degree, apparent and theoretical rather than as actual, for it becomes clear, as the case is fully stated, that what seems a saving of time or labor is sometimes merely a shifting of labor from one place to another. We have then as the nominal advantages of dry feeding:

- (1). The saving of labor in making mashes.
- (2). Avoidance of the dangers of improperly prepared mashes.
- (3). Allows more variation in the time of feeding the meal, which takes the place of the wet mash, and so gives the keeper more freedom.

Errors to be Avoided in Dry Feeding.

The wet, or moist, mash fed daily, provides daily one feed which is practically a succulent food, and if properly prepared is a bulky food. In dry feeding:—If all hard grains are fed, the fowls get no extra bulk in them, and of course no succulence:—If a dry mash is fed they get some increase of bulk without succulence. Hence it is apparent that in dry feeding unusual provision must be made for bulky and succulent food—especially green food. Taking this as the principal fault of the system, we have:

- (1). Failure to supply sufficient succulent food.
- (2). Waste of food when ground grains are kept before the fowls in open dishes or hoppers.

Which System?

The writer has no hesitation in stating his preference for the mash system as in his experience and opinion the better system for most poultry keepers. He would therefore advise beginners to use that system unless such greater convenience as dry feeding gives fitted into their days' routine better.

As a matter of fact the two systems are nearly identical for all but one meal a day, and reduced to the last analysis the difference between them may be broadly stated thus:—

The use of a good wet or moist mash containing a variety of ingredients, makes it necessary to give more time and care to the preparation of this one meal, but in it provision is made for requirements of the fowl which when only dry feeds are given must regularly be specially provided for. The omission of a mash, or substitution of a mixture of ground grains dry, makes an economy with reference to the feeding of one meal each day, but makes it imperative that vegetable foods in abundance should be provided at other times.

As the careful reader will doubtless have observed, the two systems supply the requirements of the fowls in different ways. Each is in effect an offset for the faults of the other. The practice of the most skillful feeders is in effect a judicious blending of the systems. Some of the most enthusiastic advocates of dry feeding push it, not as the best method, but as easier and safer for the beginner. As there is nothing about poultry feeding too deep or too hard for anyone of ordinary intelligence who gives the subject of feeding a little careful attention and notes the effects of his feeding on his fowls, the better policy would seem to be to learn to properly apply the mash system—unless, as previously stated—circumstances make it too inconvenient to work by that method.

A Few Good Sample Rations.

Having learned something of common food stuffs and their properties, we are ready to begin to feed fowls intelligently; that is, with some appreciation of the reasons for doing things in the way we do them. The reader should keep it clearly in mind all the time that while there are many possible rations that will give good results, there are also many combinations possible that will not give good results, and the way for the beginner to avoid a bad combination is to follow some one approved method, not attempting, as many do, to improve on the experts by combining features of different rations that have given good results. The sample rations given will cover all ordinary conditions, and the reader working by these lessons is advised to select that which suits him best, and follow it as closely as he can, departing from it only when he is absolutely sure that the change he makes cannot affect his results for the worse.

Let us take up first a few rations including a mash. As has been stated, it makes no difference to the fowls when the mash is fed. The feeder may time it to suit his convenience. The time of feeding the mash may, however, make a difference in the other meals.

Taking for our first illustration one of the most common rations in use, we have:—

Ration I. *Morning*.—Mash of corn meal, bran, and beef scrap.

Noon.—Wheat, barley, oats, or millet.

Evening.—Cracked corn.

Cabbage supplied practically all the time.

Grit and shell always before the fowls.

In this ration the morning and evening feeds are “full feeds;” that is, the fowls are given all they will eat. The noon feed is a light feed, say half as much as the evening feed of grain. The grains are fed scattered in litter spread over the floor of the house, so that the fowls have to scratch for them.

If now, one using the ingredients in this ration wished to feed the mash in the evening, he could simply transpose the morning and evening meals, making his system:—

Ration II. *Morning*.—Cracked corn.

Noon.—Wheat, barley, oats, or millet.

Evening.—Mash of corn meal, bran, and beef scrap.

Cabbage, etc., as in Ration I.

But if he wanted to feed the mash at noon it might be necessary to make some changes. For instance,—in either of the rations given above, millet or oats, both light feeds, and not eaten freely by fowls, can be used to good advantage at noon when, with full feeds morning and evening, only a light feed is needed. But if the mash is given at noon, and made a light feed, both the other feeds must be full feeds, and neither oats nor millet is suitable for regular use as a full feed. So the ration with a noon mash must be like this:

Ration III. *Morning*.—Wheat or barley.

Noon.—Mash of corn meal, bran, and beef scraps.

Evening.—Cracked corn.

Cabbage, etc., as in Ration I.

In this ration (a) the morning and evening feeds of grain should be full feeds, and the mash at noon a light feed or half feed, that is, about half wheat, the fowls will eat freely; or (b) all three feeds should be rather scant feeds. I would advise beginners not to use the noon mash unless for special and urgent reasons, for I think it is more difficult to keep fowls' appetites steady when the mash is fed at noon.

Instead of feeding one grain at a time, several grains may be mixed together, and the mixture fed once or twice a day. Suppose we make this change in each of the rations given, designating our substitutes by the same numbers with the letter A added. Then we have:

Ration I. A. *Morning*.—Mash as in Ration I.

Noon.—Mixture cracked corn and wheat, equal parts, (a half feed).

Evening.—Cracked corn and wheat, equal parts, (a full feed).

Cabbage, etc., as in Ration I.

Ration II. A. *Morning*.—Cracked corn and wheat, equal parts, (a full feed).

Noon.—Cracked corn and wheat, equal parts, (a half feed).

Evening.—Mash as in Ration II.

Cabbage, etc., as in Ration I.

Ration III. A. *Morning*.—Cracked corn and wheat, equal parts.

Noon.—Mash as in Ration III.

Evening.—Cracked corn and wheat, equal parts.

Cabbage, etc., as in Ration I.

Making a Mash.

No. 1. A Grain and Meat Mash.—

To make the mash used in the above ration, making it in small quantities, and by a method calling for nothing special in the way of utensils, proceed as follows:

For as much mash as can be readily mixed in an ordinary 3 gallon pail (preferably a pail of heavy tin, galvanized iron or granite ware), take 2 quarts of corn meal in the pail. Have a kettle of *boiling* water ready. Pour the water slowly over the meal in the pail, as you pour stirring with a long handled iron spoon. Pour on water and stir until you have a stiff smooth mash.

Now take the bran—about 3 quarts at first and stir it in, adding a little more if you find you can mix it. Perhaps it will take a quart more, and if the water was boiling and the meal swelled right, your mash should now be a stiff and rather brittle dough. Now put in the beef scraps or meat meal you wish to feed in the mash. The quantity you can use will depend on the character of the article, and also on the remainder of the ration and the constitution of the fowls, but in general fowls given all their meat food in the mash will take meat scraps or meal to the amount of about 8 or 10% of the dry bulk of the grain stuffs in the mash. That would be in this case, say about a pint of scraps. In many cases twice as much scrap may be given to advantage, but the above proportions are *safe*.

Having put in the beef scrap, stir until it seems to be thoroughly mixed. The mash is now ready to feed.

No. 2. A Vegetable Mash.—

We will call this a vegetable mash because the addition of cooked vegetables is all that makes it different from mash No. 1. Any waste vegetables or parings can go into it. Cook them in water until they are quite soft and will break up readily with the spoon when mixed with the other ingredients. For a pail full of mash take about 3 or 4 quarts of vegetables. When ready to mix the mash, have the meal in the pail as in mash No. 1, and pour the boiling water from the vegetables on it and stir as before. Then stir in the vegetables, bran and meat scraps as before.

No. 3. A Clover or Alfalfa Mash.—

In this cut clover or clover meal—or alfalfa or alfalfa meal—is used instead of vegetables. Two or three quarts of the cut dry hay may be used in a pail full of mash, and when hay is used the quantity of bran should be reduced until the meal and bran are about equal. The cut hay may be stirred into the mixture at almost any stage. It may be cooked for a few minutes in the water in a pot and the corn meal stirred into the water, or mixed in after the meal or after the bran or with the bran.

A Dry Grain Ration.

Ration IV. *Morning and Evening*.—Mixed grain as in ration III. A.

Noon.—Cabbage.

Beef scrap, etc., in hoppers accessible at all times.

This ration could be varied by using one grain in the morning and another in the evening; or if fresh meat, raw or cooked, or cut bone was used, the noon feed might be alternately cabbage and meat, but the substantial meals of the day must be given morning and evening.

Dry Mash Rations.

In these a mash made of the same grain ingredients in the same proportions as the mash in Rations I., II., and III., may be used. The meat may be mixed with the dry grains or

fed separately. If mixed with them we could substitute the dry for the wet mash in each of these rations. For convenience and future reference we will repeat these rations here, making the substitution. We have then:

Ration V. *Morning.*—Dry mash of corn meal, bran, and beef scrap.

Noon.—Wheat, barley, oats or millet.

Evening.—Cracked corn.

Cabbage, grit, and shell always before the fowls.

Ration VI. *Morning.*—Cracked corn.

Noon.—Wheat, barley, oats, or millet.

Evening.—Dry mash of corn meal, bran, and beef scraps.

Cabbage, etc., as in Ration V.

Ration VII. *Morning.*—Wheat or barley.

Noon.—Mash of corn meal, bran, and beef scrap.

Evening.—Cracked corn.

Cabbage, etc., as in Ration V.

Before bringing this lesson to a close, I will give one more ration, including dry feed fed in a hopper:

Ration VIII. *Morning and Evening.*—Mixed grain, 1 part wheat, 1 part barley, 2 parts cracked corn.

Ground mixture, equal parts corn and oats, one-half bran added, always before the fowls in hoppers.

Cabbage, grit and shell always accessible.

This last is a ration for one who has little time to give his poultry. Its simple aim is to insure that the fowls will have enough to eat and a fair variety in food.

LESSON II.

The “Hows” and “Whys” of Feeding Laying Stock in Winter.

IN THE preceding lesson we discussed poultry food stuffs and the systems of feeding with relation to their effect on the composition of rations. In this lesson we are to take up another class of questions on feeding, and try to give readers a useful understanding of these three topics:—

How often to feed.

How much to feed.

The relation of exercise to diet.

These three matters blend inseparably in practice, and we can hardly exclude anyone of them from a discussion of another. Yet to appreciate them correctly one must separate them more in his mind than he can in his work.

How Often to Feed.

Perhaps many are thinking that as all but one of the rations given in Lesson I. provide for three meals a day, the question of how often to feed is almost superfluous. It might be so considered if everyone was so situated that he could give his hens three feeds, corresponding to his own three meals, a day, but a great many poultry keepers cannot do this, so want to know what other arrangement is practicable.

For the short winter days two feeds a day would generally give as good results as three, but for one thing—the difficulty of keeping fowls in confinement interested in something, and out of mischief when there is too long an interval between feeds. Idle fowls contract vices of various kinds—such as feather and egg eating—besides gradually going out of condition from want of exercise. So whenever it is practicable to do so, it is advisable to give some sort of light feed in the middle of the day.

If, however, it is not convenient to do this, the noon feed may be either omitted or fed in the morning. Thus, in Ration I., the mash may be fed in the morning, and the grain for the noon feed fed at the same time, scattered in litter, and the fowls have something to keep them occupied through the greater part of the day. When cabbage or mangels are kept before the fowls, these things help to keep them occupied. So we may say that, provided some provision is made to give the fowls something to occupy their attention between regular meals, two meals will work as well in winter as three.

Feeding Once a Day.—I have had occasional reports from poultry keepers who could give their fowls attention only once each day, some in the morning and some in the evening,

and these sometimes are able to report good results, but, as a rule, those who get good winter egg yields look after the fowls oftener and regularly. One who has time to look after his fowls in the morning only may arrange this way:—

Mash, to be eaten at once, followed by grain for the remainder of the day, thrown in litter, and eaten as the fowls work for it.

One who has only the evening to attend his fowls by daylight may use this plan:—

Grain, to give a full feed in the morning, and something left to scratch for until well into the afternoon, may be thrown into the litter on the floor, either after the fowls go to roost at night or before daylight in the morning. Then the evening mash may be given just before dark.

Obstacles to Poultry Keeping When One Cannot Watch the Fowls.—The principal difficulties in the way of poultry keeping when one can give so little attention to the fowls by daylight come in in connection with other matters than the feeding of grain and mashes. Proper ventilation of a closed house is almost impossible when the poultry keeper is away all day, and it is a problem to keep water from freezing in a cold house. One who can attend to his fowls at noon can replenish the water supply, but one who cannot must use some kind of “anti-freezing” fountain.

On the whole I would not advise anyone to attempt much with poultry or encourage them to expect much from hens in winter unless the hens can have pretty good attention, for taking one flock and one year with another the winter egg yields are in proportion to the judicious attention given the flock. Hence, if the poultry keeper cannot make provision for some member of his family to attend to such wants of his fowls as he cannot look after, he must not think that failure to get results indicates something wrong with the fowls, the house, or the ration.

How Much to Feed.

This question seems to cause beginners more worry than any other connected with the subject of feeding. They find it hard to understand why fowls cannot be fed exactly by weight or measure. An explanation of this would require a much more exhaustive treatment of the subject than is appropriate in an elementary lesson; and the student must accept the fact and wait for experience and later lessons to furnish the explanation of it. An experienced feeder can tell a novice approximately how much to feed to average or medium sized hens.

How Much Mash.—Mashes vary so much in composition and consistency that the best rule that can be given is:—all they will eat up clean and quickly, that is in, say, fifteen or twenty minutes.

Some poultrymen leave mash before the fowls for several hours, or even give so much that they will not eat the last of it until noon, but it is better to give only what they will eat quickly and let them have grain, cabbage or roots to supplement it through the day than to give so much mash.

If fowls do not eat mash readily and freely, it is either because the mash is not palatable, or because the previous feed was too heavy, or the interval between the meals not long enough. Generally, a dozen fowls will eat about three pints of the No. 1 mash, (Lesson I.) and a third to a half more of No. 2 or No. 3 mash.

How Much Grain.—When grain is fed where the fowls can get it quickly, and with little effort, a pint is a fair allowance for eight or ten fowls. When it is fed in deep litter more than a full allowance must be in the litter if the fowls are to get their full feed within a reasonable time. In that case give about a quart to a dozen fowls. Thus in using Ration I. (Lesson I.) give at the rate of a quart of cracked corn to the dozen fowls, giving the corn in litter at least an hour before sundown. Then the fowls can get a full feed before dark, while what is left in the litter furnishes them something to work for in the morning, both before and after the mash is fed; while in Ration No. IV., a quart of grain given in the morning furnishes a good meal within an hour or so, and leaves something for the fowls to scratch for until the evening meal is given.

How Much Meat and Bone.—If sound sweet food of this class is fed regularly and often it is generally safe to give the fowls all they will eat, if the meat food is fed separately. Fresh meat may be used very freely in the mash, but the dried concentrated meat products must be used with some caution. (See "Making a Mash," in Lesson I.)

How Much Vegetable Food.—In winter it is practically impossible to feed too much vegetable food to fowls well fed on grain, because the appetite does not demand it, and they will eat green stuffs in much more limited quantities than in hot weather when heavy grain rations required to make eggs and growth are so heating that the fowls by choice fill up on green food which keeps them more comfortable, but does not always accomplish the results the poultryman is trying to get.

Good Feeding Means Heavy Feeding.

The longer I practice and study poultry feeding, and the more I see of the results of the feeding of others, the more I am convinced that the best feeding is not the most carefully adjusted ration, but the ration and the method that provides the fowls a little more than enough under conditions which require them to work for enough of what they get to give them the exercise they need to keep them in good condition.

A fowl can let a surplus alone, but has no way of making up a shortage—at least none that is satisfactory to the owner.

As between feeding short and overfeeding, I have seen good egg yields come oftener from the latter, especially with young stock; but there is little danger of bad effects from overfeeding if fowls have to take exercise by scratching for several hours a day.

Points to Consider in Determining Quantity in Feeding.

In deciding how much to feed, the poultryman has in the fowl itself three guides, three things that should furnish indications whether he is feeding right. These in the order in which it is most natural to use them are:—(1) appetite, (2) results, (3) condition.

Appetite.—The fowls should be ready and eager for each feed, even the light noon feed. If they are not there should be either a change of time of feeding or a reduction of the quantity given at the preceding feed. Frequently, poultrymen who feed the mash very early in the morning find that the hens do not seem to care for it at that time, though an hour, or even a half hour later, they will eat it readily. If the mash must be fed early, the night feed should be reduced until they will eat the mash, but it will generally work better to give the full feed of grain at night, and delay feeding the mash until the sun is well up.

Results and Condition.—If hens are laying well, the presumption is that the feeding is about right. In that case the point to watch is to see that the hens have food enough to keep them in good condition while laying. A hen that is in laying condition can hardly be overfed. If hens that presumably should be laying are not, the keeper should ascertain their condition by handling them. If not plump and solid they should be given more food, and richer food. If overfat they should be put on a diet of grain, and made to scratch for what they get until flesh is reduced. Egg production does not, however, depend entirely upon feeding, and the most that the poultryman can do is to keep his hens as nearly as possible in laying condition—that is, fat, but not so much so that the abdomen is packed with fat, and the hen either becomes sluggish or breaks down.

Exercise and Feeding.

Exercise by Scratching.—Throughout northerly latitudes the general provision for giving fowls exercise is by littering the floors of the houses with straw, hay, leaves, cut corn stalks, or any material in which the grain will bury itself, or with which it can be covered, so that the fowls must scratch for it. The proper use of litter calls for the same exercise of judgment as the adjustment of the meals or the determination of the proportions of the ingredients of the ration. Though errors both ways are numerous, the prevailing tendency is to use too much litter and compel too much exercise,—to make it so hard for the fowls to get feed that they

will work only for what is necessary to sustain life. One reason why some people get better results from evening mash is because the fowls get a full feed before going to roost, when if fed in litter (as they use it) they cannot get a good meal, or cannot get it in the time allowed them. Generally speaking, the depth of any loose and easily worked litter should not be less than three or four, and not more than six inches.

Exercise by Jumping.—A practice handed down since before the days when scratching litter was generally provided, is to hang a cabbage or fasten a root of beet or a piece of meat just out of reach of the fowls so that to get at it they must jump for every mouthful. I think this form of exercise of questionable value. A heavy hen carrying a lot of partly developed eggs is likely to be averse to taking exercise that way, or, if she does try it, to hurt herself, and it appears that sometimes jumping for exercise is responsible for the prevalence in a flock of corns and bumble foot, particularly when that is the only exercise provided, and the floors are not littered.

Exercise for Occupation.

So far we have considered exercise, especially with reference to its effects on the condition of the fowl, and as a check to rapid feeding. It serves another purpose which indirectly has quite an important relation to the matter of feeding as well as to production. The fowl with something to do keeps busy much of the time and is contented. With moderate exercise fowls probably more completely digest and assimilate their food, and are productive and keep in good condition on less food either than when not taking any exercise or when taking too much exercise. Contentment aids digestion and economizes food. But we need not depend solely upon exercise dependent upon eating. Fowls given the opportunity to do so will take vigorous exercise dusting themselves. In fact, when the sun shines in on the earth floor they will work and wallow there by the hour, and this exercise does them just as much good as scratching. So occasionally on bright days rake the litter clean from a space on the floor where the sun shines, and give the fowls a chance to put variety into their exercise.

LESSON III.

General Principles and Rules for Poultry Breeders.

LET us first understand clearly that a poultry keeper is not necessarily a poultry breeder. The terms *poultry keeper*, *poultryman*, *poultry raiser*, *poultry grower*, and *poultry breeder*, are commonly used as synonymous, but with the exception of *poultry raiser* and *poultry grower*, they are not wholly so.

Poultry keeper applies to anyone who keeps poultry, without regard to experience, skill, or success.

Poultryman applies to a poultry keeper considered as in some degree an expert.

Poultry raiser and *poultry grower* apply to persons merely hatching and rearing poultry.

Poultry breeder applies to those who regulate the reproduction of poultry.

One person may combine all these functions, but the number who do actually combine them is very much less than the whole number of poultry keepers.

I have been thus explicit in defining these terms because the first step toward right appreciation of what poultry breeding demands is correct understanding of what poultry breeding means. The breeder of a fowl is the person responsible for the mating of its parents. The matter of first and greatest importance in the breeding of poultry is that the breeder should know something of the natural laws affecting his work, should understand in a general way the principles upon which breeding systems, methods and rules are based; should know the characteristics and tendencies of the breed, variety, stock and individuals with which he works, and should apply his knowledge with judgment, faithfully and persistently.

This list of qualifications for poultry breeding may have a formidable look, but let no beginner be therefore discouraged. One need not be all this at the beginning. Indeed the list of qualifications presents an ideal rather than the complement of knowledge and experience which even the most skillful breeder brings to his work. Besides, these qualifications only come and grow by experience and use. No man ever had or can have a respectable practical knowledge of what a breeder must know without experience in breeding. Still a beginner need not feel discouraged by a realization of how much he falls short of the knowledge and skill of the expert breeder. As the saying goes, "What man has done man can do," and a few years of study, observation, and experiment in breeding poultry often make a man a very good breeder.

Two General Facts of First Importance.

The first broad fact to be considered in connection with the breeding of poultry is:—

That our varieties of poultry are all bred to artificial standards, to arbitrary, and often unnatural, requirements; that specimens perfect according to any such standard are virtually unknown; that in all varieties there are wide variations in individuals; that only a small proportion of an average good flock are of special excellence; and that a considerable number are not suited for breeding specimens of their own kind true to type.

This group of facts, which is given above as one general fact, is self-evident to the breeder of several years experience, but is so at variance with the common ideas of persons not familiar with the history and methods of the improvement of domestic animals and plants, that it needs to be specially emphasized here.

The idea prevails that breeds, varieties, strains and stocks of fowls are fixed, established so well that a poultryman who wishes to use a certain kind of stock has only to get that kind of stock and all will be plain sailing. That this is not the case the novice discovers very early in his work, but too often fails to realize what his discovery means. He frequently blames the breeder of the stock he begins with or the stock itself for unsatisfactory results, tries other stock with similar results, and perhaps repeats the process several times before he discovers our second important general fact, which is:—

That any grade of excellence attained in the breeding of poultry can only be maintained or excelled by continuing the same careful selection by which such excellence was developed.

A beginner cannot expect or be expected to do work that will rival that of the experienced breeder in the production of fine fowls, but he may easily produce fowls that if not of high excellence in the special features of their kind are still good fowls, and using the experience and results of expert breeders and relying upon their advice, he may produce fowls of very good breed or variety type.

The First Principle.

The foundation principle in all breeding to type or standard is, "Like begets like." This does not mean that all fowls of one breed or variety are exact duplicates. What it means is, that the qualities and characteristics of each individual fowl are derived from its ancestors and chiefly from its immediate ancestors.

This is one of those statements which at first may seem so self-evident as to make insistence upon it, or emphasis of the fact it declares absurd. To most beginners it seems like an insult to their intelligence to ask them to give the matter special consideration. But the beginner, no matter how clearly he may see the logic of the statement, cannot understand its real significance until he begins to study fowls for the purpose of mating them to produce what he wants in their progeny.

Then he finds that with breed resemblances go variety differences, with variety resemblances go strain or family differences, with strain or family resemblances go individual differences.

These individual differences are of varying character and value, and mark the fowl as an ordinary or a superior or an inferior specimen; or as ordinary, superior or inferior in a particular character or characters.

A fowl that is in all points ideal is so rarely produced that practically we do not have to consider the production of a union of two ideal specimens. What we have to do is to consider how to get fowls as nearly as possible of the type which is our ideal from fowls which while in a general way of that type depart from it in some particulars.

In practice the mating of fowls finally becomes a carefully studied system of balancing desirable and undesirable characters, of offsetting lack of development in a certain feature in one fowl by a full, or perhaps an exaggerated development of that feature in its mate or mates of the opposite sex, of securing certain points as a result of the union of fowls in which these points differ. All our established breeds and varieties of fowls have been made by breeders working in this way toward common ideals. Fowls that are not pure bred are for the most part results of breeding in which no intelligent selection was used, and as a rule will not transmit their characteristics with any such regularity and uniformity as is found even in ordinary thoroughbred stock. Because of this it is much better for a beginner in breeding poultry to begin breeding thoroughbreds than to waste his time with crosses or mongrels. For though the laws of breeding are always the same, the results of these laws in crosses and mixtures are often so confused that the breeder makes no progress either in the development of his stock or in knowledge of the subject.

Selection of Breeding Stock.

The first step in breeding upon the principle that like produces like, is the selection of individual specimens considered most suitable for the production of offspring of the desired type and quality. Selection should be based on the following points:

1. Constitutional Vigor and Physical Perfection.—Only healthy, vigorous specimens should be used for breeding purposes. No deformed or seriously malformed specimen should be used for breeding. There are some minor malformations not in any way affecting the health, vigor or practical usefulness of the fowl which should be treated as defects to be offset in the mate; but such things as crooked backs, crooked breasts, crooked legs, twisted wings, wry tails (that is, tails carried to one side) and squirrel tails (that is, tails carried too high and inclining toward the head) should be rigidly excluded from the breeding pen.*

There are some less serious malformations, perhaps more accurately described as lack of development, but as they are somewhat common in all varieties we will mention them here: Narrow and shallow bodies, pinched tails, and conspicuous lack of breast development, make a fowl unsymmetrical, detract something from its economic value as well as from its appearance, and often indicate lack of development of some of the internal organs. The breeder who carefully avoids using specimens having such faults rarely has cause to regret the loss of the use of birds attractive in other particulars which this severe selection rules out.

Breeding from Fowls that Have Been Sick.—This is a question which properly comes under the head of constitutional vigor. A fowl that has been very sick, though apparently completely recovered before the breeding season, should not be used to breed from, or if such a fowl is of such excellence that it is desirable to get stock from it if possible, it may be used, but the breeder should not rely on it for the stock he needs. The chicks from such parents are apt to lack constitutional stamina, and frequently are weak in the parts affected by the disease the parent had.

2. Breed Shape.—This is where the breeder's appreciation of the differences in shapes of fowls should begin. A fowl may be a well proportioned fowl, and not essentially lacking in physical development in any section, and yet not be at all of the shape considered typical for its breed. The breeder of thoroughbred stock should learn what is the ideal shape in his breed, and follow it as closely as possible in selecting for his matings.

3. Color of Plumage.—While it is almost universally conceded as theoretically right to place shape before color, in practice more fanciers give color the precedence, because color counts for more in the show room. This actual precedence given color, however, is detrimental to the practical qualities of some of the varieties, and, in general, destructive of distinctions in breed shape. Fanciers who compete with others in exhibitions where color is more important in awards, and prizes depend on extreme development of certain color characteristics, may find their success a justification of the use of breeding fowls of fine color but not at all of breed shape; but those who breed for practical qualities first, or for ordinary excellence in fancy points, will always find results, on the whole, more satisfactory if they give due precedence to breed shape in selecting their breeding stock.

4. Comb and Head Appurtenances.—The matter of selection with reference to these is, of course, selection for quality, as a bird not having these features of the kind characteristic of its breed or variety, would never be considered at all. These features are practically of little, if any, importance, but, in breeding exhibition stock, some of them are of very great importance. They will be specially considered in connection with statements about mating in the next lesson.

5. Color of Beak and Legs.—This is a point to which novices in general give undue importance, often selecting or rejecting on this more than all other points. Except as it may indicate healthy condition, color in these points has no absolute value; but considered as giving a finishing touch to a fowl, or as conforming with a market demand, it assumes some importance.

*Some breeders would consider this rule too strict, especially with regard to defects which are either not disqualifications according to the Standard, or the rules regarding them not rigidly enforced. While I admit exceptional cases where for the sake of other special merit a fowl with one of these faults might be bred from, I think it very evident that the general tendency is to be too lenient with such faults when selecting breeding stock, and that to this carelessness much of the weakness and lack of general attractiveness in some pure bred stock is due. The cases where the use of malformed specimens is justified by results are so few, and the cases where general results condemn their use so numerous, that it seems to me the net result would be much better if no exceptions to the rule were allowed.

These five points cover the things to be considered in selecting breeding birds on appearance. I think it is as well not to go beyond that in this year's lessons.

Novices' Errors in Selection.

The first serious mistake made by most novices in selecting breeding stock is to consider some particular feature, often a superficial one, as indicating purity of blood, and select with reference to excellence in that feature. With selection on this basis, goes rejection of specimens deficient in this feature. The result is the use for breeding of fowls which, for other considerations, ought to be rejected, and the rejection for a minor fault in one place of really valuable breeding fowls. The breeder must consider his matings first with reference to the more important points, then with reference to the others, and must carefully estimate the total breeding value of a fowl when the importance is given each point under consideration.

In general, this method of selection gives one breeding fowls of good all round excellence rather than birds of phenomenal excellence in one particular point, and it is the all round good bird that experienced breeders find most reliable in the reproduction of its kind.

Mating.

The breeder having selected from his flock such specimens as seem to combine a pleasing quality in desirable characteristics with not too marked possession of undesirable features, finds his task by no means completed. Instead, he is only now ready to begin the balancing of characteristics mentioned in the first part of the lesson as distinctively the breeder's work.

The specimens which he has selected are not all alike. Perhaps his selection has resulted in setting aside as possible breeders some specimens with very strong individual differences. It may be that his birds, if all bred alike, have some objectionable feature in common, or alike fail to show a pleasing excellence in a section of considerable importance.

Standard Matings.

Supposing the breeder has males and females of fair merit and nowhere notably deficient: if he is to make but a single mating it should be of the male he considers his best, with as many of the females as he considers suitable to mate with his male as the male is likely to be able to serve efficiently. This is what is called a "standard mating," that is, a mating of specimens of opposite sexes conforming most closely to the standard requirements for their variety.

Compensation Matings.

After making his Standard mating or matings a breeder may have left birds which may make very valuable breeders if properly mated, but if not suitably mated will have no special breeding value. These are, as a rule, specimens deficient only in one or a few minor points. Such specimens in fact as the breeder has whose stock is in some particular deficient.

If one happens to have fowls of the opposite sex strong in the feature in which these fowls are weak, and in other respects not unsuitable to mate with them, he may make such compensation matings; or if he can buy breeding birds likely to offset these defects in the progeny, it is well to do so, if he has room to give to chicks from experimental matings of this kind, but it is poor policy to make a number of matings of different types of stock with the expectation of having radical defects on one side offset by special excellence on the other. The reasons for this cannot be given in the limits of a lesson like this, but the breeder who tries making many matings in expectation of getting something from all his stock will shortly realize, if (as he should) he keeps records of his matings, that taking one season with another he will produce more good stock from one mating of his best specimens than from ten times as many specimens mated up in a variety of compensation matings.

While even a "Standard" mating introduces in a degree the compensation principle in the balancing of defects; with close selection, this balancing is within comparatively narrow limits, and does not present the radical individual differences too often found when matings are in reality crosses of extreme types of the same variety. Such extreme matings are always experimental, and as a rule are profitable only when the object is to preserve in the stock special excellence appearing in an individual which also has faults which make it unwise to mingle the blood of this individual with that of the general stock, or make it dominant in it, before the special defects of the fowl have been to a considerable degree eliminated.

The field for the exercise of skill and good judgment is a very large one. There is practically no limit to experimenting in making matings if one undertakes to discover all the possibilities a study of his fowls suggest, but the practical breeder soon learns to confine his production to what he can get from the matings which will probably give him good results, and the beginner may well pattern by him, and give little attention to possible results of matings made merely to utilize birds for breeding purposes.

The Double Mating System.

The system of special matings or double matings, so called because exhibition types of the sexes are produced from different matings, is a system of matings for color, devised to produce color types required by the established standards, but rarely obtained in both sexes from the same mating. It will be more fully explained in connection with descriptions of matings for varieties with which it is practiced. Where this system is generally used for any variety, the beginner will find it is to his advantage to follow it, regardless of whether he considers it wrong in principle.

Should a Novice Make His Own Matings?

It will have occurred to many readers that it would be of material advantage to every novice to have the benefit of expert advice in mating his fowls.

There can be no doubt that this is so, and that where the results of his matings has an important relation to the finances of his poultry keeping, the expense of securing the services of an expert for this work might well be considered a necessary expense, and the expert engaged, unless to do so would involve cost entirely out of proportion to the stock kept, in which event the breeder is wisest to do the best he can for himself.

Miscellaneous Information.

There are a number of general questions about matters relating to the breeding of poultry, which do not come under any of the topics we have considered. These we will take up here, and treat as briefly as possible, and yet make the points involved clear.

(1). The Age of Breeding Stock.—

Under this heading we have a number of common questions which are given herewith, with reply following each.

(a). *At what age is a fowl fit for breeding?*

When full grown and well developed sexually. A cockerel will generally serve hens long before he is full grown, and will fertilize eggs. A pullet will often lay before she attains her full growth. Such immature stock should not be bred. It will produce, but not often stock that in size and stamina will approach the offspring of better developed stock.

(b). *At what age does a fowl cease to be fit for breeding?*

The age varies greatly. In general, the smaller breeds remain capable of breeding well longer than the larger ones. Then the use of the same stock for laying and breeding purposes, and the custom of giving the males as many mates as possible tend to greatly shorten the period of usefulness of the fowls as breeders. Many fowls are serviceable breeders for only one season. Generally two seasons breeding is as much as can be relied upon. A few fowls breed well for much longer periods, but the fowl that is of value enough to the breeder to be used more than two seasons is the exception.

(c). *Should fowls of the same age be bred together, or is it better to mate old males with young females, and young males with old females?*

It is a mistake to make too much of a point of the relative age of the sexes. If the young birds are well grown, fully developed, and in good condition, they will produce as good chicks as old birds. It is really a question of condition rather than of age—or a question of age only as age may have affected condition. Young stock of both sexes is much more reliable for fertility early in the season. An old cock will sometimes not fertilize eggs at all till toward spring, and old hens often give very unsatisfactory results in fertility, even though laying well, early in the season. The advantages sometimes found in mating old stock of one sex with young stock of the other, is that if the old is a little sluggish, the greater vigor of the young may increase fertility, while if the young is not fully developed the effects of immaturity are to some extent overcome by the better development of the other sex.

(2). Relative Proportion of Males and Females.—

The breeder who follows the suggestions that have been given in regard to selection, will not often find it necessary to ask the limit of the number of hens to be allowed to one male, because he will mostly find only a few hens like enough to be used in one mating. Where the rules given are observed, where only such fowls as are suitable are mated together, matings are almost invariably small, and in most cases there is no need of allowing the male more females. If occasionally a male is found which mated with a few females annoys them too much by excessive attentions, tone him down by allowing him to run for a day occasionally with a larger flock of hens not used for breeding, and not kept continuously with the male.

Line Breeding and Inbreeding.

These are topics to be treated at length at a more advanced stage in the course. For the present I would say of line breeding only that if one buys line bred stock he should follow as closely as possible the same line of breeding; and of inbreeding that if one selects his stock carefully with reference to constitutional vigor and physical perfection, and avoids mating birds with the same, he need have no fear of immediate bad results from inbreeding, and may mate in absolute disregard of possible evil from mating birds of near kin.

LESSON IV.

Putting Principles of Breeding Into Practice.

THE last lesson stated some elementary principles of poultry breeding and discussed them in a general way. In this we are to consider more specifically the details to which those principles apply and the methods of their application.

In discussing the selection of breeding stock we found five points upon which selection should be based, namely:

1. *Constitutional vigor and physical perfection.*
2. *Breed shape.*
3. *Color of plumage.*
4. *Comb and head appurtenances.*
5. *Beak and legs.*

The first of these points needs no further explanation at present. Discussion of it along the lines followed for the other points would merely be a statement of the average relative vigor, hardiness, etc., of the different breeds, and on these points the differences that concern the breeder do not follow breed and variety divisions. On the other points there are a few things not mentioned in the last lesson to consider before special rules for mating are given.

Breed Shape.

The first thing for the novice in breeding to learn about the shape of the breed he is to work with is what is the typical shape for that breed. To appreciate it correctly he must also know something about the types of form for other breeds, for our ideas of form in fowls are always relative.

We find among fowls, even of the same breed and variety, great diversity of form, due largely to the general neglect to give shape due importance in mating and judging. Some of these forms are pleasing, some are not. A few of them have been chosen as models for particular breeds, and however disregarded in practice are still recognized as correct standards, and easily recognized as distinct and distinctive forms. Not all breeds have such dis-

Light Brahma Cock.

Buff Cochins.

slon a well shaped specimen gives is of massiveness. The Langshan is of quite different type, not so massive looking as the others, shorter feathered, higher stationed, a big, well built but rather spare fowl. A comparison of the cuts which accompany this lesson will show the type differences quite plainly.

2. *The Mediterranean types.*

The principal types of this class are the well known Leghorn and Minorca types. The Leghorn is a fowl of graceful carriage and fine curves yet with quite a substantial body. The Minorca is larger with more angular curves, and longer, straighter lines. The other breeds in this class are the Ancona, which is a Leghorn in shape; the Black Spanish, much like the Minorca, but with less breadth and depth of body; and the Andalusian a type intermediate between the Leghorn and Minorca.

3. *The American types.*

We may speak of the American type or of American types. In a general way the fowls of the American class are of the same type, a type intermediate between the Asiatic and Mediterranean types. But in the several breeds of fowls in the American class we have clear sub-types. Thus the Plymouth Rock has a rather long and deep yet well rounded body; the Wyandotte, a chunkier, rather square body. The Rhode Island Red standard calls for a body intermediate between Plymouth

tinative forms, but many do have, and the breeder with a little effort trains his eye to recognize each wherever seen, and to give it due credit when found in the variety or breed to which it belongs.

Dividing fowls (exclusive of Bantams) according to the more plainly apparent breed shapes, we have:

1. *The Asiatic types.*—

Of these there are three, each breed in the Asiatic class having distinct breed shape. These three are: The Brahma, Cochin, and Langshan.

The difference between the Brahma and Cochin is largely due to the difference in plumage; the standard Cochin being an extremely heavily feathered fowl, so much so that the female looks round as a ball, and the male also suggests the appearance of having more feathers than he can use to advantage. The Brahma is a closer feathered bird, and appears to have greater length of body. Both fowls are large, and the first impres-

Black Langshan Cock.

*S. C. White Leghorns.*4. *The Orpington type.*

Intermediate between American and Asiatic types.

Then we have in the Dorking and the Houdan, two breeds of different classes but with a conspicuous resemblance in shape of body. We make them:

5. *The Dorking-Houdan type.*

The characteristic of the shape in these two breeds is the full breast and rather long keel, giving the body some resemblance to that of a duck. This is most pronounced in the Dorking, which is the larger of the two breeds, and often a very massive fowl, but is also easily distinguished in some Houdans, though others seem entirely lacking in this feature.

6. *The Hamburg type.*7. *The Polish type.*

These two types are somewhat similar, both small, fine boned, very symmetrical and stylish looking fowls, very energetic and nervous. The Polish more round and plump; the Hamburg, in the larger specimens, sometimes suggesting the Minorca or Dorking.

8. *Game types.*

Under this heading we have three

Rock and Wyandotte types, and though specimens conforming to that description have been rare in the past, more and more of them are seen each year. Breeders of these breeds should carefully distinguish the different types. Of the other American varieties the Java is of extreme Plymouth Rock type, while the American Dominique does not properly belong to this class of fowls.

Some of the types which in a natural classification of the subject should follow these cannot be so easily placed or grouped, the divisions according to shape not following Standard classification. For this reason it is sometimes more difficult to give the type an appropriate name. Thus we have in the Orpington fowl a more massive American type, many of the Orpingtons being conspicuously "Cochinny," but other differences make it seem inadmissible to put the Orpington in the American type class, so we must put it by itself as:

S. C. Black Minorcas.

pronounced types: the Pit Game, a compact round bodied, rather fine boned fowl; the Exhibition Game, an abnormally elongated type of the Pit Game; the Indian Game, a heavy, massive Game type, apparently an intermediate between the Pit Game and Asiatic types.

The breeder will find in every breed many specimens which are not of good breed shape; many that approximate it; a few that are fine models of their type. Whatever his breed he should study shape, and learn to distinguish shape of body as readily as shape of comb or color.

Color of Plumage.

Generally speaking, novices in poultry breeding are not so likely to make mistakes in color as in shape. Color differences are more pronounced. In white and black are presented extremes of color, which are exact opposites, while the most extreme shape types are in reality similar types. Differences in shape resemble rather differences in shades of the same color. Hence we find fanciers easily making the broad distinctions between color types, but when they come to the finer distinctions meeting the same difficulties they do in working with shape.

The colors and color combinations in poultry may be classed as follows:

1. *Solid colors*.—White, black, buff and red.

2. *Parti-colors*.—Which may be sub-divided according to the character of the markings into barred, laced, penciled, spangled, and mottled plumage in varieties in which one or both sexes retain the same colors and markings through all sections; while in varieties where the colors vary systematically in different sections, we have combinations, such as the black-red combination seen in the Black Breasted Red Game and the Brown Leghorn, the descriptive name being the color description of the male. Following the same method of describing the color type we would have a black-white combination in the Silver Duckwing Leghorn and Silver Gray Dorking, and a white-red combination in the Red Pyle Game.

Barred Plymouth Rocks.

A complete classified description of colors would be too elaborate for this stage of the treatment of the subject, if indeed it would be of any special use at any time, but it is worth while for a breeder to make sure that he distinguishes between the different arrangements of color, and clearly understands just what he is trying to do. A good many breeders in the beginning pay little attention to the study of markings. They merely see certain color effects without knowing how they are obtained, and for want of a proper appreciation of the color qualities of their fowls not infrequently make the mistake of breeding from specimens not suitable for their purpose or neglecting to use valuable specimens. Color is not to be sought at the sacrifice of more substantial qualities, but if it is worth while to breed a variety at all, it certainly is worth while to know its color requirements thoroughly, and so be sure that specimens that are good in color as well as in other features will not be neglected. So I would urge the novice in any breed to study his color description with live models before him, and make sure that he knows just what the colors should be in each section.

Comb and Head Appurtenances.

There are four principal types of comb:

(1). *The Single Comb*, a single, upright, serrated comb, in some varieties very small, in others medium in size, in still others very large, but the general type always the same.

(2). *The Rose Comb*.—By persons not familiar with the technical terms of poultry men, every comb that is not single is commonly called a double comb; the rose comb is the most common type. It is a thick, fleshy comb, flattened on top, sometimes small and "neat," as the typical Wyandotte comb, larger in the Leghorn and Hamburg, and in the Red Cap so exaggerated as to seem almost a deformity.

(3). *The Pea Comb*, a triple comb, looks like three parallel single combs growing from the same base. Seen in its best development in the Brahma.

(4). *The Leaf Comb*, a forked or branching comb, as in the Houdans and Polish.

In one way the comb is of no practical importance. In itself it has no actual value. Yet a good comb adds much to the appearance of a fowl, and without developing fine combs at the expense of other features it is possible by simply avoiding the use for breeding of birds that have poor combs, or combs out of proportion to the size most favored for a variety, to add much to the appearance of the flock.

Wattles.—These are the folds of skin pendant from the lower beak, and of the same quality and color as the comb. They vary much in shape and size, and due regard should be given to the selection of birds having wattles such as are desired for their type.

Ear Lobes.—The folds of skin just below the ears. It is always desired and generally required that they be uniform in color—either red, or white, or creamy white. The tendency is to mix red and white. As with all superficial points, while not to be

given undue importance, color of ear lobes should not be neglected. If neglected for a few years it is very difficult to eradicate red from a lobe that should be white, or white from one that should be red.

Crests and Beards.—Comparatively few crested fowls are bred. If one does breed fowls of that type he ought by all means to avoid using birds with poor crests, however good in other respects, for unless the crests of your fowls are ornamental, there is no object in having crested fowls.

Beak and Legs.

Beak.—In general the shape of the beak of a fowl conforms to the structure of the fowl, and if one observes that the beak of a specimen he considered typical in shape of body does not conform to the description of the typical beak for that kind of fowl, he

White Wyandottes.

S. C. Rhode Island Red Hen.

needs to reconsider his judgment on shape—perhaps to find a new standard upon which to base his judgment. An elongated and rather weak looking beak is rarely if ever found on a plump or stocky bird, while a specimen with a powerful, hawk like beak is likely to be too heavily built all through to be symmetrical. The color of the beak is of importance only as it harmonizes with the general color of the fowl, or appeals to individual taste.

Legs and Toes.—In these again we have a good index of the general structure of a specimen. If one has a fowl which seems to him good in shape of body, but with poor legs—either poor in shape or not smooth, strong and well developed—he needs to reconsider his judgment on shape of body, and in most cases will find he was wrong. As to color of leg, it will be found that whenever a certain color is given the preference by fanciers, carelessness in selecting with reference to that color very soon results in a very shabby looking lot of fowls.

I have gone into the above points at more length than I had intended when the lessons for this year were first mapped out, because within a few weeks it has been very pointedly brought to my notice that a very great many beginners who are most interested in the “practical” aspects of mating, need to be admonished not to neglect appearances. So I have tried by reiteration in a little different form to give special emphasis to some general points which every breeder of thoroughbred fowls ought to give some consideration. By giving a little attention to these points a breeder will save himself disappointment in the coming seasons when he knows enough about the finer qualities of the varieties he breeds to want to select more closely with reference to them. The points I have indicated are points I think anyone can distinguish and appreciate. Giving them consideration simply means guarding against serious faults. A good many new breeders need to understand that while it would be not at all to their advantage to go to the extreme in fancy points, it is just as much to their disadvantage to neglect them altogether. Indeed, unless one gives reasonable attention to the looks of his fowls he loses half the satisfaction of producing good ones, though producing only for eggs and meat.

Mating White Varieties.

The impression is general among breeders not producing stock for competition and among beginners that white is easy to reproduce. This is true of the white commonly produced by such breeders, but not of such a pure silvery white as the fancier works for. The ordinary white fowl compares with a good white fowl about as a piece of unbleached muslin does with a piece that is thoroughly bleached and *white*.

The common color faults of white fowls are yellow distributed through the plumage, giving it a creamy appearance in all sections, and sometimes becoming very brassy looking on the backs of the males; and ticks or splotches of foreign color, as black or red occurring irregularly in the plumage. Very few fowls are absolutely free from these faults. Ticks or splotches are most apt to occur in the specimens with whitest plumage, while creaminess is correlative with the yellow legs, beak, and skin required in all the popular white varieties.

While the Standard calls for an absolutely white fowl, many of the best breeders think it better to allow a little creamy color throughout the plumage rather than take the lighter faded yellow skin and legs seen on most very white birds. So in mating his white fowls the beginner is wisest who does not try to get *white* regardless of other matters, but avoids pronounced brassiness and creaminess, and foreign color in the stiff feathers where it cannot be removed without disfiguring a bird.

In the white varieties not having yellow legs and skin creaminess and brassiness are not so prevalent, but—as would be expected—there is likely to be a great deal more ticking and blotches of the black, red, or brown.

Mating Black Varieties.

In black again we have a so-called solid color as difficult to produce to perfection as any of the color combinations. The black oftenest seen is a dull brownish black. The black desired is a jet black with a greenish sheen. The black oftenest obtained by fanciers trying to

get the required color is a jet black with purple barring. This comes from an excess of color, and results generally from too strong color matings. The mating of two jet black specimens with fine green sheen is apt to bring the objectionable purple bars. So the expert fancier breeding black fowls avoids mating the finest plumaged birds of either sex with equally fine colored specimens of the other sex. With a male perfect (approximately) in color he mates females that, without being pronouncedly brownish, show a tendency to that color. Similarly with his finest females he uses a male with a little less strength of color.

Fine specimens having the purple barring are used in breeding with birds very poor in color with black weak and showing quite brown and dull. They are also used with birds of correct color. In the first case only a small proportion of the progeny is likely to come good in color, for uniformity and soundness of color do not result quickly from such extreme matings. In the mating of a bird with an excess of color with one of standard color some very fine specimens are sometimes produced, though, naturally, a considerable part of the progeny shows the purple bars.

Mating Buff Varieties.

A solid golden buff fowl is one of the most beautiful in plumage, and the perfection of color in buff fowls is most difficult to obtain. From the most carefully selected matings a proportion of chicks come that as they grow up show white or black in wings and tails, or red across the shoulders and backs of males, uneven mottling of different shades of buff throughout the plumage, different shades of buff in different sections. The proportion of such chicks is often discouraging to the beginner, but by persistently mating from the best specimens he can procure or afford to buy, he in time can develop a line of buffs that will give him a very satisfactory proportion of birds as good as the best.

In mating buff fowls keep as near as possible to the shade of buff you are trying to get. Good buff being so very scarce—even yet—it follows that most matings will be of males a little dark with females a little light, or *vice versa*; but in making these necessary compensation matings keep as near the standard color as you can, and if you have fowls of both sexes of standard color, and in other respects suitable to mate together, by all means make such a mating if only of a single male and female.

In breeding for buff more perhaps than in working with any other surface color, undercolor is of great importance. In saying this I do not wish to be understood as suggesting a neglect of undercolor in other varieties, but I know of no other color in which surface faults may be overlooked safely and reliance placed on sound undercolor to work the defects out of the surface to the same extent as in buff. Get the best undercolor possible, a buff, but a little lighter in shade and duller than the surface color. In undercolor, though, take a bird that is almost white, if good in surface color, rather than one that has a bluish or slaty smudge or bar in the undercolor, for birds with such undercolor are apt to give you too much black in wings and tails, and often give a great deal of lacing and ticking of black in the surface color of their progeny.

In surface color a little white is less tolerable than a little black—appearing in mealiness in flights and tail feathers, but in undercolor black should not be tolerated.

Mating Red Varieties.

In general what has been said of mating buff varieties applies to reds, though the ideas of breeders of red varieties do not yet agree as do those of breeders of buffs, and therefore their methods of mating are not so generally alike, and the fact that black is admitted in the wings and tails, and to some extent in the hackle, makes the use of birds with smutty undercolor perhaps a little less risky than in breeding buff color. The tendency in the development of the reds, however, has been for the elimination of black and toward making it a solid colored bird. The R. I. Red standard in fact simply recognizes and permits markings which in the buff breeds were never treated as leniently in the Standard as they were in practice. It is because the tendency in Reds seems unmistakably toward uniform color and the final elimination of black, and because this tendency makes the breeders follow the methods of breeders of buff fowls that I have taken the liberty of classing red as a solid color, though it is not strictly so in fact.

Mating Barred Varieties.

In considering the mating of Barred varieties, we will take up the Barred Plymouth Rock as the representative of this color type known everywhere, and indeed the only one in which those studying these lessons are likely to be interested.

The Standard requires that the plumage of males and females shall be of the same uniform color throughout. The exact description of this color has caused no end of controversy. Some affirm that it is a black bar on a white ground, but looks blue. Others say the ground color is grayish or bluish white with the darker bars blue. Breeders agreeing on color often disagree about proper description of it. The amateur, however, need not puzzle himself about their differences on that point. On the things that trouble him most in the appearance of his fowls, the breeders are pretty well in agreement—though they differ again as to the best method of getting what they want.

The beauty of Barred Plymouth Rock color is in the character of the bars. They should be parallel—that is, straight across the feather, not breaking at the quill, and not crescentric in form, and they should be quite sharply defined. The ground color should be clean, and the dark bar should be free from greenish or brownish tinge.

Some of the faults indicated in the last paragraph are found in some degree in nearly all Barred Plymouth Rocks. It is only by using specimens as free as possible from them that a breeder succeeds in getting plumage on his fowls that makes them really attractive, and it is because beginners so seldom look sharply after these faults that the first few years of work with Barred Rocks so often results in striking deterioration from the quality of the original stock regardless of the system of mating used.

The Two Systems of Mating.

The average beginner—I might go further and say ninety-nine in every hundred persons who begin the breeding of Barred Plymouth Rocks accept off-hand the principle set forth by the advocates of mating standard male and female to produce standard colored progeny of both sexes. The advocates of single matings insist that that system should be followed because it is right in principle. So the beginner follows it—for a while.

Now because I went through all that, and spent a good deal of money finding out for myself that the other way was better, and because I know so many of the best breeders use double matings, and so few do not; in this lesson I am going to discuss the single mating system with the remark that if one wants to try it he should be very sure that the birds he begins with are line bred that way.

The Double Mating of Barred Rocks.

This system calls for two distinct lines of stock—one to produce standard males, the other to produce standard females. A breeder who wants to exhibit and sell Barred Rocks to a general trade must mate both ways. One who likes Barred Plymouth Rocks, and can keep only one mating, can breed either a cockerel or a pullet line and produce nice stock and have a stock that looks as well in his yards as anyone's—for be it remembered the specimens mated in the show room for exhibition are not, as a rule, mated anywhere else.

Very early in the history of the Barred Rock breeders were worried by the tendency of the females to run dark, and of the males from the same mating to run light in color. Finally someone (I believe it was judge H. B. May, of Natick, Mass.,) hit upon the plan of a special mating for each sex. The results were so satisfactory that the idea was gradually taken up and the plan followed so generally and systematically that the leading stocks of Barred Rocks in the country are now, with few exceptions, carefully line bred for many years with distinct male and female lines.

The special mating to produce males takes a male of standard or exhibition color and mates him with females of the male line, that is, females bred as he is bred. Such females are considerably darker than the females seen in the shows, but must be well and strongly barred. From this mating come males the color of the sire; females the color of the dam.

The special mating to produce females mates with exhibition females cockerels of the female line. These males are lighter colored than the females, sometimes very light in color, but always must be distinctly barred. Males from such matings follow, as a rule, the color of the sire; females the color of the dam.

The breeder of Barred Rocks who would follow this system of breeding should buy all his stock from one breeder, and have him make the matings. The common practice of beginners buying a pen or trio from one breeder, and a pen or trio from another breeder, and changing the males to avoid inbreeding is responsible for a great deal of unsatisfactory results in all varieties, but in none is the risk greater than in Barred Rocks. Until one knows his own stock and knows how it is bred, it is better to rely on the breeder of his original stock for the first mating, and, if possible, to get his advice and buy stock needed for future matings from him until one has reason to think he can go it alone.

Undercolor.

The Standard requires that the barring on the feathers of the Barred Rock extend the entire length of the feather, right down to the skin. The underbarring need not be as distinct as on the surface, but should be clearly discernible. Some advanced breeders get underbarring so strong that it makes a smutty surface, but the beginner errs oftener in the other direction.

Mating Light Brahmas.

In the Light Brahma, Light Brahma Bantam, and Columbian Wyandotte, we have a color combination, perhaps best described as white with black points—that is, the white greatly predominates in the surface color, the black appearing only in a few sections, i. e., in hackle, wings and tail.

In the hackle the black is in the form of a heavy black stripe in the middle of the feather.

In the tail the stiff main tail feathers should be solid black; the sickles and larger coverts black, while the lesser coverts are black edged with white. The coverts are the soft somewhat curling secondary feathers of the tail, larger next the main feathers, and gradually merging into the plumage of the back and saddle.

In the wings the largest primary or flight feathers are in the best specimens black with a narrow edge of white at the lower edge of the feather. The secondary feathers should have enough of the lower web of each white to make the folded wing white.

The undercolor should be white or bluish white, and it is desirable that sections that are white on the surface should be white or nearly white in undercolor except near their juncture with a color section containing black in surface color, where a darker undercolor is not objectionable.

The problem in mating for this color combination is to keep the surface colors in their allotted places as intense and as clean as possible. As in all color combinations, the tendency is for the colors to run together. While no double mating system such as is used for Barred Plymouth Rocks is employed, Light Brahma matings generally have to be compensation matings, a standard male with a female not so intense in black sections, and females very strong in color with males a trifle weak. Two birds that are both rather dark in undercolor, if mated together, generally give chicks with much splashing, mottling, and ticking of black in surfaces that should be white.

Mating Silver Penciled Varieties.

In all the varieties so far considered the male and female are as nearly identical in color and markings in every section as the art of the breeder can make them. We now take up a number of varieties in which the male and the female are not the same color: First, we consider the silver penciled varieties—the Dark Brahma and the Silver Penciled Wyandotte—which are practically the same in color.

The males are black, or black slightly frosted with white, in plumage of breast and body, white on the back and wing bows, white with black striping in hackle and saddle feathers, while the stiff wing and tail feathers are the same as in the Light Brahma, except that the wing coverts are black and make the black bar across the wing when folded. This gives us the "black-white" color combination.

The females are like the males in color only in the hackle. The prevailing color of the female is a light gray with distinct dark lines of penciling following the outlines of the feather, the several lines of penciling on each feather making a completely penciled surface. The main tail feathers are black, and the stiff feathers of the wing are black and a penciled gray instead of black and white, as in the wing of the male.

The difficulties in breeding this combination are to get clean colors and distinct penciling in all sections in the females, and to get good black breasts in the males, and get these from the same matings. One of the best of our breeders who breeds both these varieties gets his best results from well penciled females mated with males as near Standard color as possible, and known to be from well penciled hens. Such a male may have some "frosting" of white in the black of the breast and body, which is a fault in the exhibition pen, but not so much so in the breeding pen. The males with solid black breasts are apt to produce females that are too dark and not well laced.

The fault in quality of color most necessary to guard against is a brownish tinge in the females, and red or brown in the cape or back of the male.

Mating Golden Penciled Varieties.

In these two varieties with "Partridge" markings constitute one type of the black-red color combination; these are the Partridge Cochins and the Partridge Wyandotte, in which the markings are similar to those of the Dark Brahma and Silver Penciled Wyandotte.

The males of both varieties are red where the males of the silver penciled varieties are white. The females of the "Partridge" varieties have red or reddish brown plumage with darker brown pencillings.

The rules for mating are the same. Some breeders use double matings, making two distinct lines as in double matings of Barred Plymouth Rocks. Whether the practice will become general, remains to be seen.

Mating Silver Laced Varieties.

There are three of these: the Silver Laced Wyandotte, the Silver Polish, and the Silver Sebright Bantam. Though not alike in all sections they have a general resemblance. The conspicuous difference between them and the type we have called the black-white type, is that in these varieties the plumage of the breast and body has the same markings in both males and females. The necks, backs, and tails of the males of the Wyandotte and Polish are not much different from those of the silver penciled varieties, but in the Bantam the markings are like the hen throughout.

We will consider only the Wyandotte in this lesson. Originally the Silver Laced Wyandotte had plumage with such a very wide lacing of black that the white centers were so small that it seemed more appropriate to consider the white as a mark on the black rather than the black a lacing around the white. Of late years, however, there has been a change to a more "open" center, making a different looking and very much handsomer fowl. What puzzles the breeder is to get these lacings uniform all over the female and in the laced sections of the male. To accomplish this the double mating system seems to be preferred by our most successful breeders, two distinct lines being bred as with the Barred Rock, though it can hardly be said that the lines are as well established as in the Rocks. The type of Silver Wyandotte color has changed so much that we must regard the ideas of breeders as in a transition stage, and that being the case I would rather advise a reader handling that variety to either find out what lines his stock has been bred on, and follow same lines, or supply himself with all the literature on mating the variety he can get, and after deciding what line he wants to follow in mating, begin to build the stock on that line, drawing for new blood as needed on some one breeder following the same line.

Mating Golden Laced Varieties.

Here we have the three varieties discussed above, each duplicated in its own breed with a variety having a golden or bay ground color of plumage instead of white, as in the Silvers. With the change of color, the principles and rules of mating are the same.

In popularity too, the Golden Wyandottes, Polish, and Sebright Bantams have relatively much the same positions as the Silvers. None of the laced varieties are as yet very extensively

bred. Like the penciled varieties described above, they have been too difficult for the average breeder, but as knowledge of breeding increases there is more and more disposition to take up the breeds that have been let alone because they were difficult, and these breeds become more and more popular.

Mating Brown Leghorns.

The Brown Leghorn male and the Partridge Cochin male are very like in color, but the females are quite different. The Partridge Cochin female is required to be uniform in color throughout. The Brown Leghorn female has a yellow neck with black stripe, a light brown back so very finely penciled as to produce an effect quite different from the heavy distinct penciling of the Cochin and Wyandotte. The breast is salmon colored, the body a light brown, the tail black with coverts penciled as is the plumage of the back, the wings a combination of slaty brown and light brown disposed as are the black and white in the wing of the Light Brahma.

To produce males and females so different, the double mating system is generally used, the exhibition males being bred from exhibition males mated with females of the same line of breeding. Such females are, as a rule, much too dark for exhibition, and not nearly as handsome as the exhibition females. The exhibition females are produced from exhibition females mated to males that are not merely of the same line of breeding, but known to be the sons of exhibition females of the highest merit.

The exhibition male has, or should have, (he does not always) his hackle and saddle well striped with black, but no striping at all is wanted in the saddle of the pullet breeding male, and provided a stripe is present in his hackle, the breeder is not disposed to be overparticular about the kind of stripe. These pullet breeding males are much lighter in color, a light orange where the others are red. They are handsome birds, but will not often compare for depth and brilliancy of color with the males of the exhibition type.

The Literature of Mating Fowls.

I have given quite briefly, statements about color matings of fowls most commonly bred. What has been given, while most elementary in scope, will help a good many breeders, will keep them from getting too far out of the way in their breeding operations. A full discussion of the mating of any single variety will easily take a long article. As a matter of fact there are few, if any, special articles that are exhaustive, complete, and leaving nothing unsaid. So to get at all there is known about the breed or variety in which he is interested, one has to systematically collect articles, booklets, and books in which it is treated. These vary greatly in their character. Some give minute descriptions of fowls point by point, some are largely historical, some are devoted almost entirely to mating, some combine all these features. Sometimes one writer in an article that is on the whole very unsatisfactory brings out valuable points not noticed by the writer of a better and much more complete article.

Thus we must gather up our information little by little, remembering all the time that as we grow in our knowledge of a breed we can again and again go back to the articles we have read, and in the light of our added knowledge discover in them information we had not found at any previous reading. Because this is so it is good for every breeder to collect as much as he can of the literature pertaining to his breed, and frequently take a spare hour or two to review and think it over.

With regard to the purchase of books, which in cases where the literature of a breed or variety is unusually large, might mean an outlay of several dollars, if one is going to breed on a considerable scale with the idea of selling stock, it is worth his while to get everything he can on his subject, even though some of the books contain comparatively little that seems of value to him, and therefore not worth their price considered as books. That, however, is not the way to look at it. If I buy a book for a dollar that is compared with some other book treating on the subject worth not more than ten cents, still if it gives me one item of useful information I had not before, it is worth the money.

LESSON V.

Hatching Chicks With Hens.

WITHOUT entering here into a discussion of the relative merits and advantages of artificial and natural systems of incubation, I want to state first of all that many of those who do not get satisfactory results by natural methods, and do get much better results by artificial methods would have had much better results than they did by natural methods if they had been as careful to make conditions right for the hens to do their best, as they try to be with the incubators.

The cost of an incubator, the value of the eggs required to fill it, and the fact that anything going wrong with the machine may mean a total loss of the eggs put into the machine, and of three weeks time, makes operators of incubators appreciate the importance of doing all in their power to make conditions for a good hatch. But the fact that a hen left entirely to herself may bring off a good hatch, and the fact that hens can be put off with very indifferent hatching accommodations, leads many poultry keepers to do their hatching with hens under conditions not favorable to good hatching.

"Whatever is worth doing is worth doing well." If one is going to hatch with hens he should, as far as possible, give the hens a chance. He should go beyond this, and seek to avoid all things which operate against good hatching with hens.

Where to Set the Hens.

Sitting Hens in Regular Poultry Houses.—The quarters for sitting hens should be comfortable and convenient to work in. If possible such a house or pen as is used for laying and breeding stock should be used for the sitting hens. About the only changes desirable are the removal of unnecessary fixtures, and, if the place is very brightly lighted, some darkening of the windows.

The floor should be cleaned, all litter and manure removed, and, if the floor is of earth, it should be forked over, to give as clean a surface as possible.

While access to a yard is not absolutely necessary, I consider it important; for my experience has been that, on the whole, hatches were better, chickens more thrifty, and hens kept in better condition when they were able to get outdoors every time they came off the nest.

If nests are placed only on the floor, ranged around the walls, a pen will accommodate about the same number of sitters as it will of layers. It can be used for a few more than it is advisable to put in it for laying, but to keep down the work of caring for the sitters it is best not to crowd them too much.

Making Special Quarters for Sitting Hens.—If no quarters like those used for other stock can be taken for hatching purposes, and some other arrangement has to be made, the first consideration is to see that it provides freedom from disturbance, and that it is not a place in which

it will be inconvenient to care for the hens. Too many of the places improvised for sitting hens are faulty in these particulars, and as a result the hens may get too much attention from others and too little from the keeper.

There are often rooms, or sheds, or corners in large buildings that can be partitioned off that, as far as indoor accommodations go, are just as good as quarters in a poultry house, but often such quarters do not admit of letting the hens out doors during incubation, and in case it is possible to make arrangements that will give the hens a daily outing that ought by all means to be done.

It is also important in taking a place sometimes used for other purposes for sitting hens, not to continue its use for other purposes if that would at all interfere with the proper treatment of the hens while incubating.

Individual Compartments for Sitting Hens.—My experience in using a separate small coop for each sitter never went beyond the experimental stage, because I never had average hatches that way that made it seem worth while to continue any of the numerous arrangements of this kind that I have tried. The hens confined to nests and to very small runs when off the nest have always been restless, and good hatches under such conditions have, with me, been rare.

The Unit of Nest Boxes for Sitting Hens.

The single nest box for a sitting hen, shown in the accompanying cut, is so simple and works so well that it seems to me not necessary to discuss other possible forms of nest receptacles; barrels, half barrels, and boxes in almost endless variety have been used, but for economy of material and room, combined with convenience, I have never seen anything that approached a system of nests in which this is used as the unit.

The most convenient dimensions for nests for medium sized hens are 12 x 14 in. on the ground, and 14 in. high, 12 in. high will answer, but such low nests are not as convenient for handling the hens. For small hens 12 x 12 on the ground will do, but I would not advise anyone cutting up lumber for nest boxes to make them smaller than 12 x 14 x 14 in. Make the small nests only in case you can use a few of them and have odds and ends of lumber that will make them, but would not make the larger size. For large hens make nests up to 16 x 16 x 16 in size, that size making a roomy nest for the largest Brahma hens. Note that very much of the trouble with large hens breaking eggs is due to their not having room to turn in the nest.

This nest may be made either with or without a bottom. For single nests it is advisable to have a bottom, because the nest is so light that it is easily moved out of position. In that case if the nest is in the box the eggs are not disturbed, but if the nest box is simply a cover over a nest built on the ground the eggs may be injured. Where double or triple nests are used, the weight and the binding of the earth produced by shaping a nest in it when the box is in position, hold the nest box so firmly that it is not easily displaced, and there is no need of a bottom unless it is thought advisable to have nest boxes that can be moved with the hens in them if desired.

The narrow strip at the bottom of the front of the box should be 3 to 4 in. wide according to the height of the box.

With nest boxes of this construction a hen cannot jump down on the eggs as she may if set in a barrel or half barrel, or box open at the top, while it is very much easier to inspect the nest when the hen is on by simply putting a hand under the hen and lifting her body enough to let you see the eggs. She is disturbed but little by this, when she would be much annoyed by being lifted off to let the attendant see the eggs from above.

The Beginning of a System of Nest Boxes.

In the double nest box shown in the illustration on the next page, we have the beginning of a system of nests based on the unit just described. This box also has a movable front which can be used to confine the hens to the nests. I have sometimes made nests in sets of three or four, but for my own use prefer to have them in pairs, because more easily handled and generally fitting better into spaces available.

Placing Nests for Sitters in Tiers.

When it is desired to set many more hens in a room than can be accommodated with nests on the floor, poultrymen sometimes build the nests in tiers, two, three, or more tiers high, and instead of a loose front, like that shown in the illustration of the double nest, make a slat (lath) front, hinged to the strip at the bottom of the front of the nest, and either supported by a bracket below or by a string or hook from above, so that when open it makes a shelf for hens to go on when leaving and entering the nest.

This arrangement of nests may be made with the nests built in large sections, each the full height of the combined tiers, or with each small section of two, three, or four nests independent of the others and combining like the sections in a sectional book case. When constructed in this way the nests must, of course, have wooden bottoms.

How to Make a Nest.

In a Nest Box With a Bottom the nest may be made of earth covered with fine straw or hay, or of straw or hay alone. The nest on a base of earth is usually more satisfactory if properly shaped; if not properly shaped at the start, hens are more likely to break eggs and crush chicks in it than in a nest of all hay or straw, because the latter will improve in shape as a result of the movements of the hen, while the earth base formed once, there is no alteration in its form.

To make the base of earth for the nest: Take a shovelful of fine loam, not wet, but moist; put it in the nest box, and with the hand make a hollow nest, working the earth up to the corners and around the sides, but leaving the bottom of the nest, while a little hollow, not so much so that eggs will roll to the middle. Now, after having worked the earth quite firm and smooth with the palm of the hand, take a good handful of soft hay or straw — not too long—say six or eight inches long, and make the nest of it, distributing it evenly over the earth base, and working with the hand until you have it smooth and well pressed down. It does not take as long to do this as to tell about it. If it is not well done the hen will undertake to do it herself with the eggs in the nest, and the result is apt to be hard on the eggs and also on the temper of the keeper.

Double Nest Box for Sitters.

a — Wooden latch to hold front in place.

When a Nest is Made Without Earth in the box, more nest material is used; it must be much more carefully shaped, and it does not hold the shape given it as well—which is or is not a fault according as the work was well or badly done.

To Make a Nest on an Earth Floor the box is placed in position and the earth shaped just as if earth had been put into the box. All lumps of earth must be broken fine, and all stones or large gravel must be removed. Then the nesting material must be put in as described above.

A Few Observations on Nest Materials.— Hay and straw, cut short, do not make good nests, because the material works about, and does not retain the shape given it.

Excelsior makes a very good nesting material.

Waste tobacco leaves and stems make good nest material, whether used with other material to keep lice out, or used alone.

Nests of earth without other material, I have never found satisfactory. True, hens that steal their nests and make such nests in them sometimes do well, but oftener they break eggs in them, just as hens do in any poorly formed nest, and a good proportion of the stolen nests are poorly formed. A hen by no means always makes a good nest, and seeing that the nest is a good one is one way in which a poultryman can improve on nature.

Selection of Sitting Hens.

Because not all hens that have the disposition to incubate make good sitters, there must be a judicious selection of the hens to be used for hatching. Otherwise, good hatches will not be as frequent as they should — to say nothing of the difference in the work of handling good and poor sitters.

While no rule will apply universally, I think it will be found to be the general rule that rather small hens make the best sitters, but large hens the best mothers. The superiority of the small hen as a sitter is not due altogether to her light weight, and the greater danger of a large hen breaking eggs — particularly when, as is too often the case, the large hen is set in a nest none too large for a small one. The great superiority of the small hen in incubation is that she is, as a rule, more warm blooded, generates heat more rapidly. When it comes to brooding the chicks, her small size and short plumage handicap her, and the chicks quickly reach such a stage of growth that she is too small a brooder for the chicks she hatched, and unless the weather is very mild her chicks cease to thrive.

The small hen often has the objectionable trait of being wild and nervous, not docile and easily handled as a sitter should be. This fault can generally be overcome by judicious handling. While I do not think it is as necessary as some authorities on poultry keeping say, to "be sure your hen wants to sit" before you give her the eggs you want her to incubate, I do consider it very necessary to be sure your hen will allow herself to be handled before you set her. Hens that are unmanageable provoke tempers that are out of place among sitting hens, and the result is likely to be unsatisfactory. Be sure then, that the broody hen will allow herself to be handled, by dusk or dark, if not by daylight.

Temperature of Hens.—That the temperatures of hens vary, and that hens that seem very hot, generally make the best hatches, is, I believe, agreed among poultry keepers who have closely observed conditions of hatching by natural methods. The difference in temperatures is apparent to the touch if hens are so handled that the palm of the hand comes in contact with the body of the hen, which is generally partially stripped of feathers when she begins to incubate. If, in handling several hens, you find one that seems to have perceptibly less heat than the others, do not use her; or, if you use her, watch her eggs and chicks and you will nearly always find her a poor hatcher and a poor mother. Some poultrymen who hatch large numbers of chicks with hens, overcome the effect of using these low temperature hens for sitters by changing them from nest to nest, so that a low temperature hen will not be likely to be on the same eggs for more than a day at a time, and perhaps not for more than one day during the entire period of incubation. Under ordinary circumstances, however, I think it is better to reject low temperature hens when selecting sitters, for with no more hens sitting at one time than on the ordinary plant where hatching is by natural methods, it is an advantage to have the hens keep the same nests.

When and How to Set Hens.

When a hen is not to sit in the nest she has been laying in, it is best that she should be moved after dark. It is not in all cases necessary to do so, but it will be found that a much larger proportion of the hens will settle down quietly in their new quarters if moved after dark, and their nests kept darkened until they are let out to feed just before dark the next evening.

If there are many hens to be moved, and they have to be moved some distance, it is a good idea to have a coop to move them in, but if only a few hens at a time, and no great distance, take one hen under each arm and carry them. Whether carried separately by hand or in coops, the hens should be handled gently and not excited.

A novice in handling sitting hens may find it better to keep them on nest eggs for a few days while breaking them and himself in. After one is sure of his steps it saves time to have the eggs that are to be incubated in the nests when the hens are moved to them.

Except with the quietest hens it is necessary to close the nests after the hens are put on them, and advisable to darken them. When I use a single open nest I put a wide board in front of it. For darkening nests, like that in the second illustration, we use an old grain sack. With the nests darkened, and the place quiet, the hens will nearly always settle down to business.

About Eggs For Hatching.

The eggs intended to be incubated should be kept in a dry place at a rather cool temperature, say 40 to 50 degrees.

It is not advisable to keep them longer than two weeks before being incubated, and the fresher they are when set the better chances of a good hatch and strong chicks.

It is not necessary to turn eggs while kept in this way, nor does the position of the egg, whether on the side or on an end make any difference.

Only well formed eggs with good strong shells should be set. A great deal of the breakage of eggs of which people using hens for hatching complain is of thin shelled and imperfect eggs. There is less breakage of such eggs in incubators than under hens, but it is doubtful whether there is any real gain in hatching them.

When eggs are bought outside and delivered by rail or wagon they should be rested for a day before being placed under hens. This is to allow the contents of the egg, sometimes much shaken up in transit, to regain their normal condition.

When setting such eggs it is a good plan to divide each sitting, and under each hen used place some of the boughten and some of one's own eggs. This gives a better opportunity to determine whether a poor hatch is due to poor eggs or to some cause for which the party from whom they were purchased is not in any way responsible.

Number of Eggs to a Hen.—This must depend on the season and on the size of the hen. The usual number for an average sized hen in the spring is thirteen. The same hen set in winter should not be given more than eleven. After the middle of May she would generally take care of fifteen average eggs.

If one is in any doubt as to how many eggs he ought to give a hen he should err on the safe side and give a number he is sure is not too large, for when too many eggs are given a hen every egg in the lot is likely to be somewhat chilled at some period of incubation.

Food For Sitting Hens.

Nothing could be simpler and easier than the feeding of sitting hens. All they need is whole corn and water. Though I have tried other rations the hens have never seemed to me either to keep in as good condition or to hatch as well as when fed on corn alone. The condition of the hen is not at this time normal. She needs food that will generate in her body heat to be transmitted to her eggs, and whole corn seems to be the perfect food for the sitting hen. She can eat a crop full in a few minutes. Being inactive, she digests it slowly, can get along on one meal a day, and I have had a good many hens that would leave the nest to feed only every other day, yet keep in good condition and make good hatches.

Care of Sitting Hens.

Assuming that the hens when set were confined to the nests, and they should be unless it is certain that they will not leave them, (some hens are so quiet that there is practically no doubt that they can be set anywhere, and from the first be trusted to come off to feed and go right back of their own accord), they should have an opportunity to leave the nest within twenty-four hours after being set, and if they do not come off of their own accord should be taken off, for if they do not leave the nest and void their excrement now, they are almost certain to foul the nests before the corresponding time on the following day, and during the first days of incubation the change of conditions and food often produce a disturbance of the bowels, and for awhile some hens will be loose and unable to retain the excrement as long as they will later. Hence, even if a hen is not hungry, and eats little or nothing, it is important to have her off the nest daily at first.

Hens that are handled without any trouble may be let off the nests at any time convenient for the attendant. With hens that are inclined to be shy, the easiest way to break them to return promptly to the nest in a strange place is to let them off just long enough before dark to give them time to feed. They will often return to the nest quietly at this time, when if let off early in the day they would make a great fuss, and if handled roughly give the business up altogether. At dusk hens that do not go back of their own accord are more easily caught, and settle down quietly when returned to the nest.

Having returned to her nest once of her own accord, a hen may, as a rule, be allowed to leave it at any time convenient for the attendant, and unless there is something wrong with the hen or the nest, will generally go back within fifteen or twenty minutes, which is about as long as it is safe to have the eggs uncovered in cold or very cool weather. On bright warm days hens may remain off the nest half an hour to an hour without the eggs being any the worse for it. Indeed, the general rule is that the colder blooded hens stick closest to the nests, while the hot blooded ones give so much heat to their eggs that the nest gets uncomfortably warm, and they leave it for their own comfort, and instinct seems to prompt them to let their eggs cool longer than the cold blooded hen does.

When Many Sitters are in the Same Room it might cause trouble to release them all at once, especially if they came from different flocks. There are several ways of keeping things working smoothly.

If the hens were all set at the same time, and all, or any considerable part of them, are so shy that it is advisable to let them off late in the day, the attendant can watch them while off, and interfere if they go to fighting. If he does not wish to watch them daily he can, within a few days, arrange to let them off at different times in pairs or small squads, leaving the more troublesome ones to the last.

If, as is the case on most small plants, the hens set in a pen are set a few at a time, they are broken to return to the nest in the order in which they are set, and when new hens are set the others can be released at intervals earlier in the day.

On a larger scale of operations, if several rooms or pens are required for sitters, they can be prepared at the same time, a few hens set in each, then a few more, and so on until filled. This admits of gradually breaking in a large number of sitters to the desired routine without having to watch them when off the nests. Thus it is possible to establish a routine of releasing sitters which will enable one to do all the work of caring for them as he goes about his other work, yet take so little time for it that he never feels it as a burden — in fact, hardly notices it.

The routine just described will apply when up to twenty or twenty-five hens are sitting in the same place, but with larger numbers together, as there often are when nests are several tiers high, it becomes necessary to let many hens off at the same time, watch them to some extent while off, and return them to the nests after a sufficient time off has been given them.

Importance of Confining Hens to Nests.

I have always had better hatches, on the whole, when I kept nests closed except when the hens were off for food, etc. By doing so, one is sure that no nest is uncovered too long, and no serious interference of hens going on without his knowledge. Making this the rule insures against the most common causes of spoiled eggs. It is one of the little things that it pays to do, and the rule should be broken only in emergencies.

Keeping Sitting Hens' Quarters Clean.

General Cleanliness.—The dung of the sitting hen has a peculiarly strong and offensive odor, hence the importance of removing it daily. If it is not removed promptly from a pen in which there are many hens sitting the place soon gets very dirty. When hens are set in tiers, many in a small room, some poultry keepers as they watch them remove the dung, which is voided in large lumps, at once. If they did not do this the floor would soon be filthy, though cleaned daily.

Keeping the Nests Clean.—Absolute cleanliness in the nests is a condition of good hatching. If a nest is fouled, or if eggs are broken in it, it should be cleaned, the eggs washed in lukewarm water, the soiled nest material removed and the nest made new as soon as possible. Generally it will do no great harm if a nest goes for twenty-four hours uncleaned, but it should not go longer. There is some excuse for that much delay because it is not advisable to disturb the hens to inspect the nests. The inspection of nests should be made as the hens come off to feed. If the nest is in very bad condition it should be cleaned up at once. If not very bad note should be made of it, and all nests which need cleaning cleaned as soon as the attendant can conveniently do so.

Treating Nests and Hens for Lice.

Insecticides.—Tobacco leaves and stems, as noted in a preceding paragraph, are often used to keep lice away from sitting hens. When these are not used the nest should be liberally sprinkled with a good insect powder when made. Then a few days later the hen may be lifted from the nest in the evening and well dusted with insect powder. Another dusting of the hen about the middle of the hatch, and a third just before the eggs begin to pip will generally insure chicks freedom from lice when they hatch, and make it unnecessary to treat them for lice in the nests.

The Dust Bath.—When the earth of the floor of the place where the hens are set is clean and fine and dry enough that affords them a suitable place for wallowing, and hens that make liberal use of it will keep in much better condition than those that go back to the nest quickly after eating their fill. Wallowing gives them vigorous exercise, and also keeps the feathers clean. When there is a yard accessible, and the ground dry enough, hens will by preference go out in the sun to wallow, but this is too uncertain to rely upon.

Testing the Eggs.

It is always best to test eggs as soon as they have incubated long enough to show development, and remove all infertile eggs and all showing dead germs or a general breaking up of the liquid contents of the egg. It is such eggs that are most likely to break, and when they do break make the worst mess of the nest.

Egg testers are sold by all dealers in poultry supplies. One of the most common forms is a metal chimney to go on an ordinary lamp. One side of the chimney at the point opposite the flame of the lamp, is cut out and fitted with a piece of heavy felt in which is an oval hole of such dimensions that when an egg is held before it, the light shines through the egg, and whatever developments are made inside the egg can be seen.

A home made tester may be made of a box of such size as to contain a common hand lamp. The accompanying illustration shows how such a tester may be made.

Home Made Egg Tester.

White shelled eggs may be tested at the fourth or fifth day. Dark shelled eggs can sometimes be tested at the fifth day, but when the shells are thick and strong, as well as dark, it is as well to let testing go until the seventh day.

The most pronounced indications of fertility and beginning development of the chick are a clearly defined air space at the large end of the egg, (the egg should be tested large end up), and a cloudy appearance, densest in the upper part of the egg.

An absolutely clear egg is either an infertile egg or one in which the germ did not develop far enough for its death to immediately cause decomposition to begin about it.

An infertile egg will not decompose during the period of incubation, but would be clear if allowed at the end of three weeks to remain under the hen the full period.

Heavy red lines or clots in the egg indicate dead germs. In a white egg a spider like red spot is often seen at the first test. This is the beginning of the development of the arterial system, and the egg showing it is all right.

When the air space, as seen through the tester, is not permanently defined, but the line between it and the fluids of the egg moves as the egg is turned about, the germ is dead, and the egg is decomposing.

The various conditions described above are not always unmistakably plain. Practice is required before one becomes expert in distinguishing them. In all cases where there is doubt, mark the egg and leave it for the next test, which should be made about the end of the second week. At that time the air space should show very plain, while all below it is dark.

Chilled Eggs.

If the instructions given in this lesson in regard to keeping nests closed are followed, there will be chilled eggs only in case of a hen becoming sick, or dying on the nest, or refusing to

sit. Such cases do occur, but the most common cause of chilled eggs is two hens taking the same nest, and leaving a nest uncovered. In freezing weather an hour is about the limit of time that eggs under ordinary conditions can be uncovered and still hatch. In warm weather they may be uncovered for several hours, or even all day without injury.

When the Chicks are Hatching.

After the eggs begin to pip, hens should not be disturbed more than is necessary. It is quite necessary, however, to look under the hens occasionally to see that everything is right. Some hens become very nervous at this time, move about and break the eggs. Such hens should be removed if possible and quieter hens that have eggs not far advanced exchanged for them. By shifting hens in this way when necessary, much of the loss common at this stage is saved.

It is at this time that a badly formed nest causes most trouble. If the nest is too dishing, the eggs tend to roll to the center, and crush in the shells of picked eggs, and often crush chicks as soon as out of the shell.

There are also some hens that will kill their chicks as hatched. One must watch for these, exchange them for others, and, of course, take them out of the sitters' pens as soon as their services can be dispensed with.

If, as sometimes happens, a part of the eggs in each nest hatch a day or so ahead of the others, it is a good plan to give some of the hens the chicks, and others the eggs yet to hatch. This gives much better chance of good chicks from the last eggs.

As a general rule, eggs that have not hatched by the morning of the twenty-second day, will not, even if they do hatch after that, produce chicks worth keeping.

Many people consider it an indication of exceptional vitality to have chicks come out in nineteen days, but I think most close observers will agree that the chick that takes twenty to twenty-one days to develop makes the best chick.

Helping Chicks Out of the Shell.

As a rule, it is best to let chicks get out by themselves. The chick that needs help is not often good enough to make it worth while to fuss with it.

LESSON VI.

Rearing Chicks With Hens.

BEFORE discussing the care of chicks with hens, we must consider the question of coops for hens with chicks. As we found in the last lesson that the necessary appliances for hatching chicks with hens were very few, simple, and inexpensive, and that the point of most importance was to provide quarters where the hens and nests would be as free as possible from all kinds of interference, and at the same time the place be convenient for the attendant; so in rearing chicks with hens we find that the appliances essential when conditions are ideal are simple, and that a variety of makeshifts, costing practically nothing, are used by poultrymen. As special conditions have to be considered, we have to give more attention to providing appliances to meet those conditions, yet in no case need these appliances be such that a man handy with tools could not make them for himself with little expense for material.

The primitive style of chicken coop was probably an old barrel lying on its side on the ground, with stakes driven into the ground across the open end, to confine the hen while giving the chicks liberty. A wide board closed the end of the barrel at night, or at any time it was desired to confine the chicks; this board being simply set in position and held there by a stone, brick, or block of wood. Barrels are often so used still.

An improvement on this form of quickly improvised coop was the box turned over on one side, with slats nailed across the open front. With boxes of good size, and fairly substantial construction, such an arrangement is still a good one where there are few enemies to molest the chicks, and they can have good range. The principal objection to it is that the hen is rather closely confined.

Of coops made for the purpose, the simplest is the common Δ shaped coop illustrated above. I do not recommend it except as an emergency coop. It can be quickly and easily made, and almost any old material will work into it, so if a coop is needed in a great hurry this will do.

A better form of this style coop is the Δ shaped coop with pen and movable shelter board shown in the accompanying cut.

This coop may be made either with or without floor. If to be used on heavy soil that holds the water after a rain, it should have a floor. If used on land that drains quickly, no floor is needed. Many people use and like these Δ shaped coops. It has always seemed to me that must be because they were used to them, and had not tried the other style. I might use such coops temporarily, but for a regular thing I prefer a box coop in its general makeup resembling the coop shown below with knock down pen.

Common Δ Shaped Coop.

Should be not less than 12 inches wide; 14 or 16 inches is better. Length of sides about 3 ft.

Advantage of Box Style Coops.

One advantage of this style of coop is that the entire floor space in the coop, and ground space in the pen, are available for the hen as well as for the chicks. In the Δ shaped coop the hen can stand upright only in the middle of the coop. This gives her actually much less room than she appears to have, and this close confinement in coops is one of the reasons why hens sometimes do not do well with chicks. We must give the hen a chance.

Another Δ Shaped Coop.
Sides of roof 22 x 28 inches.

by tipping first backward, then sideways toward the door, then forward, the droppings rolling out at the door. For climates where the floor gets damp, and the droppings adhesive, the top should be hinged, thus making it easy to get at the inside of the coop to clean. Besides, the angles at the floor being right angles instead of acute angles, as in the other style of coops, the corners are much easier to keep clean in case of the coop with a floor, and this box coop makes a serviceable coop for all seasons.

To go into all the details of coop construction in this lesson would be out of the question. We must have a special lesson on that subject next winter at the time when coops should be made ready for the coming season. I give here only enough about coops to give those studying these lessons a fair idea of them, and wish to impress on them as having special bearing on their success in rearing chicks with hens that the structure of the coops should combine these two features:

- (1). *Comfort of both hen and chicks.*
- (2). *Convenience of the attendant.*

Coop Shown in Last Illustration with Pen 4 ft. Long and Movable Shelter Board.

Coop Pens for Hens and Chicks.

The illustrations so far show pens which confine the hen, but give the chicks full liberty. This is the best way to handle them if it can be done.

It cannot be done, however, where enemies of chicks are so numerous that they would

destroy many of the chicks if given liberty. Poultry keepers living in towns have especially to guard against the maraudings of cats. Against these the best protection is wire covered pens. The illustration on next page shows such a pen used with a box coop of the same width.

Box Coop With Knock Down Pen.

This coop is 22 x 24 inches, outside measure on the ground, 24 inches high in front, and 16 inches in the rear. When made of these dimensions 10 inch boards cut with practically no waste. The latter pen is 4 ft. long, 2 ft. wide, 2 ft. high. Top and bottom rails are of 1 inch stuff, 2 inches wide.

Now just a word about the use of such coops to protect the small chicks. They are more expensive, and it is more trouble to handle chicks this way than in the other coops with the

This pen is a little more easily handled than that I use, which is wider, mine being 6 x 12 ft. on the ground, where this is 2 x 12 ft. I prefer the larger ones as giving the chicks more room, and not requiring to be moved so often.

chicks at liberty, but unless you are sure that losses from cats, hawks, etc., with the chicks at liberty will be very light, it pays to use safe coops. They have to be used only for a short time, and there is no use hatching chicks unless you take care of them after they are hatched.

Why Coop Hens and Chicks?

This is the question which has suggested itself to many readers. They may see the advisability of confining hens and chicks to protect the chicks while small, but do not so readily see the need of confining the hen while the chicks run at large. In a state of nature the hen runs with the chicks. Yes, but in growing chicks we have to average very much better than nature, both as to quality and quantity produced.

Hens have advantages as mothers. These we need not here consider. They also have their disadvantages. It is in guarding against losses from these that those who succeed well in growing chicks by natural methods excel. All hens are not alike in their habits with chicks. Some can be allowed full liberty; others cannot. You cannot know in advance which to trust.

Cat and Hawk Proof Coop Pens.

Dimensions of these coop pens are, — length 12 ft.; height 2 ft.; width 2 ft. They are made of lath, and covered with 1-inch mesh wire netting.

Hence you must devise a system of handling them, and impose such restraints on all that you are sure that avoidable losses are reduced to the minimum.

The faults of some hens as mothers are:—

(1). *Too great activity and restlessness, never still themselves, they wear the chicks out.*

I have seen fine broods of a dozen or more chicks reduced to two or three in less than two days, in this way, when, had the hen been restrained, not a chick need have been lost. Confine the hen, and, as a rule, she soon learns to be contented in her coop, if it is a suitable coop, and, if her wants are supplied, gives her chickens a great deal more brooding than if allowed to run with them.

(2). Weaning the chicks too soon.

Many hens would leave their chicks at two to three weeks old, if allowed to do so. Some will brood chicks while laying, but many will not, and as a well fed hen is likely to begin laying within ten to twenty days after hatching her chicks, many chicks will be forsaken while still in heed of a mother, if the hens could leave them at will.

These are the general faults against which cooping is an insurance. The other special faults will be considered briefly under the next heading.

Selecting Hens for Mothers.

A hen that makes a good sitter does not always make a good mother. Some hens that sit very quietly become very fussy with a brood of chicks, are a constant aggravation to the keeper, and frequently injure chicks. The ideal mother is the hen that has made a good hatch, and, that on removal from the nest with chicks, settles down quietly in the quarters assigned her. If she tramps about and seems to move without regard to the chicks, change for another hen if possible. If she is vicious, don't use her for another unless you have to. The hen that fights for her chicks, with or without provocation, will do in fiction, but in practice she harms more than she helps them. For the sake of the chicks as well as for the sake of the attendant, only docile hens should be used as mothers.

Taking Chicks from the Nest.

Chicks should be removed from the nest about twenty-four hours after the first chicks in it hatched. If hatching has been uneven, there may be some chicks not ready to leave the nest then. If so, they may be put under other hens, or if that is not practicable, remove to a warm place, and keep them wrapped in flannel or cotton until well dried and up on their feet.

By the time the first hatched chicks (which are generally the strongest), are a day old they want to get out from under the hen and move about a little, and may make her so restless that if the nest is open she will leave it with such chicks as can follow her, and if closed so that she cannot get out, may scratch around in it and do a good deal of damage.

Except in warm bright settled weather, it is not, as a rule, advisable to take chicks at this age direct from the nests to outdoor coops. Though they want to move about a little, and soon eat some, for the first few days warmth and quiet are of greatest importance. To secure these, have boxes with open tops protected by slats or wire netting, into which the broods can be put for a few days, and kept indoors.

The hen and chicks can be fed and watered in these, and can move about a little, but must keep quite quiet, and in case a hen is not disposed to brood her chicks the greater part of the time, she can be "persuaded" to do so by throwing a bag over the top of the box, making it dark. Chicks kept close and warm and quiet this way for a few days go to the outdoor coops strong and lively.

In bad weather they may be kept in such boxes a little longer, but never more than four or five days, or they fret at confinement and do not thrive.

Before putting chicks into the box, put a sprinkling of chaff, hay, leaves, or finely cut hay or straw into it. Use just enough to cover the bottom. Too much will often make trouble, the hen scratching in it and burying some of her chicks with it.

Marking the Chicks.

If the chicks are to be punch marked in the feet to identify them, it should be done as they are taken from the nest. For this purpose use a small size spring punch made for marking chicks, and sold by all supply houses and many poultry journals. (We advertise one in this paper).

If chicks are marked at this age, the operation gives as little pain as possible. The cut bleeds but little, sometimes not at all, and as the chicks remain under the hens most of the time for a day or two, there is less trouble with chicks, attracted by the blood on feet that bleed, picking each other to pieces.

In making the punch mark, mark well into the web, but not so far as to injure the bones of the foot.

The usual practice is to mark chicks according to the mating from which they came. Sometimes, however, each brood is given its special mark. As the accompanying cut shows, it is possible to make fifteen combinations of punch marks in the four webs.

Culling Chicks as Taken from the Nests.

A vigorous weeding out of deformed and weak chicks at this time is good insurance against trouble and loss afterwards. It pays to kill at this stage, every chick that does not seem to be just right. Some of the weaklings may outgrow their weakness if given a chance, but many more will not, and the best way is to take no chance on a chick that does not seem to be a good chick. The loss on that chick is less now than it will be at any later stage, and the common experience has been that the great majority of the deformed or weak chicks allowed to live, make a loss at some time.

Some minor troubles, like club feet and crooked beaks, do not materially affect the health of the chick, but, on general principles, and for the sake of the good looks of the flock, it is well to dispose of these also.

How Many Chicks to a Hen?

If the chicks are all of one color, the hens will take chicks hatched by other hens, but if there are chicks of several colors hatched at the same time, unless a hen hatched all colors one must be careful in giving her odd looking chicks. Some will take them; others will kill them.

With chicks all of one kind and age, then they may be divided up as desired among the hens selected for mothers.

As long as the weather is at all cool, nine or ten chicks is enough for an ordinary sized hen, and twelve or thirteen for a large one. As the season advances, more may be given, but I have found results much better in growth and quality of chicks when I never went very far beyond these figures.

I have given as high as forty chicks to a hen, and had them live and grow to be healthy. I have run eighteen to twenty chicks with medium sized hens, and had quite satisfactory results. But comparing the general results under such conditions with results when broods were smaller, I have, for years, rarely given over twelve chicks to a medium sized hen, or fifteen to a large one, and think the better results well worth what little additional work the greater number of broods makes.

Where to Place the Coops.

There is not always opportunity for choice in this matter. With many there is just one spot available for coops, and the question becomes how best to handle chicks in this place. But when there are different situations available, that should be selected which best combines the two points we have already emphasized once in this lesson, i. e., the comfort of the hens and chicks, and the convenience of the attendant.

The best place for chicken coops, and for young chickens, is in an orchard which furnishes abundance of sun and shade. If an orchard near the dwelling can be used for chicks, this is quite the ideal place; and, of course, if on a small place, the few coops of chicks can be placed under the few fruit trees the place may have, we have the same conditions on a small scale.

Another good place is near a hedge, where the coops of the hens may be shaded at least a part of the day, while the chicks can run in the shade of the hedge, or out into the open fields at will. The conditions for the chicks may be just as good as in an orchard, but the coops have to be extended in lines, and cannot be as compactly placed as in an orchard where they may be in parallel rows, and the attendant can look after them without going over so much ground.

Method of Punch
Marking Chicks.

When the hens are confined while the chicks go at will, the coops may be placed two or three rods apart each way, and the coops shifted as often as necessary to prevent the grass being ruined under them.

When the chicks are confined while small to wire covered coops, these may be placed as close together as desired, or as the lay of the land admits, and moved the length of a coop to new ground in a block; or, if one prefers, he can place his coops separately, and shift them independently. A little study to locate coops at first with reference to the shiftings necessary, will often save some inconvenience later.

What To Do Where There is No Natural Shade.

Both shade and sun the chicks must have, and if there is no natural shade, shades must be made to cover either the whole or a part of the top of a coop. With such shade provided, the coops may be put right out in the open where they get the full strength of the sun, and will do well, though I think never on the whole as well as with natural shade, and the moist earth under it.

Transferring Hens and Chicks to the Coops.

Always, if possible, move the hens and chicks to the coops when the weather is bright and warm. Avoid moving hens with small chicks to new coops late in the afternoon. If you cannot get them out in time to give them several hours in the sun before they have to settle down for the night, better let them wait until next morning. Older chicks are easier to move after dark, but if the small ones are moved about, then one must be very careful or the hens trample some of them before they settle down.

Let them get wonted to their new quarters before bedtime. Then, as a rule, if she has not done so several times during the day, the hen will go into the coop of her own accord, and make her nest in one corner, (the coop should have a good big handful of chaff or cut hay or straw thrown in for this purpose), and the chicks will follow her.

If, as sometimes happens, the hen insists on staying out in one corner of the pen at night, try to drive her gently into the coop. If she will not go in and stay, wait until it is almost dark, catch her and put her in the coop, closing the door so that she cannot get out, but the chickens can get in. In view of possible cases like this it is well to have coops so constructed that you can get at the hens easily when they stay out. I have to confess that mine have not always been so built, and, in consequence, I have sometimes had to fool away more time than I should with such cases. After being compelled to go to the coop for the night once or twice the hen seldom gives further trouble on that score.

Feeding the Young Chickens.

The feeding of young chickens need not differ much from the feeding of adult fowls. The young chick needs food oftener, and needs it in form appropriate to its size, but except for these two particulars the systems and methods of feeding can be the same for both small chicks and fowls,—*provided the method of feeding the fowls is good*. If the method of feeding the fowls is bad, the effects on the young chicks will be very much worse than on the fowls, and their digestive systems are easily ruined.

In this we have the explanation of the fact that so many people do really find it necessary to use a ration for their chicks different from that given their fowls, and when they do the general tendency is to go much further than necessary in fussing with foods for the chicks. In this, too, we have an explanation for the fact that the dry feed system began to be applied extensively with young chicks some time before much attention was given it in connection with the feeding of old fowls, and while I personally do not use the dry feed system for young chicks I can easily see that a great many get better results by it than by their application of a mash system.

What was said in Lesson I. of poultry foods and feeding systems for winter egg production applies generally to foods and feeding systems for young chicks, with the difference as indicated above, and with the additional difference that disadvantages in either system need to be more carefully watched with chicks than with fowls.

Common Errors in Feeding Chicks.

There is nothing mysterious, complicated or difficult about the proper feeding of young chicks, and yet most beginners have a great deal of trouble with them. So before discussing a few of the good methods of feeding let us have a statement of some of the more common errors in feeding.

1. *When soft food is used, often too much of it is used. Too many meals of soft food are given, and not enough hard grain.*

People either do not know or do not appreciate the fact that the chick unlike the young of mammals and of pigeons, has digestive organs that will take just the same kind of food the adult fowls take.

The old fashioned way of feeding chicks was to give them corn meal dough or merely wetted corn meal three, four, or five times a day. Some chicks lived and grew on this feeding because they had good range and exercise, and plenty of vegetable food and insects, but they did not then and do not now make the growth on such feeding that they do when fed a more appropriate ration.

2. *Too concentrated foods are used, especially meals—corn meal and oat meal, and hard boiled eggs.*

Corn meal may be used alone, if baked in a johnnycake, with good results; but raw or only partly cooked corn meal alone is too likely to be hard to digest.

Oat meal and various oat preparations if fed heavily have much the same effects as corn meal. One of the surprising things about opinions of feeding chickens is the persistence with which some authorities cling to the idea that oats are an ideal and very complete food, and oat meal the most desirable article for feeding young chicks; when the fact is that chicks do not like it, and the sentiment in favor of it is traditional, and not based on modern experience at all.

Oat meal and corn meal mixed together, and with bran, make a good food for chicks. The proportion of the meals to bran may be slightly greater for chicks than for fowls, because the growing chick can more readily utilize an excess of nutritious matter than the matured fowl can, but the difference in this respect in rations should be slight.

Hard boiled eggs are often fed very heavily—especially if fertility of eggs is poor—and when combined, as they too often are, with a ration which without them would be too concentrated, they are likely to aggravate any digestive disorders that develop.

3. *Animal and vegetable foods are not provided as they should be.*

Many poultry keepers who are no longer amateurs are like most novices in being afraid to feed meat meals and scraps to young chickens. There certainly is greater risk in feeding them an article of poor quality, but a good grade of meat scrap or meal may be fed quite as freely as to older fowls, though of course, if used in a mash or cake that is fed several times a day to the chicks where the mash for fowls is fed but once, the percentage of meat in the mash must be reduced or the chicks are fed more meat proportionately than old fowls.

In supplying green food to chicks the great majority of novices give it very irregularly, and rarely in sufficient quantity.

The three points stated and explained above cover, I believe, the most serious errors in the feeding of chicks. When these are avoided the other faults in feeding may not show conspicuously poor results.

Methods of Feeding.

Of these we will consider a few which may be taken as typical:

1. Mash and grain feeds alternated.
2. Baked cake and grain feeds alternated.
3. Combination of 1 and 2.
4. All dry feed—small cracked and broken grains.
5. Dry mash and dry grain.

These are all simple systems calling for the use of only such foods as are used for the old stock, or may be bought in bulk at about the same prices. The use of foods which require entirely different bill of fare and mode of preparation for young chicks will not

be considered here. Readers using such foods, and desiring to continue their use rather than any of the methods here described, may ask such questions as they wish about them, and these will be answered; but to consider the multitudes of "fussy" methods at length is out of the question.

Ration I. Mash and Grain Feeds Alternated.

I speak of the mash and grain as "alternated" for want of a word which in a word will convey the idea. They are not regularly alternated all the time, but as far as convenient and advisable the soft and hard feeds alternate.

Morning. First Feed.—Mash as recommended for hens in Ration I., Lesson I.

Middle of Morning.—Millet or a "chick feed" mixture.

Noon.—Wheat.

Middle of Afternoon.—Mash.

Evening.—Cracked corn.

If the chicks have grass run they get their own green food; if confined where they have no grass green food must be provided. As will be noticed, the only thing this ration calls for in addition to what is provided for the old fowls is the chick feed mixture. Such a mixture I would recommend generally in preference to ordinary millet because it gives greater variety, and is on the whole, more economical. Indeed often the cost per 100 lbs. is no greater.

Ration II. Baked Cake and Grain Feeds Alternated.

In this ration we simply substitute a baked "johnnycake" for the mash in Ration I. This cake may be made entirely of corn meal or of a mixture of corn meal with other ground stuffs. This ration is to be preferred to Ration I. where only a few chicks are to be fed, as a large cake may be baked which will last several days, giving the soft food always ready, and making it unnecessary to mix a mash daily or oftener. When so many chicks are kept that the baking of cake for them becomes burdensome, the mash is preferable.

Ration III. Mash. Baked Cake and Grains Alternated.

This ration may be used if it is preferred not to have mash about after the morning feed, or if it is more convenient to mix only enough mash for that feed.

A Few Recipes for Johnnycake.

Add a little soda to sour milk; stir in corn meal or corn chop, to make a stiff batter — the stiffer the better. A few infertile eggs added improve the cake. Bake until well cooked through. Make cake thick to reduce proportion of crust.

Take one pint corn meal, one teacup bran, one teaspoonful meat meal, one raw egg, one teaspoon soda, one teacup cold water; bake two hours.

Take three quarts corn meal, one quart wheat middlings, one cup meat meal; mix with water or skimmed milk to which has been added four tablespoons vinegar, two teaspoons soda.

Ration IV. All Dry Grain.

For this ration bought prepared mixtures are generally used.

Ration V. Dry Mash and Dry Grain.

For this again I would recommend those who use it to buy the prepared mixtures, because the chick dry mash is ground more finely than they can get it for themselves, and the mixture of grain contains a greater variety than they would give, and when they leave out mashes and johnnycakes with the variety which is secured in the use of these, and in their alternation with grain, they need greater variety in the grain.

There are scores of very good mixtures for chicks on the market, and many of them at very reasonable prices.

How Often to Feed.

In rations I., II., and III., five feedings a day are indicated. This is about right for small chicks, up to the time of weaning, when conditions are such that it is not advisable to feed more at a time than will be eaten up within a comparatively short time. For Ration IV., five feedings may be used. For Ration V., the mash may be kept before the chicks all the time, if fed in troughs or hoppers they cannot get into, and the grain feeds given as used.

Keeping Feed by Chicks all the Time.

If Ration V. is used as indicated above, one kind of feed is kept before the chicks all the time.

If chicks have good range, it is entirely practicable to put out at one time all the food for the day, a dry mash in hoppers or troughs, and the grain scattered over the ground they run over. It will be found that they feed themselves quite regularly.

Mashes and baked cakes cannot be left long before chicks without souring or drying, but under any conditions which admit of scattering the grain for the day over the chicks' range, the grain for Rations I., II., and III. may be put out in the morning when the first mash or cake is fed, and if chicks are watered then, only one more visit is needed for the day, i. e., to give the second soft food, and perhaps renew the water supply.

Sometimes it is practicable to feed all grain in hoppers, boxes, or troughs, the chicks taking sufficient exercise of their own accord, and as they forage for green food and insects.

There is, however, the danger that chicks with all grain food so easily acquired, may fail to forage enough, hence, if one adopts this method, he should continue or reject it according as he finds it works well or otherwise with any particular lot of chicks.

How Much to Feed.

Chicks that have opportunity and disposition to exercise may, as a rule, safely be fed all they will eat. Keeping food before them of course means that they can get all they will eat at any time.

The danger in feeding more than is eaten at the time is not so much due to chicks overeating of sound sweet food, as to their eating the food left over, after it has become sour or fouled.

In feeding mash and cake, one must learn by experience how much to feed to a brood. At first the hen and chicks will eat so little more than the hen alone that, as the hen generally gets a share of each food given the chicks, and is likely to see that their wants are supplied before satisfying her own appetite, the best rule I can give for first feeds is to feed the hen and brood just as if feeding the hen without a brood. Then as you give the hen five feeds instead of three, this means that you are allowing the brood about two-thirds of what you would give a hen. This is for a brood of a dozen or so. Now the chicks do not eat so much as this, but the hen, after her three weeks on the nest, will take all they leave for awhile. Then by the time the chicks are eating a perceptible quantity, her appetite has moderated. So, while the rule will not always apply exactly, if for the first two or three weeks you give hen and chicks at each feed one hen's allowance, you will be as near right as you can be by any general rule. After that time the chicks begin to eat so much more that you can better gauge the quantity by observation.

Remember that almost all poultrymen feeding chicks with hens throw out a great deal more food than is necessary while the chicks are small.

Feed Troughs for Chicks.

For a brood of chicks a bit of board about 5 or 6 in. wide by 10 or 12 long, with strips of lath nailed around the edges to form the sides of a very shallow box, makes a satisfactory trough for feeding mash, and is large enough for the brood as long as they stay with the hen. Many other simple styles might be described, but to do so here would take more space than is available.

A trough or box in which a supply of food is to be kept before the chicks must, of course, be deeper, and must be protected from rain.

Water for Chicks.

Chicks should have always before them a supply of good water. Many cases of "cramps" are caused by letting the chicks become very thirsty and then fill up with cold water.

For a few chicks together with a hen I prefer flower pot saucers for drinking vessels. Different sizes of these can be used for different sized chicks. There is no possibility of their drowning in them. They keep the water cooler than either tin, iron or wooden vessels, and though more dirt will be kicked into them than into a drinking fountain they are more easily cleaned.

Keeping Chicks Free From Lice.

If the hen and nest were kept free from lice, the chicks should need no treatment for several days. They may not need it then, but for an inexperienced grower it is always better to keep on the safe side and prevent lice getting established, for when they become numerous they do a great deal of damage in a very short time. Dust them with an insecticide within two or three days after taking from the nest, then at intervals of a week until they are three weeks old. After that they should not need treatment for lice.

I have always used Dalmatian insect powder for young chicks. There may be some of the other insect powders not composed largely of Dalmatian that are as effective, but many of them will not kill head lice on young chickens, while fresh Dalmatian has never failed to do this for me.

Apply it with a powder gun, such as can be bought at any drug store for 15 to 25 cents, according to size. Here the advantage of a convenient coop is apparent. With a box coop with hinged top, one may go in the evening, raise the top, take the hen in one hand, puff a few puffs of powder over the chicks as they sit in one corner of the coop; then holding the hen by the feet, head down, with one hand, work the powder gun with the other, puffing the powder well into the feathers, especially around the vent and under the wings.

Observe that the powder is very pungent, (it will make you sneeze) and a few puffs of it are enough. It will not injure the chicks if used moderately. I never knew of its injuring them anyway, but some claim it has in some cases.

LESSON VII.

The Care of Chicks From Weaning to Maturity.

IT IS often said that the first three weeks in the chick's life are the critical period; that if the chick lives through that period it is likely to grow to maturity.

There is some truth in this view, but it is not all true. It is not true to the extent that the poultryman is warranted in relaxing his efforts to produce chicks each of which shall make the best development of which it is capable. Indeed, I am inclined, after a good many years listening to complaints about chicks that do not thrive, and with a vivid recollection of some faults I have seen in my own work with poultry, to consider the period just after weaning the most critical period in the life of a chick reared by the natural method. Let me give a single illustration.

While the hen remains, or is kept, with the chicks, she relieves the owner of responsibility in regard to supplying them with heat. After the chicks are weaned the attendant must make sure that they do not suffer for lack of heat. They may not need supplied heat at all, but if they do they must have it, and whether they get it or not depends generally upon the judgment of the attendant, and his attention to his business.

Age for Weaning Chicks

The age at which chicks should be weaned depends upon the weather and upon their condition, especially the condition of the plumage.

Left to herself, the average hen would wean her chicks at six to eight weeks of age. This may be all right for chicks coming to such age in this latitude after the middle of June, but earlier than that chicks left to themselves are very likely to get chilled, and it is safest to see that they have some heat supplied until one feels sure they do not need it. Prior to May 1st, chicks, unless in a very warm house or coop, may need more warmth than they themselves furnish, up to ten or twelve weeks of age. After that they should, if well developed and feathered for their age, get along very well with the same kind of accommodations the old fowls have.

Coops for Weaned and Growing Chicks.

The accompanying cuts show two somewhat similar styles of coops for growing chicks. (I would just say, by the way, that it has become quite the custom to apply the term "growing chicks" to the chicks after weaning, perhaps because the rate of growth of thrifty chicks, from weaning to maturity, being very clearly noticed, while earlier growth seems slower).

The first coop shown is one that may be used very early in the season, and which is so constructed as to make the chicks secure when the coop is closed. This coop may be built with or without board floor.

Secure Coop for Growing Chicks.

The second style is more common, and, when there is nothing to molest the chicks at night, is preferable, because more airy in warm weather. It must be remembered in using coops like these that the cubic air space in the coop is very much less in proportion to floor and roosting space than in a house for adult fowls; hence the necessity of making ample provision for fresh air.

A Common Style of Roosting Coop for Chicks.

Many other styles of coops suitable for chicks might be given, but this general plan seems to be that which gives most general satisfaction. Wherever it is safe to use a coop without a floor, coops should be built that way. Then they can be shifted easily to new locations, and no cleaning of floors is needed.

The dimensions for such coops as these should be 6 to 8 ft. long, about 3 ft. wide, 2 to 2½ ft. high in the rear, and 3 to 3½ ft. high in front.

Capacity of Roosting Coop.—The capacity of coops approximating the dimensions given above, is about thirty well grown chicks, and this is about as many as it is advisable to put into them, for though a much larger number of chicks just weaned could be kept in such a coop, it is much better to put into the coop at first not many more than the coop will conveniently accommodate when the chicks are well grown. Then one need not fear the effects of overcrowding by the chicks outgrowing their quarters.

Other Arrangements for Growing Chicks.

The coops illustrated above furnish substantial neat coops exactly adapted to this special purpose, but many other arrangements are possible. All the chicks really need is *shelter*, and during summer weather it need not be very complete shelter. One of the nicest lots of chickens I ever had were kept at night, from June until late in October, in a makeshift, temporary coop, the back of which was a strip of the board walk we used over the gravel walk in winter. This was 16 ft. long and 2 ft. wide, and made the coop two feet high at the back. The ends of the coop were two sides of a dry goods box, 2 ft. square. The open front of the coop was 2 ft. high the length of the coop. A board 10 in. wide at the top of the front kept the rain from driving in, and to this and to the edge of the back were nailed short pieces of old goods boxes, making a roof through which rain might drip, but would not drive. This coop remained in one spot in an orchard where the ground sloped just enough to let all droppings work out of the coop, leaving the floor always clean.

I give this as an extreme illustration of the useful makeshifts for the purpose our present lesson considers. We do not want such arrangements for permanent use, but for an emergency, and especially when it is necessary to get chicks out of a crowded and badly ventilated coop or house, such quickly improvised coops are a good thing. Give the chicks room if you can do no more to provide it than to make a rude shelter of boards.

Letting Chicks Roost in Trees.

On the score of general health there is no objection whatever to letting chicks roost in trees. The objectionable features of it are that the chicks acquire too much readiness to fly, that they are not easy to get at, if one has occasion to catch them, and that their habits have to be radically changed in the fall when they must go into the houses.

Teaching Chicks to Roost.

Many chicks of the light and medium weight varieties begin to roost of their own accord about the weaning age. If, when they are first put into roosting coops, one or two hens are left with each bunch, the hens may soon teach the chickens to roost. The chicks may sit on the floor for awhile, but, as a rule, if a few begin to roost, the rest, one by one, follow their natural instinct, and before long the entire lot will be roosting. If they do not begin roosting as they should, even with a few old birds for guides, put a wide board in place of a roost, about ten inches from the ground, and extending back to the wall, and go after dark and put chicks up on this. Generally after a few lessons they will go up of their own accord. Then

the board may be moved out from the wall, so that chicks crowding to the wall will drop off, and when the chicks learn not to huddle to the wall, take out the board and put in its place an ordinary roost.

Chicks of the heavy breeds ought not to roost as early as the others. Many of them will not roost until about full grown, and chicks from Brahma or Cochin stock that have been kept without roosts for generations are sometimes very hard to teach to roost. I have had some that I gave up, and let have their way.

If chicks will roost it is better that they should, for on the roost they are not crowding and sweating, nor are they fouling themselves in their own droppings. The one thing to avoid when chicks roost young is crooked breast bones, and with roosts three to four inches wide no more of these occur than would probably develop regardless of roosting conditions.

Yard Room and Range for Growing Chicks.

To grow good chicks without extraordinary attention it is necessary that they should have plenty of room outdoors. I would make the minimum of yard room about the same as for adult fowls when yards are to be kept in grass, and would double this if possible. The more room you can give your growing chicks the less care you will have to give them, and the less risk you run in raising them. When chicks are kept in small yards, the yards late in the season become very foul, and they will not thrive on foul ground as they will on clean fresh ground—especially a nice grassy lot.

By giving due attention to all their wants, seeing that their quarters are kept quite clean, and providing exercise and sufficient supplies of animal food and green food with the grain ration, good chicks may be grown in very limited quarters, but I doubt whether, when time and expense are considered, there is any profit in growing stock that way except for market. Crowding tends to shorten the period of development, and to make chicks sexually mature before they are full developed physically. That is one of the reasons why market chicks, if thrifty, make a plumper, better filled out, as well as a softer meated, carcass than chicks given more liberty. The chick given good range develops a better frame which subsequently fills out fully, but for quick development for market condition confinement is preferable. So poultrymen are accustomed at about the weaning age to separate the chicks destined for market from those reserved for stock purposes, and handle the two lots differently.

Feeding the Growing Chicks.

The methods of feeding chicks after weaning are, or should be, a continuance, with some modifications, of the method followed previous to that time. A radical change of methods of feeding at this period is most unwise, and unless the feeding of the small chicks is much the same as that of old stock, the feeder should begin weeks before weaning, and change gradually from the baby chick ration to that which is to be used this season. The growth of a thrifty chick at this period is notable from week to week, and the amount of food consumed increases very fast.

The chicks have now attained such size that they are no longer easy prey to cats, crows, small hawks, and other enemies which hunt by day, and so may be given more liberty, and kept further from the dwelling with less risk of loss. Under such conditions, with good range and sun and shade, the feeding proposition becomes so simple that if the chick has reached this stage with good sound digestive organs, it is quite impossible to go wrong with it. The general conditions correct any errors in feeding, and it will make practically very little difference what method is used—provided the chicks get enough to eat. It is, further, almost impossible to overfeed chicks under such conditions, and the thing to avoid is not overfeeding on account of danger to the chicks, but overfeeding with consequent loss of food before the chicks eat it.

Still, in giving food, one can put it out much more freely than if the chicks were confined to a small area, because if the grain is broadcasted they do not foul it as they do food in coops or small yards; and if fed in hoppers, or even in open troughs, they do not linger around these as they would if they had no opportunity to forage, and so the place is cleaner.

If the yards, while giving a fair allowance of room, are still so small that it is thought best to feed several times a day, the feedings may be reduced to three or four, and these timed to suit the convenience of the keeper.

My usual method of feeding chicks, from weaning until they go into winter quarters, is:

Morning.—Mash.

Morning.—(As soon after the mash is fed as I get around to it, say, within an hour). Wheat or cracked corn — wheat if price is right. Enough is thrown broadcast in the grass to give them something to look for, and still find good picking until late in the afternoon.

Afternoon.—(About 4 to 5 o'clock, as I happen to get home from the office).—A good feed of fine cracked corn. If it is early so that the chicks have time to hunt for it, and still get a good feed before 6 o'clock, I scatter the grain widely. If it is a little late I throw it down in handfuls on the shorter grass.

Evening.—(Just as the chicks are going in for the night).—All the mash they will eat. Chicks will eat a good bit of mash after having had their fill of hard grain, and also will eat quite freely of grain after having eaten all the mash they want.

To get the best possible growth the chick must be full fed daily. If it has good digestion, and can take plenty of exercise, heavy feeding will not hurt it, unless the proportion of meat scrap in the mash is too great. My observation, however, has been that very few err by giving growing chicks too much meat. The general tendency is to give them too little, and the digestive troubles which chicks develop during this period are generally due to crowding and lack of exercise and green food combined with heavy feeding.

In other words:—

Under natural conditions overfeeding is almost impossible, while,

When chicks are confined in too restricted quarters we have to be careful in feeding them, not because the feeding system is bad, but because the other conditions interfere with digestion.

Under artificial conditions we have to balance rations with a care we need not use under natural conditions.

The system of feeding given above differs from that I use for adult fowls only in that grain is given rather more freely, and a second mash is given supplementing the last feed of grain. Such feeding as this constitutes "forcing," or not, as you look at it. If chicks are given a meal of only one kind of food, and we take what they eat that way and the results obtained as our standards, then whatever induces them to eat more than by this system is forcing, and any better results thus obtained are due to such forcing.

But consider this, instead, from our own point of view. Do we not eat more when we have a variety (not too great) at a meal than when the meal is comprised of but one or two plain and perhaps not very palatable foods? As I look at it, by giving a variety we are not forcing the chick, we are simply securing the fullness of development. All the feeding and heavy feeding the chick can stand stops short of forcing. Forcing begins when the chick cannot stand the ration given it, and its digestion gives out, or it goes down on its legs, and as has been said these troubles are avoided by making conditions which admit of heavy feeding, better than by keeping conditions bad and making rations to suit faulty conditions.

Different Rations for Different Purposes.

From what has just been said about the relations between feeding and conditions the reader is prepared to understand that the simplest way to arrange for feeding for different results is to change the conditions, letting the system of feeding remain the same.

There are two kinds of results to be considered in feeding chicks after weaning.

1. *Feeding chicks for stock purposes, that is, chicks to be used when mature for layers or breeders.*

2. *Feeding chicks to be marketed at the most profitable marketable size.*

For chicks for stock purposes we have to either give conditions or make a ration which they can stand indefinitely.

For market chicks the final consequences of feeding and conditions may be disregarded—provided they are not reached before the chick is to be marketed.

Suppose now a poultryman has a lot of chicks, the pullets and a few cockerels of which he wishes to reserve for stock purposes, while the rest of the cockerels he will market as soon as possible.

He shuts the cockerels that are to be marketed in a small yard, and feeds them the same as the others, but as they take little exercise, they grow faster, put on fat more readily, and are soon in salable condition.

The chicks for stock purposes he gives more room, they take more exercise, develop larger frames and grow constitutionally stronger, while the others, though putting on weight more quickly, are growing constitutionally weaker. In the long run the chicks that are given the best conditions will make the better development, but for quick returns and profits from meat the other way is better, the chicks being disposed of before they break down under the forcing process.

Making the difference in conditions, and consequently in the method of feeding, will be found the most economical way of special feeding for special results. There is no need of special foods for different purposes.

Separating Chicks.

Perhaps it would be more appropriate to say, "assorting the chicks." Some authorities put great stress on the separation of the sexes early in life; but separation according to age and size, and the separation of the thrifty from the unthrifty are of greater importance. The separation of the sexes of thrifty chicks of the same age and size need not be made at all when they are to be handled the same way, except when the cockerels begin to annoy the pullets. This time will vary with different breeds, so we have a general rule, but a special application of it in each case. Leghorn males are very precocious. In Asiatics it is not at all uncommon for the pullets to begin to lay before the cockerels of the same age would offer them any attentions. Between these extremes we have cockerels of different breeds arriving at the age when it is advisable to separate them from the females at varying periods, and the only point necessary to observe is to remove a male that annoys the females in advance of their inclination.

Overcrowding.

Too much emphasis cannot be placed on the importance of preventing the overcrowding of growing chicks. With an ordinary sized brood with a hen there is practically no possibility of overcrowding while the chicks are small, but after the chicks are weaned they grow so rapidly that a coop that was adequate when they were eight weeks old, may be entirely too small when they are twelve. A great many poultrymen leave their chicks, after weaning, in the small coops in which they were kept with the hen. This practice sometimes works all right, but is uncertain, depending much on the disposition of the chicks in each lot. If, when they find the coop too small and close, they sit on the ground outside, or on the coop itself, no overcrowding will occur, but if they all push into the coop and pile up there, one warm night will spoil many weeks of good growth.

There is special need of guarding against overcrowding when chicks are kept in coops or houses that are closed at night. Many coops or houses are so constructed that it is not possible to get such circulation of air into them on sultry nights as there should be to give the chicks what fresh air they need.

Fresh air they must have. They can no more thrive without it than without food. It is because so many poultrymen fail to provide ventilation suitable to warm weather conditions that so many lots of chicks that start well in the spring are spoiled in the summer. The number so injured, and the total loss in consequence, are very much greater every year than anyone who has not looked into the matter would believe.

Chicks can be kept (roost) in quite small coops provided there is free circulation of air, but if the chicks are to be confined where air does not circulate freely the number that will do well in a place is hardly greater than the number of adult fowls that would be considered right in that place.

Keep the Chicks Growing.

A well known poultry writer is accustomed to assert that the secret of success in winter egg production is to keep the chicks growing from the shell to maturity. That may not be all there is of it. Looking over the subject we can see other essentials not included in his view, but it certainly is of great importance to have the chicks develop steadily without check or setback.

To insure this there must be constant attention to the wants of the chick. Now I do not

mean by this that the attendant must be forever doing something for them. On the contrary I think chicks will stand a great deal of judicious letting alone. But the attendant must see that the chicks want nothing, lack for nothing essential to their comfort and development.

They need alternate shade and sunshine. They need good water, and all they want of it. It should be before them all the time. There should always be food available for every chick to get all it will eat, and while a great variety is not necessary there should be sufficient variety to give the necessary proportions of grain, vegetable and meat foods. If these are supplied freely the chick balances the ration for itself. Too often the meat and vegetable foods are supplied spasmodically. This is especially the case when chicks are kept in close quarters and dependent upon the attendant for everything they get. While growing they need good feeding even more than after maturity. A hen of good constitution may go underfed for quite a long time and not suffer permanent harm, but a chick that is underfed fails to grow, and practical poultrymen agree that chicks of this kind are made up of subsequent good care and feeding so rarely that practically such injuries are irreparable.

Late Hatched Chicks.

For many years the idea prevailed that chicks hatched late in the season could not make the development of the earlier chicks, and that late chicks were as a rule not profitable. Gradually this notion has broken down as poultrymen find that given breeding stock in as good condition, given the same care the early chicks had, and above all, given fresh ground to start on, and not ground contaminated by the early chicks, late chicks will thrive as well as early ones, and will have made as good growth at corresponding ages.

The first difficulty is to get the stock in good condition late in the breeding season, and it is quite hard to do this with hens except such as have had a rest during the spring.

LESSON VIII.

Points to be Considered in Poultry House Construction.

AS I THOUGHT over the matters to be taken up in this lesson, and tried to determine the most suitable title for it, it seemed to me at first that it would be most aptly described as a discussion of principles of poultry house construction. But when I began to inquire which of the propositions I might produce in this connection I could call "principles," I concluded that that was a word which might as well be omitted, for there are very few of the customs and methods of building, or styles and plans of houses for poultry, that are so universally accepted that one is warranted in designating them as principles, or laws. Those upon which agreement is most general still lack very much of being even common rules.

Occasionally we find a certain kind or type of poultry house prevailing in a certain territory, or used by many because highly recommended by someone whose opinion is regarded as authoritative, but, taking poultry houses as they come, the more one sees of them the more "the wonder grows" that so great variety of plans should be devised for buildings for the simple purpose of affording shelter for fowls. It should be said, though, that the greater number of these houses, and especially the "freak" buildings, were not designed by people who had had experience in handling fowls. This is a matter the reader would do well to keep in mind when examining poultry houses, and listening to the opinions their owners express of them; and if an odd plan or feature attracts their attention, it is well for them to ascertain whether it was designed before the owner began to keep poultry, or after some experience with various styles of poultry houses.

Why the Housing Problem Sometimes Becomes Difficult.

It is almost impossible to make a single poultry house for a small flock that will not, with reasonable use, give fair to good satisfaction.

When, however, the owner of such a satisfactory small house makes it the unit in a system of houses for a large flock of poultry, he very often gets buildings that are far from satisfactory—an inconvenient feature that seemed trifling in the single house becomes intolerable when multiplied by ten, twenty, or perhaps fifty, while features of construction or design which were unobjectionable in the single small house, work altogether differently when applied on a larger scale.

To illustrate: A one pen house may be 16 or 20 feet wide, and with windows in the ends, and three-fourths of the outside wall surface touched by the sun at some time of the day be dry and comfortable, and sunny. But make one such pen the unit in a house containing, say, ten pens, and in eight of these pens the only sunlight received comes through the windows in one side, and it is impossible to get the sunlight to the back part of a pen 16 feet wide without making the building high in front, thus adding to the cost without increasing the capacity.

Another point to consider in this connection is this:—In housing poultry we have too often a problem corresponding not to the housing of human families in roomy, detached dwellings, or of a few domestic animals in ample barns or sheds, but to the housing of population in flats and tenements, or to the provision for the health and comfort of human beings congregated in large numbers as in schools, churches and public gatherings.

The ventilation of a dwelling house is a comparatively easy matter. Under ordinary circumstances no attention need be given it but such as any sensible person will give almost instinctively. But to maintain a supply of pure air and still keep up the temperature in a school room where forty or fifty pupils are kept for several consecutive hours, or in a church where 500 to 1,000 people are together for an hour or two, requires more general knowledge of the principles of heating and ventilation, and also special knowledge of their application to the existing conditions; and it is for want of such knowledge in those in charge of such places that bad air in an underventilated or drafts in an overventilated room make public places more productive of colds than private dwellings.

In the poultry house, as a rule, we find much the same conditions. Nearly every poultry keeper either builds the smallest house possible for the number of fowls he intends to keep, or having a building or buildings of certain dimensions stocks them to their fullest stated capacity—and sometimes away beyond. And if in anything different, the conditions are harder in the poultry house, for the children in school are there for two relatively short periods; the people at a public gathering are together in the same enclosure for only a short time, while the fowls are often confined to the same restricted quarters day and night for months. To state the point in its simplest form, the artificial methods of managing fowls often make housing an intricate problem, when with more natural methods it would be a very simple one.

It is for each poultry keeper to determine for himself what kind of problem in housing he must work out, and after presenting in this lesson general information on poultry houses, materials and construction, we will, in several consecutive lessons, describe houses adapted to a variety of conditions ranging from the simplest to somewhat complex, but stopping quite a long way from the limit in that direction.

Methods of Housing Laying and Breeding Stock.

In systems of housing adult fowls, we have at one extreme the colony plan, which, in its simplest form, consists in placing small houses for flocks of a few dozen fowls far enough apart to obviate the use of fences, and give the flocks free range with very little mingling of fowls from different flocks; and, at the other extreme, a connected series of houses, each containing many pens which connect each with the adjoining pens, or all open on covered walks running the entire length of each house. In what we call the extreme type in this house arrangement, the various accessory buildings of the plant are located in such manner, and so connected with the poultry houses, as to make it possible to do all the work under cover.

The number of possible plans and arrangements between these two extremes is unlimited. To enumerate fully the common and familiar house plans would make quite a formidable looking list. We will discuss here only a few of the most popular, the most useful, and the most interesting plans and arrangements. Some of the latter class call for notice not because of the merit of the plans, but because their features seem to appeal very strongly to novices in poultry culture.

We classify the houses we are to discuss, then, as follows:

1. As to Position of Pens or Compartments.

(a). SINGLE PEN HOUSES.

Usually these are small houses, the ordinary one pen poultry house having a floor area of about 100 sq. ft., but sometimes they are large enough for flocks of 100 or more, with floor area of 500 to 1,000 sq. ft.

(b). TWO (OR MORE) PEN HOUSES WITH CONNECTING PENS.

This is the most common arrangement where a few small flocks are to be kept in the same building.

(c). TWO (OR MORE) PEN HOUSES WITH WALKS EXTENDING THE LENGTH OF THE HOUSE, AND ACCESS TO EACH PEN SEPARATELY FROM THE WALK.

This is the most common arrangement where more than a few small flocks are kept in the same building.

Position of the Walk.

In a house facing south with one row of pens, it is customary to put the walk along the back or north side, but occasionally the walk is put in front. This latter arrangement seems to me to have little to recommend it, and in many hundreds of houses that I have inspected, I have seen not more than two or three with walk in front.

In a house with two rows of pens, the walk must be in the middle. Such a house may face south. In that case, the south pens in front of the walk should have low roof pitched to the south, the north

Semi-Monitor Top Roof.

pens a high roof pitched to the north, as shown in the accompanying cut. Or the pens may face east and west, the length of the building running north and south, and the walk in the middle the entire length of the building.

I don't think the walk in the middle is ever found very satisfactory, except in comparatively short houses. The east and west front does not work well where winters are severe, but where winters are mild and summers oppressively warm, its faults are not serious in winter, while, as a summer house, it is superior.

2. As to Construction of House With Reference to Methods of Handling Fowls.

(a). ORDINARY CLOSED HOUSES.

That is, houses with doors and windows arranged with reference only to ingress and egress, and to light.

(b). OPEN FRONT SCRATCHING SHED HOUSES.

In this type of house each house, or each section in a series of pens, consists of two compartments, a closed roosting room, and, connecting with it, a scratching shed with open front.

(c). SCRATCHING ROOM HOUSES.

This type of house is intermediate between the other two, and is by all odds the best type devised to date. It differs from the ordinary closed house in having doors and windows designed to give it when open all the advantages of the open front scratching shed, while when closed in bad weather they make it a close house and more suitable to such conditions than the open front shed. It has the additional advantage of giving greater capacity than the double compartment scratching shed plan. In that plan poultrymen found in practice that the capacity of a section was no greater than the capacity of the scratching shed, in which the hens passed most of their time. The most common dimensions in such houses have been 10 x 18 ft. sections divided into roosting room 8 x 10 ft., and scratching shed 10 x 10 ft. By removing the partition and throwing the two compartments into one the capacity became the capacity of the floor of the entire section.

Why "Scratching" Shed and Room?—Most readers whose interest in poultry culture dates not more than a few years back will have some curiosity to know how the term "scratching" has come to be given so much emphasis in connection with housing systems. The object of the open front scratching shed was to make a special place for fowls to take air and exercise

together, the floor being littered with hay, straw, or some such material into which the grain was thrown and the fowls obliged to scratch for it. The practice is so general now that many will be surprised to learn that so recently as ten years ago there were probably several poultrymen making no provision for exercise to every one who did make such provision. In the ordinary closed house the floor is often littered to furnish exercise, though there is not the same provision for fresh air as in the so-called scratching room house.

3. Styles of Roofs.

In describing these we will consider only roof plans for which there is a practical reason. In these we may have:—

(a). *The Single Pitch Shed Roof Sloping North.*

With this style of roof we may have either a moderately high (for a poultry house) front (or south) wall, and a low rear wall, or if we wish the wall at the back of ordinary height, the front wall must be quite high. Houses are sometimes built the latter way, but it is not an economical plan, and has, on the whole, no special advantage.

(b). *The Single Pitch Shed Roof Sloping South.*

This plan is more popular for brooder houses than for houses for laying stock, though one may find a good many houses for adult stock built with such roofs.

(c). *The Double Pitch Roof With Equal Sides Pitching North and South.*

This is probably more generally used than all other styles of roofs combined.

Monitor Top Roof Poultry House.

(d). *The Double Pitch Roof With Equal Sides Pitching East and West.*

This plan of course is out of the question on long houses running east and west, but it could be used to good advantage much oftener than it is on small houses, as will appear in some of the house plans to be given in following lessons.

(e). *The Double Pitch Roof With One Long and One Short Pitch.*

This is often used on low houses with walk at one side, the short pitch being over the walk.

(f). *The Monitor Top Roof.*

(g). *The Semi-Monitor Top Roof.*

The last two styles should be considered only when peculiar conditions make it necessary to build houses of such styles.

Height of Walls.—The poultry house should be high enough to allow a man of average height to work comfortably in it at any work that has to be done there. The relative height of opposite walls will depend on the roof plan, or vice versa.

It is a mistake to try to economize in material, or to make houses warmer by making them too low for convenience of those doing the work in them.

4. Quality of Construction.

Many poultry houses are built much better than is necessary, either because the builder thinks that the more substantial building will be easier to operate, or because he wants the building done once for all. It is better to begin with the least expensive buildings that will

answer the purpose. Then there is no capital unnecessarily tied up in buildings, and if — as is very likely to be the case — the poultryman with added experience thinks it advisable to build differently, he can do so, altering or replacing a cheap building, when he could not change or do away with an expensive one.

A low cost building need not be unsightly. If neatly built, painted, and the surroundings orderly and well kept, it may present a much better appearance than a better building not so well cared for.

Keeping what has been said in mind, and noting that the expensive house is built because the poultryman wants it, not because the fowls need it, we note these classes of construction:

- (a). SINGLE BOARDS, WITH OR WITHOUT BATTENS.
- (b). SINGLE BOARDS COVERED WITH ONE OR TWO THICKNESSES BUILDING PAPER OR ROOFING.
- (c). SINGLE BOARDS COVERED WITH PAPER AND SHINGLED, OR COVERED WITH LAPPED SIDING OR MATCHED LUMBER, MAKING A SOLID DOUBLE WALL.
- (d). DOUBLE BOARDS WITH DEAD AIR SPACE BETWEEN, THE OUTER WALL COVERED WITH PAPER, PREPARED ROOFING, OR SHINGLES.

Of these constructions, b. and c. are the most common. The framework for such buildings is very light — only what is necessary to hold it together.

Poultry houses may also be built of almost any material used for other buildings, except such material as the corrugated iron often used for cheap warehouses. I would not say positively that that form of construction could not be made satisfactory, but the few attempts to use it I have seen have not given good results.

Poultry houses are also often built of discarded material of various kinds, not ordinarily used for building purposes. Very serviceable buildings are made of old railroad ties laid or set on end close together, and the interstices chinked with clay or mortar, as in the log houses of earlier days.

In sections where stone is abundant the rear wall, (especially if the house is set into a bank), is often, and sometimes the end walls also, built of stone, and the whole building may be of stone or brick if desired; but unless it can be built without cash outlay for labor this is too expensive where economy has to be considered.

5. Capacity and Dimensions.

One of the first points to be considered is the capacity of a house of certain dimensions, or the dimensions required to give a desired capacity.

Floor Space per Fowl.—The common rule is five or six square feet of floor space per fowl. This is for ordinary sized flocks of one dozen to, say, three or four dozen. For a smaller number of fowls more floor space per fowl should be given, for a larger flock the space per fowl may be somewhat reduced, for while it is customary to estimate poultry house capacity according to average square feet of floor space per fowl, that way is misleading if the average for flocks of ordinary numbers is made the basis of a general rule.

Each fowl in a flock has the use, in house and yard room, of all the house or yard area not actually occupied by its companions. That is, the fowl practically has the use of the entire house and yard, and while with a flock of ten hens in a house containing 60 sq. ft. floor space, the average for each hen is 6 sq. ft., each hen really has the use of 60 sq. ft. of floor, and has much more room than a single hen in a house, giving her 20 or 30 sq. ft. floor space all to herself.

Cubic Space per Fowl.—This need not be numerically reckoned. In a house with floor space right for the number of fowls to be kept in it, and with height right for the workman, there will be air space enough if ventilation is properly done.

Proportions of Floor.—For the maximum of floor space at the minimum cost, a building should be square. To make a building of many pens square, or even approximately so, is obviously out of the question, and as buildings for poultry are usually constructed with side walls about 6 ft. high, if of equal height, and averaging about 6 ft., if the walls are of unequal height, the depth, from south to north, of a house facing south, and having windows only in the south side, cannot be more than twelve or thirteen feet, and have the sun reach every part of the floor at some time of day. A wider house must be higher, or the parts not reached by the sun will be often damp and musty.

Now if we establish the depth of a house, or the width of each pen, at 12 ft., and make the pen square, we get too short a frontage for each pen, when the length of the pen is to be the same as the width of the yard connecting with it, as it must be generally in a long house containing many pens. So to suit the yards better, as well as to get the largest capacity in each compartment that we can, we make the pens in a long house slightly oblong, and in length, 14, 16, or possibly 18 ft., but not more than 18 ft. in a house 12 ft. wide, because the longer a pen is made in proportion to its width, the narrower it becomes in proportion to its capacity, and a flock of fowls is disturbed a great deal more by an attendant moving about in a long narrow pen or yard than in a nearly square one, where the distance they can keep from the attendant is always about the same.

Planning buildings and small yards with reference to this simple point, will save the poultry keeper a great deal of future annoyance in his work with his fowls.

Width of House With a Walk.—For a poultry house with pens 12 ft. wide, 3 or 4 ft. should be added to the width, if it is to have a walk. If a walk is used at all it is a good plan to add 4 ft., which gives a walk about 3 ft. 6 in. wide, this clear without taking anything from the pens. A 3 ft. walk is rather narrow.

6. About Foundations and Floors.

The common, cheaply constructed poultry house, if placed on a well drained spot, needs no foundation or underpinning. The sills may rest on the earth, leveled to receive them, while the floor is of earth filled in to the level of the top of the sills. The sills rot out in time, but in the judgment of some of our best poultrymen, it is much cheaper to replace them than to try to keep them from rotting, while the opinion that a poultry house must have the floor elevated enough to keep it always very dry is gradually dying out.

If one wants to build foundations of stone or brick, or to set buildings on cedar posts and fill the floor to the depth of a foot or more with stone, that is his privilege, but it is expensive and is rarely really necessary when a house is placed on a suitable site. If the site is defective, that of course is another matter.

For floors there is nothing so good as earth renewed once or twice a year, and there are few places where fowls are kept that it is not possible to get fresh earth as needed. The labor of renewing the floors is more than paid for by the advantage of the earth floor, and, for one who has a garden, by the complete saving of the manure dropped in the house and the thorough composting of manure, earth and litter. In situations not the best for poultry, a floor may be necessary, and may be of wood, cement, or brick.

7. Building Materials.

Mention has been made incidentally of—I think—all the common building materials. The low cost poultry house in any section is, as a rule, constructed of wood, and of the cheapest lumber obtainable in that section.

If it is to be of a single thickness of boards, some attention should be given to selection of lumber, and the boards for the walls surfaced on one side; but this need not add materially to the cost, for by a little care an ordinary lot of boards will answer, the best being selected for the sides, while inferior boards are worked into the roof or inside partitions.

For a building to be covered with shingles or building paper, the cheapest and roughest of lumber will answer.

Shingles.—In buying shingles it generally pays to buy good quality because they go further, and the labor of putting them on is less than for inferior grades made up largely of narrow shingles, and containing many that have to be rejected, and when laid they remain in good condition very much longer.

Prepared "Roofings."—Within the last few years very much better grades of this class of goods have been put on the market, and where a few years ago I would have unhesitatingly affirmed that shingles were in the long run the best and most economical covering for a moderate cost poultry house, what I have seen of such materials as Ruberoid and Paroid roofings makes me think it wise not to be too positive. I am not prepared to say how these goods will wear with shingles, nor can I give here the comparative cost, but will go into the matter in detail in connection with one of the house plans to be given.

Putting Money in Poultry Buildings.

In concluding this lesson I want to urge it on every prospective builder with all the emphasis possible, that the best policy is to put into poultry buildings only what money is absolutely necessary. The general tendency of beginners is toward comparative extravagance in buildings and too great economy in stock, while very few provide for the reserve of working capital which they need.

In many cases the money unnecessarily put into buildings, or put into buildings before they were needed, would have given the poultryman the working capital he needed for expenses while bringing his plant up to a profit paying basis.

Remember that if you fail your fine house is as near as anything can be to a dead loss, while if you succeed you can replace your cheap buildings by better ones designed as, with your successful experience you know you want them.

LESSON IX.

Two Plain Cheap Poultry Houses of Simple Construction.

IN THIS lesson I will describe and explain the construction of two poultry houses I have been using — the single house for three, the other for four years. I take up these plans first for two reasons: A good many readers of these lessons are asking what kind of house I prefer; the construction is about as simple as it is possible to make it, and the cost about as low as it can be made in a house built of new material without patching.

In some places short cheap boards (box boards) may be obtained, and with them houses may be built at less cost per fowl than in these houses, but the boards are very often of such quality that a house built of them needs to be covered with something else to make it look well, to say nothing of making it tight—if that is considered necessary.

A House for a Dozen Fowls.

A House for a Dozen Fowls.

The accompanying illustration shows a small house that I built in the fall of 1902. I had two broods of chicks hatched the last of June that had run together all summer, making their night quarters in an old dry goods box, and having the run of about an acre of mowing land. When they outgrew the dry goods box, all other accommodations were full, and I was very busy and had little time to plan or build. The house was designed almost impromptu, and built in the spare time of a few days. I did not try to keep account of time, but think it was about a day's work, as I did the work piecemeal and alone. Originally I had no thought of making it a model, or building others like it. In fact, intended to use it only for the chicks for which it was built until I had room for them elsewhere, and afterwards to use it as an extra house for any purpose for which a building of its size would be convenient, as for sitting hens, fattening cockerels, breaking up broodies, for a small breeding pen, to store leaves in, for any such use, or—if not needed—let it stand idle. It seemed so very satisfactory in use, however, that I afterward built one other like it—except in one particular in which the change does not appear to be an advantage—and from experience with these two houses I would—for my own use—make this the model for small colonies of fowls.

Dimensions and Materials.

This house is 8 ft. square on the ground; 4 ft. high at the sides; 7 ft. high in the middle.

It has only a part of a frame of dimension stuff. No upright studs or posts are used except at the door, and these are not absolutely necessary. It is built with 2 x 6 in. stuff for sills, 2 x 3 in. stuff for plates, rafters, and other frame parts; is covered with common hemlock boards surfaced on one side, is battened on the back and half way forward on each side, and the roof is shingled over a close covering of boards.

The material for this house cost me \$12 (approximately). I was buying other lumber at the same time, and used out of the general supply, and it is quite likely that in cutting up for this house, and other purposes at the same time, I used some odds and ends, and made the actual cost slightly less than I have figured it in the list of materials given below. In many places the lumber could be bought much cheaper than in the immediate vicinity of Boston. Lumber (except shingles) for this house cost me about 10% more than for the next house to be described in this lesson, which was built the year before. Shingles cost 20% more.

List of Materials and Prices When House Was Built.

2 pieces hemlock, 2 x 6 x 16,	32 sq. ft.	
4 pieces hemlock, 2 x 3 x 16,	32 sq. ft.	
3 pieces hemlock, 2 x 3 x 10,	15 sq. ft.	
	79 sq. ft. @ \$20 per M.,	\$1 58
250 sq. ft. hemlock boards @ \$20 per M.,		5 00
4-5 M. 2d clear shingles @ \$3 per M.,		2 40
Battens,		1 00
Sash		60
Nails, hinges, hooks, etc.,		1 00
Total,		\$11 58

That \$11.58 is about as near as I can estimate it now, and is close enough. We will call the cost of the house, for material, in round figures \$12. The cost of building should not exceed \$3, giving us the total cost of the house \$15, not the cheapest possible house, but a neat looking serviceable building at a relatively very low cost.

How to Build the House.

The two pieces of 2 x 6 x 16 are for the sills. I have given the ground dimensions of the house as 8 ft. sq. As a matter of fact the house is 8 ft. by 6 ft. 4 in. on the ground. That is the measurement from outside to outside of sills.

It happens this way: When we cut each 16 ft. piece in two, giving us the four pieces for the sills, and put them together, nailing the side sills, which we call *b b* to the end sills, *a a*, we have our sill frame 4 in. longer one way than the other. To get the same dimensions both ways we would have to cut the pair of sill pieces to which the other pair is nailed 4 inches shorter. The difference is comparatively insignificant, but in building poultry houses, coops, nests, etc., I have always tried to follow the principle of taking advantage of little points like this whenever the lumber allowed. There is a slight gain in room, and also a slight increase in cost. The gain in room may not, in every case, be proportionate to the increase in cost, but in general I think the rule will be found a good one.

The sill frame should be nailed together with large spikes, the pieces being set on edge, not laid flat. Nail each corner with one nail first, then square up the frame, using a steel square at the corners and bracing pieces in position with temporary brace across each corner as indicated by the dotted piece.

If your lumber is not perfectly straight and true you may find it difficult to get the frame square. In that case measure 6 ft. from any corner along one side, then take a 10 foot straight pole, or strip of furring, and measure from this point to a point 8 ft. from the same corner on the adjoining side. To have your angle a true right angle, the point 6 ft. from the angle on one side must be just 10 ft. from the point 8 ft. from the corner on the adjoining side, your 10 ft. measure forming the hypotenuse of a right angle triangle.

Have your sill frame approximately square, (a very slight variation due to crooked lumber is not material) then nail the corners firmly and the braces fast.

Now put the sill frame in just the position it is to occupy, level it up and block it solidly in position. If it is on uneven ground, and to put the whole floor above the level of the highest point would make too much filling, dig out the higher side and part way across the ends as much as seems advisable, making the resting place for the sills level, then block up on the lower side.

We are ready now to begin on one side. First nail to the sills the two end boards *c c*, 4 ft. long, letting them project 1 in. beyond the corner to come flush with the face of the end boards *d d* when they are put on. For these as well as for the corner boards on the ends of the house select good, clear strong boards. Be sure your boards *c c* are perpendicular to the sill to which they are nailed, and then put short braces *n n* to hold them perpendicular to the end sills.

Now put the plate *p* in position, the upper side of the plate being about half an inch above the end of the boards *c c*, to allow the first board of the roof to project over the side, and nail the upper ends of the boards *c c* to it. The piece *o* may also be put on now, its exact position to be determined by the height of the window. In my house this piece was about 6 ft. long, only its use in connection with the window being considered, but when I came to put in the roost I found that the use of a short piece was a mistake. Make the piece *o* the length of the side of the house; your sash will then rest, and slide on it, and the ends of the roosts can also rest on *o*.

Nail on the board which comes next the window about the middle of the side, taking care to have the plate *p* and the stringer *o* in correct position. The tendency will be for both to sag a little in the middle. Use the level and keep them true. The distance from this board to the board at the front corner is the width of the window opening, and should be an inch and a half less than the width of sash. Put the other side up the same way.

Now the building is ready for the rafters, of which but three pair are required, one at each end and one half way between. To cut these nail a short strip of board *x x* at right angles to a longer strip of board *y y*, as at *D* in the illustration. Make a line through the middle of the short board *x x* to a point 3 ft. from the edge of *y y*. This gives the position of the apex of the roof. Now from the point where the line *x x* meets the edge of the board *y y* measure in each direction one half the length of the end of the house. In my house this is 4 ft. 2 in. In a house just 8 ft. square it would be 4 ft.

Now take a piece of 2 x 3 and lay it on your pattern so that one end and edge come at *x*, and the same edge crosses the board *y y* at *g*; and with a straight edge mark the lines *x x* and *y y* on the rafter. Saw on these lines and you have a correct pattern if your measurements are

Details of Construction of House for a Dozen Fowls.

A—sill plan, with position of corner boards indicated at c c c c, d d d d. E—construction of a corner. B—side. C—front. D—method of cutting pattern for rafters.

correct, and you saw straight. You may if you prefer make a pattern of inch or lighter stuff. In either case having made the pattern from the upper x to one y, try it to the other one and make sure that you are right before you cut all your rafters.

If the builder of such a small house has an assistant when putting up the rafters it is easy. If he is working alone it is a good plan to nail the rafters together at the apex, and put a short brace across them near the apex, while on the ground, then put the pair in position together and nail the lower ends to the plates.

The stringer m m indicated by the dotted lines in C may now be put in position. Next put in the studs j j which make the door frame sides and the cross piece i at the top. Cut the ends of j j to fit sill and rafters, and let the face of the studs come flush with the face of sill and rafters. In my house the studs are each 1 ft. from the center of the end, and the door is 5 ft. 7 in. high.

The "frame" of the building is now complete.

Before nailing the rest of the boards on the sides, put the lowest board on each side of the roof, letting them project 2 in. beyond the boards c c c on the sides, and the ends come flush with the faces of the boards d d on the ends. If you do this you put the boards on the sides snug up against the roof projection, and there is no fitting to be done as there might be if the side boards were all put on first. If you neglected to have the ends of the side boards lower than the upper edge of the plate, you will find that they prevent the first roof board from going into the position you want it in, flat on the rafters and projecting 2 in. beyond the side.

It makes no difference whether the rest of the roof is put on before the sides and ends or after. Leave joints about half an inch wide between the boards on both sides (and ends) and roof if you wish. If the boards happen to be of such width that wider joints will suit better, they may be as much as an inch wide on the front, or wherever they are to be

covered with battens, but where there are no battens on the sides, (principally the short boards below the window), put the boards closer together to prevent snow drifting in. Too wide joints on east and west sides may admit a good deal of snow.

On the front let the boards next the door come only to the middle of the edge of the stud on either side, and those above the door only to the middle of the cross piece. Before beginning to shingle the roof nail strips of batten on the ends as a finish, as shown in the illustration, and make the edge of the shingles project half an inch beyond these, and the first course of shingles project two inches beyond the lower board of the roof on the side. Lay shingles five inches to the weather. If you have never done any shingling it will be worth your while to take a lesson in the art from a practical carpenter. Observe how he "breaks joints," so that one joint shall not correspond with the nearest above or below it. Observe also that he does not lay the shingles close, but allows a little space for them to swell when wet. If shingles are laid too close they swell and bulge up when wet.

The back of the house is battened, and the sides are battened half way forward, thus covering the joints to a point a little forward of the roost. Before battening the sides, nail a strip of batten, corresponding with the strip under the shingles on the ends, snug up against the under side of the roof projection.

To finish the window, make the boards below it project an inch above the stringer o, and nail a short piece of furring to the plate p above the window, opening and projecting an inch below the plate. Now if your sash is a close fit, a lath tacked to o, and another to p, to hold the sash in place, make all the finish necessary, and the window slides easily back and forth. If the sash is rather loose between the stringers, use an inch piece for an upper stop.

To make the door take boards of the required length, having an aggregate width of one inch more than the distance between j j, thus allowing a lap of half an inch all around, and nail two cross pieces, two inches shorter than the width of the door at top and bottom, making the top one about six inches from top of door; the bottom one eight or nine inches from bottom. On so narrow a door no diagonal brace is needed. I have generally screwed cross pieces on, but on this door they are nailed with 6d. wire nails clinched, and after nearly three years exposure the door is good.

A Good Cheap House for a Stock of 75 Fowls.

This house I describe here, not as I am now using it, but as I first built it; because I think it likely that a great many readers will be more interested in a house to fit the conditions I then had to consider than in one adapted to my present needs. After giving description of the house as originally built, I will mention changes made in it on removal to present location.

The house was built late in the fall of 1901, on a leased place from which I moved two years later. The fact that I would probably want to move it within a few years, and perhaps move it some distance, had to be considered in some points of construction.

The diagram is for a house 12 ft. wide and 40 ft. long. At the east end of the house 12 ft. square is two stories high, the upper story being used for pigeons. The one story part, the dimensions of which are 12 x 28 ft., is divided into two pens, each 12 x 14 ft. The first floor of the two story part is divided in the middle from front to back, and the east half again divided in the middle at right angles with the first partition, giving on the ground floor of the two story part a pen 6 x 12, a smaller pen 6 x 6, and an entry and tool room 6 x 6.

The one story part of the house is 6 ft. 2 in. high from the lower edge of the sill to the top of the plate. The extra two inches is taken because the lumber would allow it. The posts being cut from 12 ft. stuff, and the plates being spiked on top of the posts, had the sides been just 6 ft., the posts would have been cut 5 ft. 10 in. This is what would have been done had it been necessary to make the boards outside completely cover the sill, but as there was no need that they should, I used the posts full 6 ft. long.

The two story part of the house is 12 ft. 2 in. from lower edge of sill to top of plate, with the lower edge of the upper floor joists 6 ft. 6 in. from top of sill.

At B in the diagram is shown the outline of the framing for the rear wall; at C for the front; at D for the west end of the one story part, and at E for the east end of the two story part.

The sills are 2 x 6 in. stuff set on edge and resting upon the ground. As the land lay, the east end of the space the house would cover was about a foot lower than the west end. The sills at the west end were let down into the ground about 4 in., those at the east end blocked up. Afterwards the floor inside was filled to the level of the top of the sills, and the ground outside graded as required.

The posts are of 3 x 4 in. stuff. I would have preferred 4 x 4 in., but the local lumber dealer did not have them, so I took carefully selected pieces of what he had. The 3 x 4s are all right

J. H. Robinson's Cheap Poultry House for 75 Fowls, as Used the First Winter.

for the one story part, but for the two story part they would be too light if any considerable weight were to go on the upper floor. There is one of these 3 x 4 posts at each corner of the two story part, one at each west corner of the one story part, and one midway of each side of the low part. The plates and intermediate scantlings are of 2 x 3 in. stuff. My method of joining posts and sills at corners is shown at I in the cut. At II is shown in detail the joints on a side of a corner post of the one story part of the house, and G the joints on an end corner.

In the frame of the back of the low house the intermediate stringer divides the space between the top of the sill and the bottom of the plate, making each space 2 ft. 8 in. wide.

In the back wall frame of the high part the top stringer is so placed that the ends of the floor joists will rest upon it, and the lower stringer divides the space between the upper one and the sill, making each space 3 ft. wide.

In the framing of the front of the low part the upright studs, with the exceptions of the posts mentioned, are of 2 x 3 in. stuff, one being placed in the middle of each pen, and the others at such distance from it as required by the width of the doors, which here is 3 ft.

Pieces of 2 x 3 at top and bottom of window complete this frame. The sash I used were second hand, bought at 60 cts. per pair.

The front of the higher part has one stringer to correspond with the upper one in the rear wall, and another one parallel to it 30 in. from the lower edge of the plate, thus making the proper space for the upper windows to slide between the plate and this stringer. Pieces of 2 x 8 studding are erected at the sides of the window in the middle of the 6 x 12 ft. pen, which

Plan of J. H. Robinson's Cheap Poultry House.

See foot note on opposite page.*

West Pen of J. H. Robinson's Cheap Poultry House—Double Doors Closed.

window is a full sized window with sash to move up and down. Then there are horizontal pieces of the same dimensions at the bottom of the window, and from midway of either side of the window to the corner posts.

On the west end of the low part the stringer is 3 ft. 10 in. from the top of the sill.

On the east end of the high part the space from the sill to the lower edge of the first horizontal scantling is 4 ft. 6 in., and the space between this and the next scantling the same. The short scantling above the window is simply nailed to the boards on either side, and not connected with other frame work.

The west end of the higher part corresponds with the east end above the upper floor, but not below, the partition between the 6 x 12 pen and that next it being like that shown at F.

The rafters are of 2 x 3 in. stuff, and are placed 3 ft. apart, except that between the pair of rafters at the east end of the low roof, and the pair next to them, the space is 4 ft. This was because the furring used was in 12 ft. lengths, and as I intended to lay the shingles on strips of furring, and wanted to select the best of the furring for this purpose, I figured that there would be a little less waste of material by using all 12 ft. furring, and spacing the rafters to suit. When I came to use the furring I found a good many split and weak ends which had to be discarded, so that if I were doing it over again, I think I would buy all 14 ft. furring, and space the rafters evenly. There would be some waste in cutting the battens to cover the joints between the boards, but what short pieces could not be utilized on short joints or in piecing out on the long joints, would come in handy for something else. There is almost always a place found ultimately for such bits of lumber.

The sides of the building are boarded up and down and battened with strips of furring. The

*A, ground plan of house. D D, outside doors. d d, inside doors. w w, windows. r r, roosts. s, stair. B, outline of frame work of rear wall. C, outline of frame of front wall; the dotted lines indicate the position of the windows. D, outline of frame of west end. E, outline of frame of east end. F, an inside partition between pens. G, framing of west end at corner post. H, framing of back at corner post. I, framing of posts and sills at corner. J, method of roof construction at peak, explained in the text.

boards are of hemlock, surfaced on one side. The furring is surfaced on one side, rough on one side and edges, and the rough side is turned in, so that, as the reader will see, the covering of the joint is not wind tight. It should be added that no battens are put over the joints on the front of the low part, as with the number of hens kept in here it is not desirable that the house should, at any time, be as close as it would be with the doors shut if all joints were battened.

The roof is of shingles laid $5\frac{1}{2}$ in. to the weather on strips of $2\frac{1}{2}$ in. furring laid 3 in. apart, except that the first courses on each side are on 6 in. boards, which project beyond the sides about two inches. This makes a roof that is light and cheap, yet amply strong. The roof was put up with the idea that if it was ever necessary to move the building it could be easily taken down and set up again. With this in view, instead of directly joining the two rafters of each pair at the peak or ridge of the roof, or using — as is sometimes done — a 5 or 6 in. board as a ridge pole, I used two strips of furring, nailing the upper one firmly to the ends of the rafters of one side, and the lower one to the rafters of the other side, making practically a split ridge pole, as shown at J, in the cut.

As I framed the building unaided, this part of the work had to be done on the ground. The frame of the roof was put together on the ground in four 12-ft. sections, the rafters in each section being held together by the first strip of furring at the lower end, and the half of the ridge board attached to that section, and by two strips of furring crossed on the under side of the rafters. Each such section was put up with supports from the ground to the upper part until the lower parts of two opposite sections had been tacked to the plates. Then the supports were knocked out, and the upper parts fitted together, after which the ends of the rafters at the plates were securely nailed. All the nailing needed at the joining of the sections at the peak is what is required to prevent the light frame springing or slipping before all the strips of furring are on and nailed fast. Only one ten penny nail through each upper end of a rafter to the opposite rafter was used. The shingles used were "2d clear," costing \$2.50 per thousand.

West Pen of J. H. Robinson's Cheap Poultry House—Double Doors Open.

There is a little waste in shingles of this grade, but the quantity to be discarded was less than I expected, and of the five thousand bought I had almost half a thousand left.

The doors the floor of the upper story, and the partition through the middle of the lower story of the two story part are of matched spruce. The object of having this partition of matched stuff was to keep the dust from the pens off things kept in this part. The floor is laid on joists of 2 x 6 inch stuff, placed 2 ft. 6 in. apart from center to center. For the stairway two pieces of 2 x 9, 10 ft. long were used for stringers. Then nine steps, each having 8 in. rise and 8 in. tread.

The inside partitions are boarded up for 28 inches from the ground. Above that is wire netting.

The roosts are of 2 x 3 inch stuff, wide side up, placed 20 inches from the ground, the roost next the wall being 18-inches from it, and the space between the two roosts 16 inches. The roosts extend the full length of each pen, thus giving in the large pens a little less than one foot of roost room to each fowl. There are no droppings boards.

The construction of the outer doors is easily seen in the illustration of the house; the only fastenings on the doors in the front are hooks which, when the doors are closed, go into screw eyes in the stud in the middle of each wide doorway. The inside doors are fitted with springs. For nests empty boxes of suitable size set on the floor are used. Some of these will be shown in illustrations in connection with a future article on fixings.

The list of materials in this house, and cost of same, is given in tabulated form herewith.

The list as given does not include the fitting up of the second story room for pigeons, or the cages for them outside, though some few odds and ends of stuff left over have been worked in for that purpose. With what additional material is used to fit up the pigeons, the material in the completed building will come to just about \$70 — will not vary more than a few cents from this either way.

As I did all the work myself at odd times, I cannot give a very accurate idea of the probable cost of the labor if one hired the construction of such a building. It seems to me, though, that two good rough carpenters would do it in about three days.

For the benefit of those who simply want the lower part, or a repetition of it in sections, I give here list of materials and cost for building 12 x 28, with two pens and partition in the middle. The two sections of this house, with a capacity of sixty hens, would cost the man who built it himself \$33.10. That is \$1.18 per running foot. Perhaps a better comparison of the cost as with some other styles of house could be made on the basis of the cubic capacity of the house and its cost per foot, which in this house is 1½ cts. With cubic air space as cheap as that there does not seem to be any good excuse for not giving the hens air, and the attendant head room.

List and Price* of Materials.

6 pieces 3 x 4 x 12	72 sq. ft.	
4 pieces 2 x 6 x 14	56 sq. ft.	
9 pieces 2 x 6 x 12	108 sq. ft.	
25 pieces 2 x 3 x 14	175 sq. ft.	
14 pieces 2 x 3 x 12	84 sq. ft.	
	525 sq. ft. @ \$20 per M.,	\$10 50
1,000 sq. ft. hemlock boards,		17 00
500 sq. ft. furring @ \$18 per M.,		9 00
5 M. 2d clear shingles @ \$2.50,		12 50
6 12-light windows (9 x 15) @ 60c. each,		3 60
400 sq. ft. matched spruce flooring,		8 80
Nails and screws,		3 00
5 pr. 6 in. hinges @ 10c.; 5 pr. 4 in. hinges @ 8c.,		90
Springs, hooks, hasp, and staple,		60
Wire netting,		50
		<hr/> \$66 40

*When house was built, 1901.

Materials for Two 12 x 14 ft. Sections.

3 pieces 3 x 4 x 12	36 sq. ft.	
4 pieces 2 x 6 x 14	56 sq. ft.	
2 pieces 2 x 6 x 12	24 sq. ft.	
8 pieces 2 x 3 x 12	48 sq. ft.	
19 pieces 2 x 3 x 14	133 sq. ft.	
	<hr/>	
	297 sq ft.,	\$5 94
500 sq. ft. hemlock boards,		8 50
72 sq. ft. matched spruce boards,		1 58
300 sq. ft. furring,		5 40
2 windows,		1 20
3½ M. shingles,		8 13
Nails and screws,		1 50
Hinges, hooks, etc.,		60
Wire netting,		25
		<hr/>
		\$33 10

Changes That Have Been Made or Might be Made in This House.

If I were going to build today a two pen house of the capacity of this one, I would change the construction in only two points.

The roof would be sheathed close as on the small house first described, instead of shingled on furring. The reason for this is that while the skeleton roof is strong enough it does not give a smooth, clean, easily whitewashed surface as when sheathed with wide boards laid close together. The advantage of having a good "ceiling" I think much more than compensates for the slight additional cost of the roof.

The other point I would alter would be that in each end I would put a window, either a full size window in the middle of the end, or a half window near the front, that point to be determined by the light as affected by surrounding conditions. When I moved the house I enlarged the windows in front, but find that it would have been more satisfactory to put windows in the ends, and intend to change them before next winter.

When the house was moved the larger two pen part was set up separately, and the pigeon house detached and made a one story house. I think that for either poultry or pigeons it is better to have everything on the ground floor if possible, but in case one is crowded for ground room it is sometimes advisable to use two story buildings.

Another change made in this building after moving it was to put doors in the north side to allow passage for both fowls and attendant to yards north of the building used in summer. This change made it necessary to shorten the roosts about three feet, and board up beside the door to a point a little forward of the outer roost. In winter when the fowls are in yards south of the house the doors in the north side are nailed up.

The Question of Cold Houses.

It would be out of the question to enter here into such discussion of the relative merits of "warm" and "cold," closed and open poultry houses, which consideration of the plans I have given suggests. Those who have files of the paper will find a great deal said both for and against the idea of using such a "shed" as this or anything at all approaching it in structure. I will only say here that while it is not yet demonstrated that this is the better way of housing fowls, and will give better results than close, warm houses, results obtained in these houses and the condition of the stock kept in them begin to make it necessary that one who argues against them should argue from practical experience with them—and also from sensible treatment of stock in them.

LESSON X.

Five Good Small Poultry Houses.

IN THE last lesson I gave plans and descriptions of two houses that suit me for my way of keeping fowls and doing the work for them. In this paper I give plans for five small houses, furnished by as many different readers of *FARM-POULTRY*, in response to an offer made to bring out good ideas of poultry house construction. These five I selected from a large number, as combining good plans and good statements for low cost poultry houses.

Let me refer in this connection to a criticism a reader of the paper occasionally makes about my advocacy of low cost poultry houses. Most poultrymen want houses to cost as little as possible, and still be as good as necessary. It is on the point of how good it is necessary for a building for fowls to be that their opinions differ. A good many people do not believe that fowls can be comfortable, contented, and productive in such houses as I use.— and will not believe it until they try it. Others think that while these houses may suit my breed, they would not suit theirs — and probably they will not believe until they have gradually learned that the requirements of a breed are not absolute, but that the stock can be adapted—hardened in this case — to the conditions made for it, and that when once “acclimated” to the cold house, fowls may do as well or better in it than in warm houses.

However, houses warmer and tighter than those described in the last lesson can be built at very little more cost. Where lumber is cheap they may be built at less than mine cost. We may have cheap warm houses as well as cheap cold ones, but always, and for all poultrymen, I am an advocate of cheap low cost poultry houses, and this for two good reasons:—

- (1). Because every dollar unnecessarily tied up in buildings is a handicap on the profitable operation of the plant.
- (2). Because costly expensive buildings always seem to me inappropriate for live stock.

If a man wants to build expensive poultry houses, I feel that it is better he should look elsewhere for the expensive features at least. The plain, simple plans I give will, of course, work just as well if worked out in more expensive material, and if that is all that is wanted, an architect's or builder's services are more useful at that stage than those of a poultryman — provided always the builder or architect does not make some change to suit his ideas of what is correct from his point of view, but wrong from a poultryman's. That is the point to guard against when professional builders begin to improve the plans of poultrymen.

So because the great majority of readers of these lessons want to build economically, as well as because I have myself no interest in costly hen houses, I will introduce into these lessons no plans of poultry houses having features which poultrymen generally would agree were superfluous, or calling for expenditure which would be commonly considered extravagant.

In presenting the following plans I will give the descriptions as furnished with the plans, except where it is as well to condense; and where there seems to be occasion for comment on a plan or statement, will make such comment immediately after.

A New Jersey Farmer's House for Twenty-five Fowls.

Grant Davis, Whitehouse, N. J.

Of plans of hen houses there are no end. Many are good, but many more fail as to the two main points of a good poultry house: *First, dryness*; and *second, a plain, smooth interior surface*. I have tried various kinds, but have settled upon the following plan, which, I think, meets the requirements of a first class house, at the same time being plain and economical.

I build for poultry on the farm, and make the houses 12 ft. by 18 ft. or 21 ft., for accommodating forty to fifty hens. For twenty-five hens the house may be built in identically the same way, and smaller in proportion. As estimates of costs are wanted, I will make my figures on a building 9 ft. by 12 ft. In height it is 6 ft. at the back and 8 ft. in front, with a roof of one slope. Pillars are set in the ground for a foundation and to receive sills 4 x 5 in. in size. The enclosure is of novelty siding or ship lap, and is boarded horizontally. The studding are 2 inches square, and placed 18 inches apart. The roof is sheathed with second class lumber, and covered with roofing paper or ruberoid.

To have a hen house that is always dry it is necessary to have double walls with an air space between. With a single enclosure moisture will sometimes be condensed upon the walls, and at times will make the house damp in spite of anything that can be done. A damp house, whether it comes from a leaky roof, condensed air moisture, or capillary water from a ground floor, will soon take the profits out of the winter egg business. A double enclosure also gives greater warmth, as the dead air space, being a non-conductor of heat, serves to prevent its escape at night. The added cost of this kind of building, as ordinarily made, is against it, but, as here constructed, the cost is not much increased.

Ground Plan of Mr. Davis' Poultry House.

D, Droppings boards. R, R, Roosts.

The building having been made as described, the inner wall is made by simply nailing on to the studding a stiff building paper, something strong that the fowls cannot pick to pieces, and that will take whitewash readily. As this generally comes 36 inches in width, and enough more to allow for lap, I have put my studding the proper distance to receive. The ceiling is also covered in the same way. Where the lap comes a liberal application of coal tar is made, so that on the whole interior surface of the house there will be no hiding place for lice or mites. The ease with which such a house can be whitewashed is a strong point in its favor.

After the interior covering is put on, a panel of 1 x 3 in. boards is nailed all around the inside about 4 ft. from the floor to hold the roosting poles and to receive the nails on which hang the movable nesting boxes. The roosting poles, two in number, will extend across the narrow way of the house, and the space beneath them is cut off from the remaining floor space by a board. Straw is kept here, and the droppings are occasionally dusted with land plaster to keep down odors, as they are not removed oftener than once or twice every month.

There are no droppings boards, no rows of nests built to the walls, in fact, nothing but what can be easily removed when the time comes for the semi-annual whitewashing.

I do not put in board floors on account of extra cost. The ground within the building is graded up eight or ten inches higher than that outside, and the surface is covered loosely with any old boards — discarded weather boarding is good — and then sand is hauled in to the depth

Front Elevation of Mr. Davis' Poultry House.

of three inches. The floor is then always dry and warm, with a wallowing place, and grit always handy.

The plan of the southern front shows the arrangement of doors and window. The door is made of good width, so that wheelbarrow or cart can pass through when cleaning the house. From 12 to 16 sq. ft. of glass is sufficient for a house of this size. Too much glass is a mistake, as it makes the room overly hot in the daytime, and too cold at night, as the heat at night quickly passes out through a

glass surface. It is well to have a shutter of boards to close at night.

It is useless to have a whole glass front in order to make summer time in the house in January. To do this, the building must be kept tight, and, with foul air, hot and humid by day, and damp and cold at night, there will soon be work for the poultry undertaker.

No scratching sheds are thought necessary for poultry houses on the farm. The interior wire door is closed, and the outer door thrown open, and the house is turned into a scratching shed. Fresh air is thereby introduced into the house, and the dust which the industrious hens stir up has a tendency to discourage lice and mites on the house walls and fixtures, as well as on the fowls themselves.

Following is an estimate of cost of house as described 9 ft. x 12 ft.:

Sills, 4 x 5,	\$1 50
Studding, 2 x 2,	2 00
12 rafters, 2 x 4,	1 50
260 ft. siding,	8 00
500 ft. roofing and interior sheathing,	5 00
Windows,	2 50
Doors, etc.,	1 00
	— \$21 50

Let the reader consider this plan in the light of the two points Mr. Davis states as of most importance — dryness, and a smooth interior surface. He considers the double wall with air space between essential to a dry house, but it is probable that his houses of this type have been dry because well ventilated, rather than because of construction. We may reasonably infer from his last paragraph that he appreciates the value of fresh air in the poultry house, and takes the necessary means to have it there.

The proposition of the relation of construction to dryness in the house may be put in this way:—

A double walled house properly ventilated will keep dry.

End Elevation of Mr. Davis' Poultry House.

A double walled house not properly ventilated will not be dry, but will collect moisture on walls and ceiling just as a single walled house would under the same conditions.

The conclusion then is unavoidable that dryness in a house depends upon ventilation rather than upon the construction of the walls.

In this connection I may appropriately refer to the occasional practice of filling or partly filling the space above the level of the eaves, in a house with double pitch roof, with hay or straw lying on a floor with wide spaces between the boards. By this means the house is kept dry without being opened, but whether the requisite amount of pure air is introduced is doubtful. I am inclined to think that it is not, except in cases where the loft overhead is open. and in such cases it is open to question whether it would not be better to leave the hay out and ventilate through the lower windows and doors.

In connection with the use of building paper to line the building arises the question of its durability, and especially of the effect upon it of repeated whitewashings, and this is a question upon which we have no authoritative information available.

The only other points in connection with this plan seeming to call for comment are in regard to the method of making the floor, and the rated capacity of the house.

I do not know where the advantage comes in in putting a loose board floor over the filled floor before covering with sand. Generally speaking, it is better to have floors so constructed that they furnish no harbor, under boards or cement, for rats and mice. While I cannot show it to be true beyond a doubt I think that it will be found by those who take notice of the matter that, broadly speaking, poultrymen who use houses set right on ground that can be dug up if necessary are much less troubled with rats and mice than those who try to build to keep them out of the houses. In other words, the more practical way of dealing with such pests, as well as with lice, seems to be to so build the houses that it is easy to get at them in their harboring places.

While rated as having capacity for 25 fowls, this house, the dimensions of which are 9 x 12, giving a floor area of 108 sq. ft., is a little small for that number.

A Maine Poultryman's Favorite Poultry House.

J. C. Pattison, Kennebunk, Me.

In describing our ideas of the best plain poultry house for twenty-five fowls, we are giving practically the plans of a house which we have built and used a sufficient time to prove its worth. The house referred to, however, has two pens, and is used during the breeding season for breeders. In our description, therefore, we are describing to all intents and purposes one pen in this house.

Requirements.

What are the requisites of a good plain poultry house?

*Neatness and simplicity of design,
Economy and durability of construction,
Convenience of equipment,
Proper hygienic conditions,*

Would seem to cover the requirements, and we shall proceed to describe a house which embodies these requisites.

Specifications.

Single pitch roof—no sills or plates used.

Dimensions, 15 ft. long, 10½ ft. wide, 7 ft. high front, 5 ft. rear.

Openings, four six-light sash 10 x 14 in. glass. Door, 2½ x 5½ ft.

Sheathing, rough boards covered with sheathing and roofing paper.

Interior.—Roosting box 9 x 3 ft. Bank of nests 18 in. above floor. Hopper for grit and oyster shells. Shelf for water pan, feed box. Dirt floor.

Construction.

Roof.—In the low single roofed house we have the warmest construction obtainable at a minimum of expense in building, and overcome any objection that there may be on the score of poor ventilation by curtains in front of roosts and at certain windows.

Framing.—The studs are toe nailed directly to posts set into the ground 18 in., and projecting 6 in. above ground, and the rafters are nailed directly to top of studs, which are cut at the right level to fit them, thus doing away with sills and plates. This construction gives ample strength for buildings of this class. The front studs are spaced to take in the three windows shown in cut, Fig. 1, about 2 ft. 10 in. apart, which allows windows to slide vertically between studs. This also establishes the spacing of rafters and rear studs at 2 ft. 10 in.

Dimensions.—The ground dimensions, 15 x 10½ ft., gives a pen of sufficient size for twenty-five fowls, and lumber will cut to good advantage. The height, 7 ft. front, 5 ft. rear, is sufficient for doing the work, while contributing greatly to the warmth, and lessening the expense over higher studding.

Windows.—Four six-light sash, three in front and one in opposite end to door, are sufficient

for light and ventilation. These are arranged to slide up and down readily, and should be open a part of each day. For these window spaces also we should have at least two frames same size as sash covered with cotton cloth to slip in in place of glass on stormy days, to give ventilation and keep out snow and rain. Sliding frames are preferable to those hinged at the top for window openings, as the latter catch dust when up, which excludes light. For our part we use no glass at all in our laying houses, (except in a house for breeders, and this only to protect combs of males), but rely on curtains entirely. In summer, with front and end windows out, and slat door, the house will cool perfectly on hottest nights.

Floor.—For almost all locations, or on practically all land suitable for fowls, a dirt floor is far superior to one of boards or other material. The building should be filled in several inches higher than ground outside, with fine dry dirt. A dirt floor furnishes the best possible absorbent for droppings, and contributes greatly to the health of the fowls—a dusting medium which the fowls may use at will—a good foundation for litter, and the labor of removing dirt and replacing with fresh each spring and fall, is less than keeping a board floor properly clean, to say nothing of the high fertilizing value of the dirt removed, which is fined up ready for use.

Covering.—The sheathing, being covered with paper, may be of unplanned lumber, if cheaper, and the bottom courses should be of hemlock, which will last longest when in contact with the earth. The sheathing runs lengthwise of the building; a sheathing paper is used to increase the warmth, and in laying work should be begun from the opposite end of building from that used in beginning to lay the roofing proper in order to break joints with the roofing and render the building warmer and more wind proof. A very good way to lay the paper is to run the strips from the ground or windows in front up over the roof and down to the ground in

Front and End of Mr. Puttison's Poultry House.

back in one piece, which saves material and insures tightness. Batten of inch pine laid two strips to a width of paper holds the covering best, although tins will do.

Interior.—In cut, Fig. 2, the interior arrangements are shown. The roosting box, with board 1 ft. high at bottom to keep litter on main floor, is 9 ft. x 3 ft., giving space for 18 ft. of roost, and has cloth covered frame hinged at top to let down in extreme weather and still permit fresh air to reach the fowls through cloth. The cut shows no droppings board, but merely the dirt floor at the bottom; this is by all odds the best arrangement, (we are using both methods, and know) doing away with the unsanitary board, an abomination as usually taken care of. A few shovelful of earth occasionally thrown in the bottom of this box will keep everything in good sanitary condition for several weeks without cleaning out.

Those who prefer the board, however, may put it in. Roosts are 2 x 3 in. scantlings, 18 in. from ground.

The nests shown in the cut are up off the floor showing floor space, and giving a secluded dark nest, which is an advantage when an egg eater develops; they are more easily reached by the attendant than the "soap box in the corner," although the latter is not to be despised. These nests are set upon a shelf run between the end of roost box and end of house 2 ft. wide, and 18 in. above floor. The cover, the lower half of which is hinged, should have slant enough to make it objectionable as a roosting place.

The hoppers for grit and oyster shells speak for themselves. For a feed box we prefer one made by using a board 10 in. wide by 2 ft. long with strips 6 in. wide nailed to its edges, the strips to be nailed from their centers, thus making in effect a box 3 in. deep whichever side is up. By simply turning it half over, a clean side presents itself. Mash may be poured from a pail into a box of these dimensions easier than into a V trough. In conclusion let us say that there is no condition met by a scratching shed house, or any other kind of house, that this house

Interior of M. J. Pattison's Poultry House, Showing Construction of Back End and Roof.

properly used (and with plenty of scratching material) will not meet also. The windows are intended to be open every day in the year. If it snows, slip in the cloth covered frames described, but give the fowls fresh air at any and all times day and night through their curtains, and don't have a droppings board six inches from their noses.

Note.—Our healthiest and best layers last winter, when the thermometer went to 20° below zero on several occasions, were housed without using a single square of glass, just the two sets of curtains. If this be true in this latitude it should be in almost any.

Materials.

The following is a list of materials required, with prices:

3 pieces 2 x 4 22 ft. long for rafters, 44 sq. ft. makes 2 each.

8 pieces 2 x 3 10 ft. long for studs, 40 sq. ft. front and rear stud each.

—	84 sq. ft., @ \$20 M.,	\$1 68
16 cedar posts, 2 ft. long,		75
500 sq. ft. 12 ft. boards, \$17 M.,		8 50
4 windows, 6 light 10 x 14 glass, 60c. each,		2 40
Nails, hinges, etc.,		90
1 roll sheathing paper, 500 sq. ft.,		1 00
1 roll red rope roofing paper, 500 sq. ft.,		5 00
Total,		\$20 23

In the matter of roofing material opinions differ widely; some would prefer to use a more expensive material than the above. In that case a lighter weight can be used for the sides than for roof, which will effect a saving in the class of material referred to, which runs from \$1.75 for one-half ply to \$3.25 for four ply per square of 100 ft. The red rope, however, will last several years, properly laid, and if painted will last longer.

We have then a house for 25 fowls costing little more than \$20 for material, which is "good enough" for the purpose, and fulfills all the requisites cited in the beginning of this article.

My first criticism on this house plan would be as to dimensions of the floor. If we admit as correct the proposition laid down in Lesson VIII., that the floor should be as nearly square as possible, the house 10 ft. wide by 15 ft. long is getting a little too far away from our standard.

Under some circumstances I would criticise the form of the roof, but in a house as narrow as this the objections which may sometimes be made to a single pitched roof with northern exposure lose much of their force; and though observation of houses I used myself has seemed to indicate to me that as a general rule a double pitch roof was more satisfactory, I would not care to dogmatize on that point, and have my judgment on it judged by the experiences of others, because points like that are difficult to determine beyond doubt.

One thing, however, should be emphasized: Whoever adopts this plan must consider the effect before making changes in the dimensions. Mr. Pattison figured out dimensions that keep him clear of faults which would be pronounced in a house of the same style with some other dimensions. If such a house is made 12 ft. wide, the front wall must be higher, or the rear wall lower, or both, and the rafters for a single stretch of roof become longer than is advisable for a roof with no supports under it.

The enclosed roosting box I would consider unnecessary, except perhaps to protect large combs, and I am not sure that it is necessary for that for fowls that are thoroughly rugged.

Another Maine Poultry House.

Martin Ryan, Baring, Me.

Although in this plan there may be nothing new, for a plain substantial poultry house that is warm, dry, and light, there is nothing better. The plan is for a house 12 x 16 ft., but it can be

built any length. The house is 4 ft. high at back, as low at side, and 6½ ft. at front side, with long and short pitched roof. It is plenty high enough for a man to stand inside back as far as the droppings board without stooping.

The house rests on ten cedar posts that are set in the ground three feet, and extend above the ground eight inches. One post goes to each corner; two at equal distances apart under the front and back sills, and one under the center of each end sill. The posts are lined off level at top, and the 4 x 4 sills spiked on top of the posts. The frame is 2 x 4 spruce. The studs and rafters are two feet apart, and the house is boarded tight down to the ground with rough boards, and roof, ends, and sides covered outside the boarding with good sheathing paper, and shingled with cedar shingles laid five inches to the weather.

Inside between the sills is filled in with small stone to the depth of six or eight inches, and covered with gravel or sand level with top of sills; this will bring the floor up enough so it will be perfectly dry, and the fowls will always have a dust bath in the sand and gravel of the floor.

The high side of the house should face the south or southwest, and have two windows fifteen lights each of 8 x 10 glass. The windows are hung on hinges, and swing inside, and when these windows are swung open on bright sunny days the house is turned into a partial open scratching shed. The house can be divided with wire partition and frame door covered with wire hung on spring hinges. This will give two pens that are very convenient if more than one variety is kept, or when sorting fowls for breeding.

The roosts are at the low side of the house. The droppings boards are put up two feet from the sill, and the cleats that the roosts rest upon are six inches higher than the droppings boards. The roosts are 2 x 4, the length of each pen, two roosts to a pen. They are ten inches from the wall and fifteen inches apart. The droppings boards are three feet wide.

The nests are under the droppings boards, and are 14 x 14 inches wide by 12 inches deep; they fit up against the droppings boards, leaving a space of one foot under them so the fowls have the entire floor to roam and scratch in. These nests are not nailed in place, but slide in on cleats; they are made in one long box divided in four nests, each with a four inch board at back to hold the straw that the nests are made of. The front of the nest is a four and an eighth inch board. The wide board is hinged and drops down so the eggs can be gathered from the front. The back of the nest is provided with a four inch board for the hens to step upon when entering the nest. These nests are retired and dark enough so there is no danger of egg eating.

The wall back of the roost from the droppings board up to plate, and the roof up to a line even with the outer edge of droppings boards is double boarded and stuffed with dry sawdust.

My house that is built on this plan is forty feet long, and I find it just the thing. I like it better every year; better than any other house that I have yet seen. There is no space taken up for walk or nests. The house is built for hens, and the entire floor space is given to them.

With the short and long roof you get a house high enough to work in without danger of head bumps; while with the single pitched roof the walls would have to be much higher to get the same room at low side of house, and, therefore, much colder. The high side of this house faces the south, giving room for high windows, and giving larger area of building the benefit of the sun in the short winter days when it is so much needed. In my house the windows are open every day, except when the snow blows in, and I am never troubled with colds or roup among my

Ground Plan of Mr. Ryan's House.
D, door, W, window, d, droppings boards, r, r, roosts.

hens. They are as healthy and vigorous a lot of fowls as you can find anywhere. I keep the floor well covered with litter in which I scatter grain, and the fowls will scratch and dig and sing all day long as happy and contented as if they were in my wife's flower beds in June.

This house I would rate as having a capacity of 12 hens to a pen, in all 24 hens. At a pinch it might be used for a few more, but with the droppings boards extending 3 ft. from the north wall, and the nests under them the floor space for use in the house is hardly more than 8 x 9 ft., or 72 sq. ft.

Outside Front and Inside Back of Mr. Ryan's Poultry House.
N, nests, e, entrance to nests, d, droppings boards, r r, roosts.

used for a few more, but with the droppings boards extending 3 ft. from the north wall, and the nests under them the floor space for use in the house is hardly more than 8 x 9 ft., or 72 sq. ft.

Bill of Lumber.

Sills, 2 pieces 4 x 4, 16 ft. long.	
Sills, 2 pieces 4 x 4, 12 ft. long.	
Studding, 9 pieces, 2 x 4, 6 ft. 4 in. long.	
Studding, 9 pieces, 2 x 4, 3 ft. 10 in. long.	
Plates, 2 pieces, 2 x 4, 16 ft. long.	
Rafters, 9 pieces, 2 x 4, 9 ft. 6 in. long.	
Rafters, 9 pieces, 2 x 4, 4 ft. 6 in. long.	
Collar beams, 9 pieces, 1 x 4, 6 ft. long.	
End and partition studs, 4 pieces, 2 x 4, 8 ft. long.	
In all—320 ft. of spruce for frame, @ \$14	\$4 48
Ten cedar posts 3 ft. 8 in. long, 4 in. at top.	
550 sq. ft. of hemlock boards, @ \$10 per M.,	5 50
150 sq. ft. of matched boards, @ \$16 per M.,	2 40
30 sq. ft. of furring 4 in. wide, @ \$14 per M.,	42
40 sq. ft. of furring 5 in. wide, @ \$14 per M.,	56
5 M. shingles, @ \$1.50 per M.,	7 50
30 lbs. of nails, @ 4c. per lb.,	1 20
3 rolls of sheathing paper, @ 50c. per roll,	1 50
10 cedar posts, @ 5c. each,	50
Hinges and latch,	50
	<hr/> \$24 56

These are the prices that rule in this vicinity.

While not disposed to quarrel with those who use and prefer them, the arrangement of nests under droppings boards never suited me, even when I used droppings boards in the poultry houses. The nest arrangement I like best for laying hens is an open nest to hang on the wall. This will be described in connection with other nests in a subsequent lesson.

As the reader may infer from a comparison of this with my own plans, the packed wall and roof back of and above the fowls is a feature I consider unnecessary. During this last winter I have had one pen of hens that had a shed full of leaves back of it, but I could not see that they were better off than the hens that had but one thickness of boards.

Cross Section of Mr. Ryan's Poultry House.

A House With Single Pitched Roof Sloping South.

E. A. O'Brien, South Dennis, Mass.

This is a 10 x 15 ft. house; 7 ft. back; 4 ft. front, facing south. The claim for this house is a combination laying house and scratching shed. Its capacity is twenty hens.

There are two windows $3\frac{1}{2}$ x 4 ft. in front, which are hinged at top, and opening inward, held up by a hook from roof, wire netting on outside of casing, so that in all stormy days these windows can be opened, and the fowls have plenty of good fresh air with no drafts. These windows are placed at the west end of the front of the house, one foot apart, leaving a space of six feet at the east end for laying and roosting room not partitioned off.

The droppings board is 3 x 6 ft., and on hinges which can be made at any blacksmith's shop—a four inch eye threaded—which is screwed into the corner upright, and into another upright six feet away; the hinge is made with an "L" to fit the eye, rounded. The roosts are made of three inch furring—two pieces 6 ft. long, 14 in. apart, and two pieces $2\frac{1}{2}$ ft. long—and put on hinges the same as the droppings board, and attached to the same uprights, only 8 in. above droppings board, which is one foot above the lower stringer.

Ground Plan of Mr. O'Brien's Poultry House.

D, door; o, small door; w, window; d, droppings board; r r, roosts; T, trough for droppings; w, water vessel.

A flat trough, 10 in. wide and 6 ft. long, with 4 in. ends and sides, is placed between the two uprights close to the wall; this trough catches all the droppings as the droppings board is raised up to the back wall and hooked up out of the way. With the hinges made as above mentioned, the roosts and droppings board can be unhinged without any trouble, and taken out and cleaned.

When going through the house mornings to feed, it is a matter of but a minute to raise roosts and droppings board, droppings falling into trough below; then when feeding at night let them down again and sprinkle a little slaked lime or ashes—just dust—which absorbs the moisture from droppings, and they roll off when the board is raised; trough may be cleaned once a week. Push wheelbarrow into house, and as the trough is wide enough to admit a shovel, it takes but few minutes to clean it out, again using a sprinkling of lime or ashes.

The arrangement of roosts and droppings boards gives the whole house for a scratching shed. Put in a foot of litter; throw grain in litter, and hens will do the rest.

On extremely cold nights a curtain of burlap can be made very cheaply and dropped from roof to about six feet above the droppings board; the burlap is better than cotton or duck, as it is so loosely woven that it does not make a hot house of the roosts, but allows a free circulation of air, and yet gives the needed warmth.

The material used in building this house is as follows:—

- 5 sticks, 2 x 4 — 15 ft. long for stringers.
- 15 sticks, 2 x 4 — 12 ft. long for roof, front and back uprights.
- 450 feet hemlock boards.
- 1 roll Neponset red roof paper.
- 2 sash, 3½ x 4 ft.
- 3 pair strap hinges for door and windows.
- 2 pair hinges and eyes for :oosts and droppings board.
- 5 hooks for door, windows, roosts, droppings board.
- 1 bundle lath for cleats for roof.

The price for material differs so much in different localities that I will not give prices, but this house, with lumber at \$18 per 1,000 ft., should and can be built for less than \$25.

Drawings Showing Structure of Mr. O'Brien's Poultry House.
D, door; o, small door; r, r, roosts; a, droppings board; f, f, front.

As in the case of Mr. Pattison's house, we have here a plan in which the dimensions minimize what I call faults in the style of the house. In a house with the front only 4 ft. high, the sun does not get into the house as it does with higher windows, while the whole roof and front being exposed to the south, such a house, unless very carefully ventilated, warms up too much during the middle of the day, and cools too quickly after the sun goes down.

Though I would not recommend this style of roof for a house built where any style of roof might be used, there are times when it is the best style — as when a poultry house is to be built as a lean-to beside another building.

In a house of this style and dimensions, I think it would be found an advantage to put windows in the ends as well as in the front. The light would be better, and the ventilation through the windows could be better worked to offset the faults of this style of roof.

The roosting arrangement is one that will appeal to many.

A Neat House With Labor Cost Given.

A. T. Grosvenor, Abington, Conn.

Last year I wintered three pens of hens in houses constructed similar to the accompanying plan. This plan, however, in order to accommodate twenty-five hens, is two feet longer and one foot wider than the plan of the house now in use. The pitch of the roof on each house is the same, consequently the larger building is somewhat higher.

In regard to the construction, the sills are 3 x 4 in. pieces, while the posts, plates, rafters, etc., are all 2 x 3 in. The frame is covered with ploughed and matched pine, or barn boards only. The roof is shingled, with no attempt to have the roof boards fit closely; in fact, on the

four houses which I have, the roof boards are nearly two inches apart. The eight inch jet is of course unnecessary, but I think it adds considerable to the appearance.

For light there are two windows with double sashes, each sash having two 12 x 16 inch panes. One or both of these windows is opened a part of each day, the time determined by the temperature and condition of the weather. The floor of each pen is sand and gravel.

Materials' and Labor.

FRAME.

Sills.	{	2 pieces	3 x 4 in. 12 ft. long,	24 sq. ft.
		1 piece	3 x 4 in. 16 ft. long,	16 sq. ft.
		3 pieces	2 x 3 in. 16 ft. long,	24 sq. ft.
		16 pieces	2 x 3 in. 12 ft. long,	96 sq. ft.

\$22.50 per M.,	160 sq. ft.	\$3 60
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BOARDS, ETC.

154 sq. ft. roof boards, 14 ft. long, @ \$20 per M.,	3 08
192 sq. ft. barn boards, 16 ft. long, @ \$30 per M.,	5 76
168 sq. ft. barn boards, 12 ft. long,	5 04
9 pieces square edge pine, 4 in. wide, 12 ft. long, @ \$30 per M.,	1 08
3 pieces square edge pine, 4 in. wide, 14 ft. long,	42
1250 shingles, @ \$4 per M.,	5 00
2 windows,	2 20
Nails, hinges, thumb latch, etc.,	1 00
Labor,	7 50

Total,	\$34 68
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In this plan we get away, a little, from the severely plain and simple construction of the other plans given, and get a building somewhat more sightly, a point which sometimes has to be considered if a poultry house is so placed with reference to other buildings that an extremely plain one would mar the general effect.

The one point which seems to me especially to call for criticism is the leaving a space between the sheathing on the roof. Most of my houses are built that way, but I would not build another without laying the roof sheathing close. The increase of cost is comparatively trifling, and the gain in looks, and a smooth surface to whitewash is considerable.

As with some of the other plans given, the capacity of this house is rated rather high. Twenty-five hens may be kept in it in winter, but twenty is nearer right, and the latter number is the safer one to use.

Diagrams Showing Ground Plan and
Scale, 4-In. 1.

Which Plan?

In the above plans, and the two given in the last lesson, readers have been furnished plans for seven plain, good, and cheap poultry houses at low to moderate cost.

While I have made some criticisms on the plans in this lesson, and also indicated some faults in construction of the houses I built, I want to impress it on those studying these lessons, and about to decide what style of house to build, that—considered from the standpoint of practical work—the faults of these plans are what we may term secondary faults. There is nothing in any of them, that I can discover, that would make it possible for one using such a house to attribute poor results to the house.

The matter of the adaptability of these different plans to different conditions, and especially to other climates, will seem to many to call for consideration. Many suppose—and not unnaturally—that a house suited to New England conditions would not suit conditions in Virginia, Maryland, Florida, or Texas.

The more substantially and warmly built houses used in northern states go beyond what

southern conditions require in construction. That they also go beyond what northern conditions require, a great many of us believe, and are proving our faith by the style of buildings we use. But a warm, tight house with small openings which might work satisfactorily in the north—except in occasional sultry weather, would be unsatisfactory in a warm climate. For such a climate an open shed house, such as those I am using, is much better. However, from my own experience with houses of different styles in Colorado, where I have seen colder weather than in the vicinity of Boston, much warmer weather than we ever have here, and more sudden changes than I have seen here, I feel safe in recommending such houses as I now use for any place where shelter is required. As slight in construction as they can be made and have them stand up and stay together, they still provide protection from storms of all kinds. The experience of many poultrymen in different sections is confirming this judgment.

Framing of Mr. Grossenor's House.
to the foot.

Exterior of Mr. Grosvenor's Poultry House,
 Scale $\frac{1}{4}$ inch to the foot.

LESSON XI.

Summer Management of Fowls.

THIS subject naturally divides into two topics:

- 1.—*What fowls to keep.*
- 2.—*How to handle them to best advantage.*

Both of these topics have to be considered with reference to future as well as immediate results.

Old Hens as Layers.

In connection with the question of keeping over for another year the hens now from a year to fifteen or sixteen months old, arises the old question of the relative value of pullets and hens as egg producers, a question which has provoked as much controversy and as much needless and pointless wrangling as any of the many questions each swiftly passing generation of beginners in poultry culture has to solve anew for itself.

The first cause of all this trouble is in the statement of the proposition — in the attempt to make an arbitrary division of fowls into profitable and unprofitable producers, and make the line of separation at a certain age.

I think it may be truly said that in no matter relating to poultry (or to anything else, but we have to do only with poultry here), is it possible to make arbitrary and sharp divisions and distinctions for certain alleged purposes, and have results as they come justify the rules upon which the divisions were made. There is no best breed of fowls. There is no best method of feeding or housing. We are many men of many minds, working under many different circumstances, with stocks of fowls that have experienced many different conditions. So we cannot all use the same rules, nor will any of us be wise to make hard and fast rules to govern in the conduct of our business.

To get back to the main point. In the discussion of question of the relative laying qualities of hens and pullets, the fowls are generally classed according to age at the beginning of the period for which results are to be compared, and considered as in that class throughout the entire period, though, as a matter of fact, the pullets may pass the pullet age at some time within it. Properly designated, a pullet is a hen less than a year old.

The period for which results are usually compared is from the time the first pullets begin to lay — generally October or November — until the next spring or early summer. Hence, in such comparisons, no account, as a rule, is taken of the performance of the hen during summer and early fall, though it must be evident to every one that in considering the question at this season, (July 1st), we must consider what we may get out of the hens in the four months or so before the pullets are laying, as well as what we may get in the winter and spring.

Some authorities advise and some poultrymen make a practice of disposing of laying stock,

in the fall when the hens that were pullets in the preceding winter are sixteen to eighteen months old. I think it is much the better way to give the old stock a general overhauling before extreme warm weather comes on, and arrange at that time for the most profitable disposition of each of the several lots into which the flock will be divided. When the general clean up is to be made in the fall the tendency is to leave in the flock many hens which should be disposed of without delay, the reason the poultryman gives himself for this being that, as the bulk of the lot is to be disposed of at that future time, it makes little difference if the few unprofitables are allowed to remain in it. Consequently some proportion of the fowls in each pen or flock are non-producers, adding nothing to the income, while consuming their share of the food, occupying room, taking time and attention of the poultryman, and, last but not least, adding to his risks of loss, for the idle unproductive fowl at this season more, perhaps, than at any other, is detrimental to the flock.

So it seems to me that the numerous beginners, and others young in the business, who are on their own initiative making preparations to cull their hens, now show a much better appreciation of the best policy than do those of longer experience who leave this culling until the summer is over.

As I come in contact, personally and through correspondence, with the experiences of a great many poultry keepers each year, it seems to me that it is still true as it was in the traditional times prior to the improvement of breeds and of methods of poultry culture, that most hens lay well for only a few months in the spring. It seems, also, to be the fact that a great many poultrymen who get fair to good egg yields in winter and spring get very poor yields after the warm weather comes on. In this fact we may find one reason for their preference for pullets for laying purposes, and for their failure to reckon summer and fall as profitable seasons in egg production.

Certainly it does not pay to keep hens over if they are idle for a period of five, six, or seven months; but, if we can have our hens giving fair to good egg yields through summer and fall, and have them idle, or nearly so, for but two or three months, that is the better way to manage. The question is: Can it be done, and how?

Selecting Hens to Keep Over.

Let me state first of all that it cannot be done with all hens. In every flock of yearling hens there are some it will not pay to carry over — hens that even at this age have outlived their usefulness. The proportion of such hens will depend on the vitality of the stock, on its general condition and performance through the winter, and on how well the poultry keeper has succeeded in adjusting food and care to maintaining the hens in condition for future productiveness.

If as the poultry keeper reviews his experiences of the past year he recalls any of the following things as circumstances in the history of his flock of yearling hens, he is warranted in considering that an unusually large proportion of them are not good candidates to keep over:—

1. *If they were not thrifty as young chicks.*
2. *If at any period of growth they were checked.*
3. *If there was at any time during the year any serious sickness epidemic among them.*
4. *If they were spasmodic layers.*
5. *If after a period of good laying they suddenly fell off and were hard to get laying again.*
6. *If they are now generally in poor condition.*

A lot of hens may have had all these unfortunate experiences; few flocks entirely escape them, and most poultrymen have to take account of some of them every year. The years when we avoid them all are red letter years in our lives, and the hens produced in those years are likely to be unusually long lived as profitable layers.

Now, though in proportion as they have escaped the above ills, the yearling hens are more promising candidates for a longer stay in the poultry yard, we must not make the mistake of condemning them on one or two counts, especially if the faults were remedied; but we must note that every unfavorable condition in the life of the hen increases the danger that as she passes her prime she will develop digestive or ovarian troubles, and with this in mind we must

select much more carefully from such a lot of hens than from a flock that has had no trouble and has been steadily productive, and always in dealing with an individual of such history must consider that its expectation of continued productiveness or of recovery from disease is below the average. In deciding upon his general arrangements for the year, the poultry keeper who has to deal with a flock like this can estimate that he will have only a small proportion of yearling hens to carry over.

In selecting from a flock of yearlings that have been generally in good condition, free from disease, and fair to good egg producers, take first those that are plainly in good health and condition, bright looking and presumed to be laying or about to lay. Hens that answer that description at this season of the year we may say quite positively that it will pay to keep over.

Of course this does not mean that every such hen will be profitable. Every hen of a small lot may be, but the rule is that as hens advance in age an increasing proportion of them develop disorders or from various reasons become unprofitable. What we say of this selected lot of yearling hens is that being at this season in fine condition these hens may be reserved and given regular care with every reasonable assurance that they will give a good account of themselves, and their further culling need not concern the poultryman for some time.

Having taken out the best hens, take now the worst ones — the hens that are noticeably inferior in size and appearance. Perhaps I can make it plainer by telling how I go about it myself.

When putting pullets into winter quarters in the fall, as long as I have room for them, I do not reject slightly undersized or those that lack typical shape, provided they seem vigorous and healthy. My experience has been that while not equal to well grown and well built pullets for continued egg production these inferior pullets are generally profitable as layers through their first winter and spring laying period. After that I find them as a rule less satisfactory, and except in case I reserve some for further tests, all such yearling hens go to the hen cart in the first general clean up in June or early July. When I was handling poultry on a larger scale, and peddling out my products, we were killing off old stock as customers wanted it every week in the year, yet always as the young chicks came up and needed the room we found it necessary to go over the whole stock carefully and dispose of many of the least promising yearlings.

These poorest hens are destined to go to the hen cart as soon as in marketable condition, whether they begin to lay or not.

We have left now some hens about which we are uncertain. They do not seem to belong positively with either of the other classes. Most of them are good hens in poor condition.

That being the case, the points for us to consider are why they are in poor condition, and whether their condition can be readily improved.

The most common cause for healthy hens being in poor condition at this season is that egg production for some time has been so heavy that they could not keep it up and keep in good flesh at the same time. The result is that they lay heavily as long as they can stand it, then have to stop, and will either not lay or lay only occasionally until restored to good condition.

My hens are at all times full fed and with sufficient variety, yet I always find a considerable number of them that thus lay themselves out of condition. The lot of hens comprising this class, if put by themselves, as I put them now, generally give, for awhile, a very small egg yield, though if one has been very rigid in selection of his first class hens, he will have left for this some that are laying, but not in good condition, and only more attractive than the others which go into the intermediate class because the comb is bright. If these laying hens go as they should into this intermediate lot we are likely to have from it at the start a low, but steady egg yield.

The hens are now divided into three lots, I. e. :

Lot 1.—Good hens in good condition.

Lot 2.—Good hens in poor condition, and hens about which the keeper feels uncertain.

Lot 3.—Poor hens and those which for other reasons it is not desirable to keep.

Under this last specification include scaly legged hens — no matter how good in other respects.

Lot 1 is to be kept over, and is to have the regular summer care to be described.

Lot 2 is to have special care and feeding to bring as many as may be into good condition, then be sorted out again, those which respond quickly to good care being transferred to Lot 1, or given the same care where they are, while those that do not get into condition with reasonable promptitude are to be marketed.

With regard to these last, and also to hens in Lot 3, if they do not flesh up readily, though apparently healthy, sell them as they are for what they will bring. Don't try to fatten them regardless of time or cost. The probability is that such hens have weak digestion, or some minor disorder that prevents getting them in good flesh, and if the attempt is made to force them pronounced disease may develop and make them a total loss. There is a market for poor fowls, but not for sick ones.

We will refer again to points in the handling of these lots of fowls after the general statement of the method of caring for fowls in summer.

The Season and the Systems.

Allusion has been made to the fact that many poultrymen who get fair to good egg yields in winter and spring do not do so well in summer. There may be other special reasons for this in special cases, but I think the prime reason is to be found in that the hens are kept under conditions that were made for winter, and cannot be properly adapted to summer poultry keeping.

Ventilation in the Poultry House.

Many poultry houses are so constructed that they cannot be thoroughly ventilated. Many that might be well ventilated by leaving all doors and windows open day and night are but partly opened in the day time, and almost closed at night. Houses with the roosts next low rear walls, and houses with deep narrow pens give very unsatisfactory conditions on hot sultry nights. In cool summers hens may do fairly well in such houses, but in hot seasons the lack of air in such quarters is very debilitating. A summer poultry house should be airy day and night; it must be so if the fowls are to do well and keep well in it. The Rhode Island colony poultry farmers block their houses up several inches from the ground in summer, admitting fresh air all around. If thorough ventilation cannot be obtained any other way, make openings in the rear wall of the house near the roof, with a slide or hinged cover that can be closed when rain or wind would beat in. There is, however, little danger of bad effects from such causes if the opening is protected by the eaves of the house; and there are few times in summer when one need fear lest fowls suffer from drafts through such openings.

Yards and Range.

Fowls keep in best condition in summer if they have good grassy range, with both sun and shade as they may want to take them.

They can, as a rule, be made more productive if confined to yards where the supply of green food does not exceed their actual needs, and fed well on a ration differing but little from that given during cool weather.

The most productive fowl, however, is not always the most profitable fowl. The item of labor must be considered, and the more yard room fowls are given the less close attention to their wants is necessary. No rule to govern the adjustment of labor to production can be given. It must vary under different circumstances.

If a man has nothing to do but take care of his fowls, or has ample time to give them all the care required under intensive methods, his best policy is to get the largest possible product from his hens.

If in the use of intensive methods, he gives time to poultry that otherwise would be devoted to other profitable work, he must decide just what division of his time will pay him best. Such decision requires some experience and some experiment in adjusting methods to circumstances. The essential thing in the early stages of one's work with poultry is to understand the need and advantage of striking the right balance in the distribution of time to different kinds of work, and direct one's effort toward the gradual solution of the problem.

Consideration must also be given to the fact that, though by confinement and high feeding, hens may, as a rule, be made more productive than when given more liberty and lighter diet, the process wears them out faster, and it is not advisable to force in this way hens that are to be used the next season for breeding purposes, or indeed hens that are wanted to lay during the succeeding winter and spring. High feeding through summer should be carried to the limit only with hens that are destined to be sold as soon as they cease to lay profitably. With those we want to produce longer we must be more moderate, and must modify the diet, even at cost of reduction in the egg yield, during extreme hot weather.

The Effects of Change.

Another point to be considered is that a change of quarters or a change from one system to a quite different one, with perhaps, changes in diet or method of feeding with the changing conditions, will at the same time better the condition and the egg yield of fowls.

Again and again poultrymen have taken breeding hens after months of heavy laying in confinement, put them on range to recuperate, not caring whether the hens laid or not, and found that after a little rest they began to lay, and laid well for a long time, when if left in their old quarters they would probably have done nothing. Good laying under such conditions does not seem to take as much out of the fowls as the same production in confinement. Such a change is not a sure way of making hens lay in summer, but it seems to do so often enough to make it worth a trial when other methods fail.

Summer Feeding.

Except for extremely hot periods or conditions which give hot effects continuously—as small yards and badly ventilated houses—the general summer and winter rations for laying stock may be virtually the same.

Using such rations as are given in Lesson I. for moderate winter weather, increase the corn meal and corn in them for extreme cold winter weather, and for summer reduce the corn meal and (especially) the corn in warmest weather.

In the last two or three seasons I have had more trouble with cracked corn than in all my previous experience, finding it difficult to get cracked corn free from mold. Consequently I have fed less cracked corn than formerly, and sometimes have omitted it altogether for weeks at a time. Good clean cracked corn free from mold and not heated may be fed to hens on range or in large grass yards quite as freely now as in winter, except in hottest weather, when it is advisable to leave it out.

Green Food.

Ordinarily fowls may be allowed all the green food they will eat, both winter and summer. Sometimes, however, when the weather is extremely hot they will, if liberally supplied with green food, fill up on it and take too little grain to sustain egg production at their usual mark. If egg production is to be maintained, if possible it is best at such times to feed green food only after the fowls have been fed on grain.

Again, fowls on a range well supplied with grass and insects are apt to get in the habit of foraging early, maintaining themselves on insects and grass, and lay very little. The best way to do in such cases is to keep the hens up until they have had one good feed of grain. If practicable the end sought may be gained by increasing the number of fowls on the range, thus making the supply of food each secures by foraging enough less than a comfortable sufficiency to keep it ready to take a fair ration of grain once or twice a day.

Animal Food.

A range must be very good indeed to furnish all the animal food they need to what fowls can get all the green food they need on it. Hence under ordinary conditions it is more necessary to supplement the animal food of hens on range than to provide special supplies of green food, and I think hens on range in summer will stand even heavier feeding of concentrated, prepared meat foods than when confined in winter. For hens that are closely confined it is safer to reduce the proportions of prepared animal food, and if it is desired to feed meat heavily, feed at least a part of fresh meat or green cut bone, which contain large percentages of water. In feeding concentrated animal foods at this season special attention should be given to the

quality of the articles used. Anything of this kind that is not sound, sweet and good will produce bad effects more quickly in hot weather than at any other time.

Manner and Times of Feeding.

Whatever may be said of dry feeding for winter, and close confinement, it must be admitted that for hens on range in summer it is a method economical of time, and saving the poultryman from the necessity of giving close attention to every feeding, for when grain for a day, or two if need be, can be broadcasted over a range where it scatters enough to give the fowls all needed exercise in getting it, the task of feeding becomes light.

In more restricted quarters the amount which may be thrown out at one time is smaller, and when we get down to small yards, times and ways of feeding differ from the winter practice only in that the days being long it is much easier to make a satisfactory adjustment of the regular meals.

One of the great difficulties in winter feeding is to give the fowls in those shortest days enough for their own maintenance and good egg production, and yet not overwork the digestive organs. In summer, with it possible to feed in the morning several hours earlier, and in the evening several hours later, there is time for three full meals, and rests for the digestive system between them. That is why fowls often eat more in summer than in winter, and why when they do they stand heavy work better.

Perhaps the poultry keeper does not want to get up early enough in the morning to give his fowls an early breakfast. If so, he should see that they have something left over from the night feed to give them an inducement to be busy until he is ready to give them their breakfast. In very hot weather—indeed at all times in summer, but especially in very hot weather, the fowls should get out as soon as it is light, so that they may have opportunity to feed and exercise while it is cool and comfortable. When the heat is great they will keep still and go without food rather than make any effort to get it, and when they do this we see the same result as when they eat too liberally of green food to the neglect of the more substantial grain diet needed to sustain egg production. As my poultry houses are never closed, the hens get out as soon as it is light. Where houses must be closed for safety the poultry keeper should be about early and let the hens out. If he isn't willing to do that I should not expect to find him enthusiastic over summer eggs.

The comment just made suggests a word in regard to attention to fowls in summer. There is little doubt in my mind that many instances of poor summer laying are due to lack of attention to the needs of the hens. Too often the poultryman's interests at this season are centered on the coming generation of chicks to the neglect of the old fowls. When this is the case there is generally mismanagement somewhere. It may be that there is not room to carry both. In that case the stock should be reduced to what he has facilities to handle to good advantage. There is never a gain, and nearly always there is a loss, in overstocking a poultry plant.

Special Feeding.

Let us take up now the special feeding of such hens as we have designated as Lot 2 and Lot 3.

Lot 2 contains hens which are probably to be kept over, and therefore should be given care and feeding that would build up the general condition of the hens, as well as cause them to put on flesh. So while being in all other respects treated like the hens in Lot 1, they should be fed heavily as long as the appetite seems good. Give them a good rich mash, and enough of it so that they will leave a little over, which, within an hour or so, they will come back and clean up. Have grain where they can get it by foraging, or scratching at any time through the day. Then, just before dark, give grain in troughs, or what mash they will eat up quickly. If a second mash is used at night, do not continue it too long, or it may produce indigestion. If fowls show any tendency to looseness of the bowels, give more grain and less mash, or use a dry mash.

From ten days to three weeks of such feeding should show quite clearly what most of the hens are going to do. Some will begin to lay as soon as in good condition. Others will grow fat very fast. Some may neither fatten nor lay.

Put those that lay on the general ration, still feeding well, but with more caution.

Sell those that fatten instead of beginning to lay. Sometimes poultry keepers try to *make* such hens lay by thinning them down again, the assumption being that they do not lay because they are too fat. Usually it is the other way: They fatten because the reproductive organs are for some reason or other dormant.

The hens that do not fatten or lay should be marketed if, on close inspection, no reason is discovered for supposing them not fit for food. If one feels in any doubt about that, and has such scruples as he ought to have about selling diseased poultry, he can dress and draw the fowls, and market only those in which he finds the organs normal. Sometimes there is digestive weakness without disease. It might be overcome, and the fowl put in good condition in time, but it is not profitable to keep and feed such fowls, for quite generally they consume as much food as the others, but the food passes through the system, and is voided without much having been assimilated.

To Fatten Fowls in Summer.

The fowls in Lot 3 are to be sold as soon as marketable. Some of them may need no fattening and may, if convenient, be disposed of at once.

To fatten the others, shut them up in a comfortable pen, feed once a day a mash composed of equal parts corn meal and bran, with about 10% of the combined bulk of the meal and bran red dog, or white middlings, or low grade flour, with as much good beef scrap or meat meal added as they will eat freely. Keep cracked corn before them all the time. Give a little green food daily, just enough for a relish. See that they are well supplied with water. Keep them quiet. If any hens are disposed to be quarrelsome, remove them and fatten by themselves in small coops.

Sell the hens as soon as in good plump condition. Don't try to get them excessively fat. Our market does not want that kind of poultry. There may, as in Lot 2, be a few hens that will not fatten; dispose of them the same way.

This method of fattening is one that anyone can use anywhere — in *almost* any season. I say "almost any season," because in an extremely hot season it is sometimes found hard or impossible to fatten fowls this way during the warmest period. I am not prepared to say whether crate fattening would accomplish the desired results with those hens at such times, but am inclined to think it would not.

As a rule it does not pay to give much time at this season to the hens that are not to be kept over. If they cannot be put in good marketable condition quickly sell them just as they are.

Molting.

Of late years a good deal of interest has been manifested in the matter of regulating the molting of fowls.

It has been claimed that a period of fasting or short feeding followed by a period of very heavy feeding of rich foods would cause the fowls to quit laying, drop the old feathers quickly, grow the new coat quickly, and promptly resume laying. This theory was, I believe, first exploited by an institute lecturer, who was also responsible for several other somewhat sensational stories. I could not learn from him that the hens he claimed to have made molt did resume laying promptly. In fact he appeared not able to produce any proof of real results, though he maintained that he had succeeded in controlling the molt. Various experiments made along this line have had varying results, not all fowls being affected alike by the treatment. It seems to be established that in some cases a molt is enforced, but not that there is any practical advantage in doing this. Investigations, however, have not been general enough to warrant any positive general conclusions, and as far as I know none have followed the hens through the year following the enforced molt. As the case stands I could not advise anyone to attempt to control the molt in this way except with fowls he was willing to experiment upon.

The Time of the Normal Molt Varies. — Hens begin to drop some feathers in June, may drop many in July, and from that time on till winter in any large stock fowls may be found in different stages of molting. If there are any general rules that could be laid down in regard to molting I have never discovered them. The greater number of hens will be "in full molt,"

that is, quite bare of feathers, and not laying, in September and October, though often hens that keep on laying in the fall do not get right down to growing the new plumage until November.

Rations for Molting Hens.

The food requirements of the molting hen do not differ materially from those of the laying hen. Some authorities prescribe rations rich in protein and low in fats, as containing in better proportion the elements required for feather production.

I began by using such rations, but soon discovered that my hens molted better, growing a much better and glossier coat of feathers if fed a ration rich in fats. Experience in this respect has been the same with hens molting in midsummer, and those molting in late fall, except that the hens molting in summer molted much more quickly and often laid continuously right through the molt. For many years my method of feeding molting hens has been:—

Morning.—Mash as in Mash No. 1, Lesson I., but nearly half corn meal.

Noon.—(or all day feed)—Wheat or barley broadcasted in the yards.

Evening.—Cracked corn scattered in the yards, followed just before the hens go to roost by as much more cracked corn, fed either in troughs or handfuls on the ground.

Cabbage before the fowls all the time.

Generally hens do not all molt alike. Some molt quickly, others slowly. It is a good plan, whenever practicable, to keep them sorted over, and have all hens in one pen or lot very nearly in the same condition.

LESSON XII.

Continuous Poultry Houses.—Continuous vs. Separate Houses.

SINCE the subject of this lesson was announced, so many readers about to build have written me asking my opinion as to the relative merits of continuous and separate poultry houses, that I have thought it better to make the discussion of that subject preface the descriptions of continuous houses, and so give those interested in them the opportunity to consider the plans and the advisability of building such plans in the light of what may be said for or against the system of keeping poultry in large, long houses.

It is undoubtedly more convenient for the poultry keeper to have his fowls all under one roof or in connecting buildings in winter. It is easier and in every way more agreeable to be able to pass from the grain and feed room to any and all of the buildings occupied by fowls without going from under cover, and without taking more steps than absolutely necessary.

In winter, again, for long periods, and sometimes through quite the entire winter, it may be impossible for the fowls to get out beyond such little strip of ground next their house as may be kept clear of snow for them, and hence all the advantages of large yards and free range are for the time inoperative.

As far as winter poultry keeping goes, in all latitudes and localities where there is much snow or mud, there is no advantage in detached, separate houses, in either of the matters alluded to above, i. e., economy of labor and benefit of ample outdoor room to the fowls.

There is, I think, but one point in which a continuous house is objectionable in winter. If built as many such houses are built, without due precautions to avoid drafts and to secure uniform conditions throughout the building we are very apt to have conditions of temperature, dryness, etc., varying greatly within the house and in parts of it becoming so unsuitable that the fowls in those pens do not do as well as the others do. This difference in conditions in pens in the same house is not the only cause of uneven results, but it is the cause very often when not at all suspected. To test for it. If there are in a long building with numerous pens certain pens of fowls laying well, and others not laying well, or some perfectly healthy while others either seem unthrifty or one by one contract some disease, (particularly colds) though there is no reason in the stock itself or in the care given that will explain the differences, try exchanging the fowls in two such pens. If, as will often be the case, the pens, soon after changing places, begin to change in condition and productiveness you may be quite sure that the bad condition and unproductiveness are due to some fault in the building. If a building is so constructed that no difficulties of this kind arise in operating it, the continuous house system is, I think, without question the best system for winter poultry keeping.

—

Section of Continuous House With Connecting Pens.

A ground plan, A 1 front, A 2 partition between pens.

Equally without question, I think that for other seasons of the year it is the worst system. If a large number of fowls are to be kept on a small piece of ground, we must consider the continuous house system the best for such circumstances; but it is a mistake, and a bad one, for a person who wants to keep a large stock of fowls to use intensive methods.

I do not mean by that that poultry cannot be made profitable under such conditions. It would be absurd to claim that they could not—for they have been kept at a good profit under such conditions by a great many people. But the profitable life of the intensive poultry plant seems to be short. The ground becomes contaminated, and the stock does not thrive as it did when the plant was new. The system is a laborious one for the poultryman—keeping his nose on the grindstone all the time, and unless he is uncommonly pleased with that process, when results begin to be less

satisfactory he becomes discouraged, and grows somewhat careless and slack about his work, and his plant soon becomes an unsatisfactory proposition. This has been the history of many a venture in which the poultryman, after a few years struggle, succeeds in getting his intensive poultry plant on a paying basis, only to discover after a few years more how difficult or impossible it will be to keep the plant up to the mark made in those fat years.

For all times of the year but winter, and perhaps we should include early spring, the easiest way to handle fowls is to give them either free range, or yards so large that they have all the advantages of free range. To keep fowls in this way houses of one or two pens are used. Whatever may be said of the relative merits of warm or closed and cold or open houses in winter, there will be no disagreement on the proposition that almost any old leaky shed will do for summer.

The ideal poultry plant I would consider a plant that gave the best conditions for both winter and summer. That means practically two sets of buildings; continuous houses convenient to the dwelling and to other outbuildings for winter, and separate houses distributed about the farm for summer. This is what I would have if I were keeping a large stock of poultry on a large farm. On a place of but a few acres, or on a small lot, I would be governed by circumstances. On my place now I have the two pen building described in Lesson IX., and five smaller one pen houses distributed about the place. Winter before last we had these small houses up near the barn, the two pen house being farthest from the dwelling. In the spring all the small houses were put beyond the two pen house, the farthest away being some 200 ft. from it. Last winter the small houses were used as in summer, because I did not care to move them in and then back again in the spring. The intention is to have the south end of the barn basement fitted for poultry, and keep in it through the winter about as many hens

as the small outlying houses will accommodate in the summer. This, as the reader will notice, is a modification of what I call the ideal system, which is a complete double system.

For my own use, and for all round economy, I would use the double capacity, one set of buildings for winter, and the other for summer, rather than adopt the plan of grouping small movable houses together for winter, and spreading them over the farm in summer, because I believe it would be cheaper in the long run, and altogether more satisfactory.

It is a good deal of a job to move a building having a capacity of over a dozen to fifteen fowls, anyway you do it. To move a lot of such buildings twice a year, it will take but a few years to make the cost of movings exceed the cost of a summer plant. Further, the moving of buildings twice a year may interfere seriously with other work; or if other work interferes with it the delays are expensive, and may put operations out of joint for the whole season. Then the grouping of small buildings close together makes a very poor substitute for the continuous house system in bad winter weather. I would not say it was impossible to group the separate buildings temporarily, and arrange everything conveniently, but I have not seen it done. Where I have seen one pen houses placed close together, it would have been as well in my judgment to have placed them far enough apart to make a system of houses like my two pen house. Such houses placed with ends 30 to 50 ft. apart, and the rows of houses 150 ft. or more apart give a medium between winter and summer conditions of convenience that will be found very satisfactory on small farms, or on farms where it is desired to keep the fowls permanently on the same ground.

In conclusion I want to say to the reader debating the house question—Don't give undue weight to my opinion. I have tried to emphasize the need of adapting systems or plans to conditions. I would also emphasize the need of adapting them to personal preferences. Because I don't object to traveling even through the snow the few hundred yards which must be traversed in caring for my fowls as I have them in winter, it does not follow that you will be suited with such conditions. One reason I don't object to it is that that may be the greater part of my *outdoor* exercise at that season. If I were out doors all day it might be different. I might still continue to do it as on the whole the best arrangement, but very likely would consider that feature sometimes a drawback.

Plan your buildings to suit your conditions, your methods of poultry keeping and yourself. If you have preferences indulge them unless you find them condemned by persons of good and fair judgment. Don't take anyone's ideas on authority unless the reasons they give seem good. Some useless features have been introduced into all buildings in a community merely because some one who was successful had them in his building, though these features were superficial and did not at all affect results.

Section of Continuous House With Connecting Pens and Enclosed Roosts.
B ground plan, B 1 front, B 2 partition between pens.

Continuous Poultry Houses.

The continuous poultry house, as the descriptive name indicates, is a system of similar compartments, or pairs of compartments united in one long building. The single pen or pair of pens is made the unit of the system. When a single pen is the unit, each pen throughout the entire system, which may extend to a number of long buildings, is in construction a duplicate of every other pen. When the unit is a double one it is because the plan adopted makes some arrangements, as of doors, windows, roosts, and nests alike in the alternate, but opposite in the adjoining pens.

Of the plans of separate and two pen houses, given in Lessons IX. and X., the first house in Lesson IX. is not adapted to become the unit of a system in a continuous house. A pen of the second house might be used as the unit in a short system, but the longer the house the more inconvenient it is to have to go through the end pens to reach the middle ones, and I would say that it would not be advisable to use this arrangement for a house of more than four pens. With the dimensions used in my building this would make the house 56 ft. long.

Mr. Davis' plan in Lesson X., as given, is not adapted to a continuous building. It might be made so by simply changing the position of the roosts. The plans given by Mr. Pattison, Mr. Ryan, and Mr. O'Brien all show pens to which may be added similar pens, with the same limitations as I gave in commenting above on adapting my house to a continuous system. Mr. Grosvenor's plan needs alterations all around to make it a good unit for a continuous house system, though, as will be seen by comparison with some continuous house plans, the effect of his arrangement is not so unlike theirs. It is only that dimensions and location of openings and fixtures are made without reference to possible adjoining pens.

By reference to the classification of houses in Lesson VIII., the reader may note that with very few exceptions the features there enumerated may be applied in the building of continuous houses. The three general styles of construction are all used in continuous houses, while of the seven styles of roofs mentioned, only two — the monitor top and the double pitch east and west roof — cannot be used with continuous houses facing south, or nearly south, as most such houses do.

Roughly estimating the materials for a continuous house consists merely in taking the estimates for one pen or section and multiplying as many times as the unit is to be repeated in the long building, except in this one point, that the ends of the building are the same for one

Section of Scratching Shed House Without Walk.

C ground plan, C1 front, C2 partition between sheds, C3 partition between pens, as I gave in commenting above on adapting my house to a continuous system. Mr. Grosvenor's plan needs alterations all around to make it a good unit for a continuous house system, though, as will be seen by comparison with some continuous house plans, the effect of his arrangement is not so unlike theirs. It is only that dimensions and location of openings and fixtures are made without reference to possible adjoining pens.

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Diagrams of Two Pens in Continuous House, With Walk in Rear.

In A the roosts run parallel to the walk; in B, parallel to division partitions.

my two pen house as the unit in a long house. Next a pen of the same size and general construction, but with single pitch roof sloping north, and with the interior arrangement changed to bring the roosts in adjoining pens, and the fowls on the roosts closer together, and make easier the enclosing of the roosts, if that is desired. This second plan would appear to be the better adaptation of my plans for fowls that seemed to require warmer quarters than I give. With this plan it is possible, by doubling the wall back of the roost, to keep the fowls as close at night as in a house built so all around, while the expense of building is much less. I would commend this plan for a trial to any who hesitate to go to the extreme in simplicity of construction.

The nests in this plan are placed along the rear wall, not as conveniently for the collection of eggs as the nests in the first plan, but better to prevent egg eating, if there is danger of that.

The third plan shows a section of the once popular scratching shed style. Let me say in regard to this plan that, while I do not consider it the best or most economical when it is desired to keep as many fowls as possible in a given space, if the purpose is to keep fowls, especially those least able to stand severe weather in the best of condition, this style of house can be arranged to furnish conditions as nearly ideal as we can make them.

It has been found in using scratching shed houses, as at first exploited, that the fowls generally preferred the open shed. This may have been partly because they were fed there, and there was nothing to do in the other room but sit on nest or roost. Now most of those who built scratching shed houses wanted to stock them to the fullest possible capacity, and, finding that the hens preferred the shed during the day time, and that the muslin fronts were not altogether satisfactory, many of them put glass windows, or large wooden doors, or a combination

pen or for twenty, and instead of the solid wall between pens we have generally a partition partly of boards and partly of wire netting. For absolute accuracy in estimates, one should make drawings of his completed house, and figure from the drawings; and to avoid errors in construction this should be done anyway. It is not always necessary that the amateur builder (most poultrymen belong to this class) should follow the plan he uses in every detail of construction, but it certainly is advisable, and personally I would consider it necessary that before beginning building he should know just how he proposes to put his building together, and the only way I know of demonstrating to himself that he does know is to prepare a plan to be followed as he works. His plan may be very crude from an architect's standpoint, but if it indicates what he is to do in such a way that he can go ahead without making mistakes that is all that is necessary.

The figures accompanying show first a single section of

of these in the front of the shed, and took out the partition between roosting room and scratching shed, thus making a scratching room house. But some few breeders of fine fowls, with the object of keeping their fowls in the best possible condition, have gone back to what seems to have been the original scratching shed idea, and used the closed part as any other closed poultry house, making the open shed an additional protected outdoor privilege. Those who have tried this way of handling breeding stock think it pays.

Walks in Continuous Houses.

The plans we have been discussing do not provide for a walk in the house. When a walk is to be used the floor arrangement should be as in the accompanying diagrams. The first two are for the ordinary closed house, and are identical except in position of the roosts. The third shows how a scratching shed house is built with walk in the rear. On page 105 is reproduced a diagram of such a scratching shed house built some ten years ago. As far as I recall now this is the only house built on this plan I have seen.

Houses are sometimes built with the walk in front of the pens. I have seen but one such, and have seen descriptions of only one or two others. The plan does not commend itself to many poultry keepers. The sun and light have not such ready access to the pens, and the walk has to be elevated to allow the fowls to pass under it to the yards in front of the building. We may consider this arrangement as warranted only by peculiar and insurmountable conditions.

Doing the Work From the Walk.

A number of continuous houses, both short and long, have been planned to do all work from the walk, with the roosts placed as in the second diagram, the nests under the droppings boards, and the feed troughs either below the nests or in the passage and accessible to fowls standing under the nests. Not many who have arranged this way will build after that pattern a second time. In only a very small proportion of the houses so equipped have I found the work all being done from the walk as designed. It is not nearly as convenient in practice as it looks on paper, and when the pens are never entered in doing routine work there is likely to be a great commotion among the hens when it is necessary to go into the pen.

Diagram Showing Method of Building Scratching Shed House With Walk.

The Passing of the Continuous House.

The continuous house plan in its extreme developments was a fad. Men seemed to vie with each other in building long houses. From buildings 100 to 150 or at most about 200 ft. in length they went to in one case, as my memory serves, about 600 ft. The shorter buildings answered their purpose very well. The very long ones, as a rule, were on plants that failed, and these unwieldy buildings clearly had something to do with the failure.

Just at present there is reaction against intensive methods, and with it inevitably goes a lack of interest in continuous house plans which may easily be carried too far. In the preliminary remarks on this lesson I tried to show how and where the continuous house plan can be used to best advantage, and is superior to separate houses. In considering house plans, as in nearly all matters relating to poultry keeping, we will find it best not to commit ourselves unqualifiedly to any one idea.

Open Front Scratching Shed House With Walk in Rear.

LESSON XIII.

Incubator Rooms and Brooder Houses.

IN DISCUSSING the topics under the title of this lesson, I shall not go into details of construction as fully as in the treatment of houses for adult stock, for these reasons :

In the first place to do so would involve a good deal of repetition of what has appeared in the other lessons, for many small buildings used in connection with artificial methods are quite like some of those already described. In the next place the larger buildings for pipe systems of brooders must often be planned with reference to the arrangement of the heating system, and the incubator and brooder manufacturers that sell heating systems furnish plans especially suited to them, and I would by all means advise any who intend to build brooder houses for pipe systems of brooding to decide first on their heating arrangements, and build after designs furnished by the manufacturers.

Incubator Rooms.

For an incubator room most incubator operators prefer a cellar. It is desirable that the temperature of the room in which the machines are to be operated should not vary sharply with outside fluctuations of temperature. This condition might be obtained in a room wholly above ground by making the walls very thick, but such a building would be expensive. The conditions sought are as nearly as possible attained—and that at comparatively small expense by building cellars, as shown in the illustration.

Sometimes the cellar used is under a building, but in general cellars built expressly for this purpose are placed at a little distance from other buildings. The use of the cellar of a house or barn for incubators is quite common when the number of machines operated is too small, or the permanence of the use of machines too uncertain to seem to warrant the expense of construction of a special cellar.

In making use of house and other cellars under buildings of more value than poultry buildings generally are, one has to consider first of all how it affects his insurance. At present most insurance companies either refuse to take risks under such circumstances, or charge a very high rate. A movement is now on foot among incubator manufacturers to induce insurance companies to modify their regulations about incubators and brooders. Almost simultaneously with the beginning of this movement some people in the insurance business seem to have discovered that harsh regulations about the operation of incubators and brooders were very poor policy. So it is likely that before long there will be a change in conditions, and an

agreement as to the circumstances under which incubators may be operated in dwellings and such other places as people are likely to want to use for them.

More fundamental objections to putting incubators in places not originally made for them are that too often the surroundings are not what could be desired. When an incubator is operated in a cellar or room used for other purposes it is too much exposed to outside influences, and when a part of such room is partitioned off for the incubators, the most favorable conditions for the operation of the machines are seldom obtained. The chief fault in such improvised quarters for incubators is the lack of suitable ventilation. A common cellar is often but an ill ventilated place at best, and the air in it good only when brought in in stronger currents than are wanted in an incubator room. When a portion of such cellar is set apart for incubators the atmospheric conditions in that part are generally not made better than in the main cellar.

How far poor ventilation of the place in which the incubators are operated is responsible for

A New England Incubator Cellar.

weak chicks and for losses of chicks which were thought all right when they hatched, it is impossible to say. Some of those making careful investigations into diseases of and mortality among artificially hatched chickens are beginning to be very strongly of the opinion that a lack of fresh air in the machines is one of the most common causes of trouble, and that this lack of air is due not so much to faults in machines, but to the imperfect adjustment of the surroundings — that is, of conditions in the incubator room to the requirements of the machines, and the impression gains ground that in future more attention will have to be given to the balancing of external and internal conditions of the artificial hatcher.

It appears from some observations and experiments made recently that the time may soon come when directions for operating incubators will be much more comprehensive than at present, the necessary variations for different conditions being tabulated so that the operator may the better adapt the running of his machine to existing conditions. This may not be done with absolute accuracy, but far better than by guess. Perhaps I can make the meaning more clear

by an illustration from amateur photography with which many readers are somewhat familiar. The photographer can purchase a little book containing carefully worked out tables which enable him to determine in a moment just what time to give an exposure with the diaphragm of any given dimensions and with any possible combination of light and surrounding objects. By the use of such tables the photographer reinforces and regulates his judgment, and is enabled to eliminate from his work much of the risk of spoiling plates or films and losing much desired pictures. So in the development of artificial incubation we are evidently coming to a time when the operator will be given more appliances to record conditions he has to reckon with, just as the thermometer now records the temperature; and will be furnished tabulated instructions as to the adjustment of the machine to conditions.

Meantime the amateur incubator operator need not be discouraged because in the operation of incubators he must rely much on his own judgment. At this stage of affairs he may get as good results as others by simply being sure he is on the safe side.

I went one day to see the new incubator cellar on a large duck plant in this state. It was

One of Farrer Bros.' Brooder Houses, W. Norwell, Mass.

built something like that in the illustration, but with the walls high enough above ground to let in full half windows on the sides, while the roof was high in the middle. As you entered the door and looked about the effect was much like that of an empty church. In a church or any other building for large gatherings the walls must be high that there may be in the room a volume of air great enough to move and create the necessary ventilation without great change of temperature. The builders of this incubator cellar had the same end in view. There was room enough in the building for a cellar higher than usually used for incubators and for a very large loft over it. There was so much room that my first question was as to whether they had completed the building, or intended to make a loft. The reply was that the building was to be used as it was; that it had been planned to give abundance of air to the machines. I noticed no odor from the lamps and machines in that cellar. I have gone into many incubator cellars in which the odor was very bad. In some of these this was because ventilation was defective regardless of the number of machines in operation; in others it was because entirely too many incubators were in operation in the room.

Therefore, wherever you run an incubator see that ventilation is good enough to remove bad air, and wherever you run more incubators see that this good condition is maintained. That it is possible to hatch chicks in crowded cellars where the air is bad, there is no doubt. There is lots of it done. That it is such chicks that give most trouble many think they begin to notice. Build the incubator cellar as large as you are ever likely to use it. Though it may always be too large—better that than too small. Space in it not needed for incubators may be used for an egg room or for storage of light, clean articles, as coops, egg boxes, and baskets, etc.

As to the structure of the incubator room: If a cellar, the walls below the surface should be of stone or brick, the floor of cement, the entire room above the ground lined with matched lumber, and the windows double, for this is a building in which it is necessary to keep the temperature moderate, avoiding both extremes.

Brooder Houses.

In artificial brooding there are two systems. In one small brooders each heated by its own lamp are used. In the other a hot water or steam heater sends the heat through a system of pipes that extends throughout a building constructed on the continuous house plan.

A pipe system is sometimes used for two or three brooders, but in that case the heater is small, and the entire system quite as easily portable as an individual brooder. Usually the building for a pipe system approaches a hundred feet in length, and may vary very much exceed it.

*View of Part of Exterior of Brooder House
At Lone Oak Poultry Farm, Reading, Mass.*

For individual brooders small buildings may be used, or the brooders may be put in such long buildings as are used for pipe brooding systems—a brooder with its lamp being required for each section in the building.

For those who hatch only a few small hatches each year the individual brooder in its own small building is generally more satisfactory. When the chickens no longer need the extra heat the brooder may be removed and the build-

ing used to shelter the growing chicks. Later it may be used for surplus cockerels or even for a pen of laying or breeding fowls.

Individual brooders may also be used in such continuous houses as are used for laying stock, one brooder in each compartment; but the brooder house especially fitted for individual brooders is as a rule used for brooding only, and the same is true of the pipe brooder houses.

Where large numbers of chicks are to be hatched in cold or cool weather I think the long brooder house with pipe heaters over the hovers is by all odds the best plan.

We say, then, that for growing winter chickens, for growing broilers and for all chicks which must be kept indoors or closely yarded the pipe system is preferable when operations go beyond the number of chicks which can be handled in a few brooders.

A few years ago a favorite style of brooder house arrangement was to build one end of the house for nursery brooders—these being individual brooders—for the youngest chicks and use the pipe system in the other end. A bank of pipes extended along the north wall of the nursery supplementing the heat of the individual brooders. This arrangement was devised because of the general difficulty in keeping youngest chicks under pipes warm through cold nights. Of late years it has been discovered that merely using a heater of sufficient capacity makes it possible to maintain the heat under the pipes.

This house is only 3 ft. high at the plate on south (front) side, and 5 ft. from the level of the pen floors to the apex of the roof. The floor of the passage in the rear of the pens is excavated to a depth of 2 ft.

The width of the house is 14 ft., the length of each pen being 10 ft., and the inside width of the walk 3 ft. 9 in. Each pen is 5 ft. wide, and is lighted by a half window (6 lights, 9 x 12) in the middle of the front of the pen.

To support the roof and carry the partitions between the pens there are two upright pieces of 2 x 3 scantling for each partition; one at the passage, going from the floor of the passage to the apex of the roof, and one a little forward of the middle of the house, which goes from the floor of the pens to the roof. Partitions between pens are of solid boards 2 ft. high. The 8 in. board extending from the passage half way forward is not a part of partition, but a board used to put across pens to keep small chicks close to the hover.

The real trouble here, as so many places in poultry keeping, was false economy, the desire to keep close to the limit. Poultrymen put more chicks than they should in a brooder, then tried to keep the brooder warm through extreme cold weather with a heater only equal to heating it in ordinary cold weather. They have learned now that it is easier and cheaper to use a heater that will do the ordinary work required of it without working near up to its capacity than to try to get the results by overworking a smaller heater.

In designs for continuous brooder houses, there has been variety without end. Almost every model of a continuous laying house, except the scratching shed and full monitor top

plans, I have seen in brooder houses—and these may have been used. The prevailing style, however, is the plain long house with double pitched roof, and the types of this style of house do not vary strikingly in appearance or construction. Some are full height (about 6 ft.) at the sides. Others are built lower, the front wall being not more than three and a half to four feet high, and the rear wall a foot or so high. In such a house the walk is excavated to a sufficient depth to give plenty of head room over it, while the rest of the

Partition Between Pens and Passage in Lone Oak Farm Brooder House.

This partition consists of two light frames for each pen covered with inch mesh poultry wire, and hung on hinges.

house has a floor only a little higher than ground outside. The object in building the house low is not so much to save cost as to conserve heat, the low building being more easily kept warm than the higher one. Whether there is, on the whole, any real economy in saving heat in this way seems doubtful. From what I have seen of the low and the full height houses in operation, I consider the latter the better plan. There are several reasons for this:

- 1.—The house heats up too much on warm winter days, and becomes uncomfortable early in the season.
- 2.—It is an inconvenient house to work in as soon as you have to get out of the walk.
- 3 —It cannot be well adapted to other uses.

These reasons will seem strong, or not according as those who consider them look at the points involved. It seems to me that the low roofed house fails to meet several conditions which may have to be considered in operation, while with heaters of ample capacity the advantage of reducing the proportion of cubic to floor space is not of such importance as when the smallest possible heater is used.

Further, in view of the fact that it may become desirable to change the lines on which a business is done, it is good policy to use buildings adaptable to any line whenever it is practicable to do so.

LESSON XIV.

Simple vs. So-Called Scientific Poultry Feeding.

SIMPLE poultry feeding I would define as following, or trying to follow, the practice of successful poultrymen.

It is what might well be called the "natural method" of feeding; and I might add that it seems quite the natural thing for the poultry novice to begin to learn to feed in this way. The first thing he wants to know about feeding is how successful poultrymen feed. Whenever he hears of unusually good, or even of average good results he wants to know how those fowls were fed and housed — that he may treat his the same way.

In a general way we may say that the instinct which prompts him to do this is a safe guide. In every matter in life we learn by doing as others do, and learn most by trying to follow those who have done best.

As in other matters, one who tries to adopt the ways of another, or to follow general methods, does not always succeed. There may be various reasons for this; different conditions of which he makes no account may require a different method; he may not properly understand and apply the method; or he may fail to adapt other features of his management to those he tries to introduce, etc. There is no way of guaranteeing success by imitation of the successful, but, on the whole, and in the long run, that is the way to achieve success, and, as I have said, the instinct which prompts the beginner to find out and try to follow the methods of those who have succeeded is a safe guide. Following it, he may advance more slowly than is agreeable, and his progress may be marred by mistakes, but if he persists he wins out in the end.

In his efforts to learn how to feed poultry in the simple natural way the novice is perplexed by the lack of explicit, exact instruction on what seem to him the points where it is most necessary that instructions should be very specific, and leave no chance for mistakes. Most important of these is the question of quantity. He wants to know how much to feed in the aggregate, and the exact proportions of the different foods used in a complete or balanced ration.

He finds no practical feeder willing to give him this information. If one can tell him just how much he feeds to a given number of hens under certain conditions, he qualifies the information by adding that this amount might not be just what the novice's flock of the same number might require, and that it also might be necessary to somewhat vary the proportions of the different articles in the ration. He must use judgment, feed according to results, condition of the fowls, etc.

To many novices this lack of definiteness is exasperating. They cannot understand the necessity for it, and they conclude that the trouble is not that it is impossible to give specific instructions, but that those who give them qualified instructions for feeding have not observed closely enough to be able to be exact.

To the novice in this frame of mind comes the expert writer on scientific feeding, purporting to give him in his science of feeding precise and exact instructions as to the feeding of fowls for any and all purposes.

This science of feeding is very interesting, and as long as certain essential things are disregarded, seems very plausible. Let me state it briefly:

The Modern "Science" of Feeding.

The discussion of scientific feeding begins with the proposition that certain food elements of different character are required to sustain life, promote growth, and keep up the various functional activities of the body; and that the proportion of each of these elements required can be ascertained and expressed in mathematical figures, which, in turn, may be taken by the poultryman and applied in his practice. It is assumed that in this way he may arrive at sure results and absolute economy in feeding.

The Needs of an Animal Organism.

The food which a fowl takes into its system serves these three purposes:—

- 1.—To build up and sustain the organism.
- 2.—To keep up the warmth of the body.
- 3.—To furnish energy — strength — which is expended in every movement.

Perhaps as the same classes of food elements serve the second and third purposes we can still further simplify the statement by saying that the two principal functions of food are:—

- 1.—Nourishment.
- 2.—Heat and energy.

To provide for these two wants we have three kinds of food elements, technically known as *proteids*, *carbohydrates*, and *fats*.

These elements are found in varying proportions in the articles we use for poultry foods. Without attempting a scientific description of them I will give the following plain definitions suitable for the present purpose.

Proteids (or *protein*).—Albuminous or nitrogenous matter occurring in different forms in different kinds of food, but having everywhere the same essential qualities. In grains it is in the form of gluten. In milk it is casein; in meat and blood, fibrin; in bones, gelatin.

Carbohydrates.—Carbonaceous matter, principally starches.

Fats.—May be regarded as highly concentrated, condensed carbohydrates.

These are the principal food elements. Besides them all foods contain some (and some a great deal of) water, and most foods contain mineral and fibrous matter which are mostly indigestible.

The Theory of Scientific Feeding.

The theory of scientific feeding is based on the assumed necessary relation of the needs of the fowl to the food elements which are given it to supply those needs.

Thus the scientific authority on poultry foods says that having ascertained just what food elements, and in what proportions, were required to produce certain results with a certain number of fowls, we are able from this data to formulate a rule which will apply universally. Whether or not this is the fact we will inquire a little further on.

The expert in scientific poultry feeding, following the lead of scientists in cattle (and in human) feeding studies, makes use of two measurements of food values which he calls *nutritive ratio* and *potential energy*.

By *nutritive ratio* he means the ratio of the proteids or nitrogenous matter to the combined values of the carbohydrates or starchy matter, and the fats, (the value of which are for the purpose reduced to terms of carbohydrates).

By the *potential energy* of a food he means its heating capacity, its fuel value, which he expresses in *calories* per ounce.

His science of feeding proceeds upon the principle that, having established standards of nutritive ratio and potential energy as the proper standards, whatever combination of foods he can make that will figure out this ratio and this heating capacity, will be a complete or balanced ration, while a ration that will not figure out to such standards is an incomplete, ill balanced ration.

Some Scientific Fallacies.

It is not necessary to explain the theory in every detail. Of more importance here are certain fallacies promulgated in connection with the teachings of scientific feeding. Chief of these is the oft repeated statement that a fowl fed on a single grain — corn being most often used in illustration—would in time starve to death, because corn did not supply the elements it needed in proper proportion. Like most fallacies, this is a perversion of the facts upon which it is supposed to rest. Neither corn nor any other single article of food makes as good a diet for fowls as a ration in which a variety of grains is used. Nor is a grain ration, though composed of many different grains, as good as a ration in which vegetables and meat are used to supplement the grain foods, but the bad effects of poor rations are not so conspicuous as some say, nor is the difference in results always as marked as some would have us believe.

To show the absurdity of the common opinion that corn, as compared with such grains as wheat, oats, etc., is very deficient in "flesh forming" elements, and contains a dangerous surplus of fats and starchy elements, let us make a few comparisons, taking figures from the tables in "Poultry-Craft," which were made from U. S. government bulletins, giving average analyses of food stuffs:

Grain.	Protein.	Carbohydrates.	Fats.	Nutritive ratio.	Potential energy.
Corn,	10.4%	70.3%	5%	1:7.9	106
Wheat,	11.9%	71.9%	2.1%	1:6.3	102
Oats,	11.8%	59.7%	5%	1:6.1	96
Barley,	12.4%	69.8%	1.8%	1:6	100

Now it is plain that ordinary or average corn has in it a smaller percentage of protein than any other of the grains in the list, and that its nutritive ratio is very much wider, and its potential energy higher. And if we accept as right the standards of nutritive ratio and potential energy given by the writers on scientific feeding, we must admit that corn is a very bad and dangerous food.

But in regard to these standards the position I take is this: So far as I can discover, not one of these would-be authorities has in a scientific way established standards for poultry feeding, and the standards which they use, adapted from other lines of feeding, require combinations which no practical feeder would think of using.

It might be said that this was because of the ignorance of the practical men, but as far as I am able to learn, no "authority" on scientific feeding has ever done any feeding that by its results attracted attention or made a reputation as a good and skillful feeder.

Leaving out of the question then what the "scientists" say about corn as compared with these other grains, let us inquire what practical feeders find they can do with it in actual practice.

The four grains mentioned above have certain physical characteristics which have to be considered in feeding them. The prominent characteristic of corn is the size of its grains, an ordinary grain of corn being about five times as large as an ordinary grain of wheat. Hence, a fowling corn will pick up what it wants (provided the supply is sufficient) with about one-fifth the effort, and in about one-fifth the time, that it would require to get a meal of wheat. This means that fowls fed whole corn do not take as much exercise as they feed as those fed smaller grains. In this point we find a reason why whole corn is not the most desirable food that is independent of its composition. The same objection would apply to any other grain if of like size.

To overcome this objection to the form in which corn grows the corn is cracked to different degrees of fineness for fowls, and used in this form. I think it would be impossible for anyone to show in practice any appreciable difference in results of the use of cracked corn and wheat in moderate weather, while in extreme hot weather it would give less satisfactory, and in extreme cold weather more satisfactory results than wheat, all other constituents of the ration remaining the same.

Nature's Checks and Balances.

From the fact that under what might be called average conditions it makes no appreciable difference in results whether corn (cracked) or wheat is fed it is reasonable to conclude that

the differences between them which analysis shows have not the significance attached to them by those who consider wheat a *good* and corn a *bad* food for poultry.

We have then in a very large class of instances the same results from rations which chemically show a difference which if each food element could be used only for its special purpose should also appear in the results.

Why does it not appear in the results?

Because the adaptation of each kind of food elements to its special purposes is not rigid. In the digestion and assimilation of food a shortage of one kind of elements is made up, within limits, from an excess of another kind, or failing that from reserves in the system of the animal or fowl. Just what the limits are within which the fowl can adapt the food it takes to its wants we do not know.

We may reasonably conclude that they are not fixed limits, but vary under different conditions and in different fowls. What we do know is that using the common food articles used by poultrymen in about the proportions in which they are mostly used, we are in absolutely no danger of any of the evils which "scientific" writers on poultry feeding assert are sure to result from improperly balanced rations. If feeding in this way we have trouble it is pretty sure to be due to other causes than the composition of the ration.

The Scientific Rules Don't Work.

I have used corn and wheat in the above illustration because wheat is generally considered the best single grain for poultry, and corn, though more extensively used for poultry food than all other grains combined, is by many writers called a very unsafe and bad poultry food; and also because in corn we have the grain which is farthest from the assumed standards of scientific feeding. If comparisons of results of feeding wheat and corn in rations in which each is made the exclusive unground grain food indicate anything at all, they show that it is nearly always possible for the fowl given a sufficient supply of either to adapt it to its needs, and therefore that it is not necessary for the poultryman to try to balance the ration exactly before feeding it.

On the other side it is possible to show that oats, which theoretically are classed as nearest the correct standard for feeding of any grains, are not eaten well by the fowls if they can get other grains, and unless the oats are of much better quality than it is usually possible to get in our markets, fowls will eat only enough of them to sustain life. So if we take wheat as our standard grain food and compare other grains with it both as to composition chemically and as to practical results in feeding, we find that the food which is theoretically poorer is practically better, and vice versa.

From which it follows that the application of the assumed feeding standards is not a reliable working rule. Whether other standards could be selected which would give us a rule that would work accurately we need not here inquire. To date they have not been.

Fixed Standards Not Applicable to Varying Conditions.

There is another most important point to consider: — Fixed standards can only exactly fit certain conditions. If it is necessary that the feeder should exactly adapt the ration to the needs of the fowl, it is necessary that he should vary the ration to suit varying conditions, and of course he must know just how and how much to vary it for any given conditions.

In the simple, natural method of feeding, the feeder's aim is to give the fowls enough food and in such simple variety that there will be no serious shortage of any one element. Beyond this he does not try to go, but leaves it to the appetite of the fowl to select what proportions of each food shall be taken into the system, and to the natural operations of the digestive system to further compensate for errors of appetite.

The scientific feeder may say that by his system and by the use of his rules or his rations the desired economies of food are made certain, and nothing left to the chances of the fowls' appetites or functions, but this is all theory that has never been demonstrated.

Still another obstacle to the practical application of the methods of scientific feeding is found in the lack of uniformity in quality of poultry foods. The analyses given are average analyses. As a matter of fact a lot of corn may contain more protein than the particular lot

of wheat with which it is compared. Without an analysis of every lot of every article he feeds the feeder does not know how closely he approximates the standards he tries to apply in scientific feeding, and is in reality as much in the dark and leaving as much to nature as one who simply follows common practice.

The plain truth about scientific feeding as it has been expounded for poultrymen is that what there is of it cannot be applied by common poultrymen under common conditions, and that it leaves out of consideration the variations in the needs of fowls from day to day which must be reckoned with if there is to be anything like an exact adaptation of rations to actual needs.

And the essential difference between simple or natural, and scientific feeding of poultry is that the first trusts much to inherent tastes and tendencies presumed to be implanted in the organism by the creator, while the other depends wholly on arbitrarily assumed and artificial rules.

The Summary of the Whole Matter.

In a nutshell the question of scientific feeding is simply this :

The exposition of it has an academic interest, but to attempt to put its formulas into practice is to attempt to work a problem in which some of the necessary factors are not given, and cannot be obtained: Our science of poultry feeding is but a "fragment of science."

How to Learn to Feed in the Natural Way.

To acquire skill in feeding fowls one must practice feeding, closely observe results, and use his judgment. Suppose I tell a boy that to project a ball through the air for a given distance a certain amount of energy must be applied, and applied in such a way that the ball, moving with the velocity given it, must describe a certain arc as it moves through the air. A scientist who perhaps could not throw a ball within two rods of the spot he desired it to reach might have figured out all about energy, velocity, etc., applying to the movement of the ball; but what good would it do to tell all this to the boy? And what boy in his senses would think of going out to play ball, and, as he prepared for the first throw, stopping to say to himself, "I must put into this throw just so much strength, and the ball must leave my hand at just such an elevation?" No, the boy takes the ball and throws it at the point he wishes it to reach. The accuracy of his aim depends mostly on his previous experience and skill in that line. If he misses, he tries again, and without being very conscious of its efforts, his mind, too, works all the time, comparing each throw with others, and estimating differences and gradually bringing the muscles under control so that before long the boy is sending the ball to the mark every time, and he may acquire marvelous control of the ball, not only in accurate throwing and in speed, but in throwing it so that its path shall be eccentric, or its speed changed in seeming defiance of nature's laws as it flies through the air. And all this he does without either knowing or caring anything about the scientific expressions of the various features of his performance. There is practically no limit to the number of illustrations that might be made on this point. Every line of work and every sport abounds in them.

When men work with machines, or with problems in which all necessary quantities and conditions are known, they may be guided more by set laws and rules, but even in such cases experience and trained judgment and skill are essential to superior work. In handling live stock it is impossible to follow arbitrary rules and get the results the rules anticipate with the uniformity that would justify such use of rules. The poultry feeder has to learn by experiment and observation how much to feed and when and how to vary his rations.

Nothing Hard About It.

From what has been said of the composition of the common grain foods, and of the functions of appetite and the capacity of the system of the fowl to adapt the food given it to its requirements, the reader may see that experiment and observation on poultry feeding do not necessarily mean intricate and puzzling processes. On the contrary they are simple and easy, requiring only very ordinary attention, just such attention in fact as must be given to any process or work requiring some exercise of judgment.

The greatest obstacle to learning to feed poultry well is that so many amateurs are wholly self trained, and are taught through books and papers, and such teaching and training cannot be anything like as effective as personal instruction. In addition to this the poultry keeper who begins in mature life to learn poultry keeping, and who is trying to learn and to make it pay at the same time, feels the effect of his errors and inefficiency much more than does one who learns while working for someone else. That is one reason why I always urge people going into poultry keeping to begin in a small way and increase very slowly. It takes time to acquire skill in feeding, and it is terribly expensive to practice on large stocks of fowls.

Another thing to consider is that the results of feeding are sometimes dependent upon or affected by circumstances which the novice either fails to see as in any way related to the feed-

ing problem,—or does not see in their true relation to it. Not infrequently the methods he adopts make good feeding difficult, and sometimes some little peculiarity in a person's way of managing his fowls will, when discovered, account to the experienced adviser for continued poor results. Such peculiarities and trifling errors are very hard to locate through correspondence.

Leave Out "Original" Ideas.

In general I think that a large part of the difficulties of amateur feeders may be traced to some "original" ideas or combinations of methods that they have introduced into their poultry keeping. To me the easy assurance with which novices in poultry keeping go about the improvement of methods recommended by experienced poultry keepers is a never ending puzzle. How few of them are willing to take simple instructions and follow them to the letter!

Still, to be fair to the novice, I must admit that a good deal of what is written for him about poultry keeping only adds to his confusion, and as those who know the least about it are usually the most positive in assurances of good results if their instructions are followed, and therefore seem to him the best instructors, he is very apt to prefer the less reliable instructors and instruction at first.

If a novice in feeding, (and by novice, in this connection, I mean any one who has not acquired a fair skill in feeding), will follow the method used by any successful poultryman right through, he will generally be getting fair results within a short time. It may be—and often is the case—that there are poor features, or unnecessary features in the methods of the more expert poultryman. As to this, the novice should not attempt to judge, or if he forms an opinion, should not make it the reason for a departure from the method, but should learn from some one of more experience whether the change he contemplates would work well.

Having adopted general methods of caring for fowls and of feeding which have given such satisfaction to some others that we may call them "tested" methods, the novice should direct all the attention he gives feeding to making a success of feeding by that method.

Let him remember that whatever method he may try will give him the results he seeks only in proportion to the skill he acquires in using it. There are many good methods—many tested methods of feeding, but his skill is as yet undeveloped and his capacity untested. If he changes methods he simply begins over again, and many a time when success comes by some method of feeding adopted after a brief trial and rejection of several others, that success is not due to that particular method of feeding alone, but is the result of the whole experience acquired, and would almost certainly have been attained sooner by persistence in the first method adopted.

"Practice Makes Perfect."

Take any good method (there are many of them) and learn to use it. As far as the instructions given are definite, try to follow them to the letter. Where they tell you to use your judgment, but give as they usually do, some statement of what should be about right, begin by using these approximate instructions and follow them until you have reason to suppose that some variation from them should be made. Then make the variation slight. For instance, in feeding fowls what is called "a full feed" of grain, the amount an average laying hen will take is an ordinary handful—not a heaping handful, but what one would grasp in the hand with the hand closed enough so that even if turned over only a few grains would fall. This is a rough way of measuring grain, but with practice many poultry men become surprisingly accurate in measuring grain out in this way as they scatter it for the fowls. They know or should know how many fowls are in each flock. If they expect the grain to be eaten up clean, as when fed on bare ground or very short litter, they give what they think the fowls will clean up. If they are feeding in deep litter they give more—as much more as they think necessary to let the fowls get a full feed of the grain in the time allowed. The judgment as to quantity does not have to be absolutely accurate every time, because as we saw in considering scientific balancing of food elements, the fowl could adapt them to its needs to some extent, so a fowl in good condition will not suffer if occasionally short-fed, for it has its reserves of fat to draw upon. Also the fowl

occasionally over-fed is not injured by it. If the feeder "is onto his job" he quickly notes that the food is not eaten, or if it is eaten the appetite is poorer at the next meal, and he feeds short for a meal or two, or perhaps omits a meal, and the fowl is soon feeding right again.

Feeling the Way.

To go back to the novice, if feeding what he estimates to be the average amount his number of fowls should get, they are in good condition and laying well, he may reasonably conclude that he is feeding about right, and keep right on giving that quantity.

If the fowls while in good condition, bright and hearty, do not lay well, the natural conclusion is that they need a little more food, and the ration should be increased. In such a case as this it is advisable to handle the fowls to ascertain just what condition they are in. If rather thin in flesh it is better to increase a little on every feed. If in pretty fair flesh it may be better to increase only on one meal each day,—for if fed too heavily they may fatten instead of beginning to lay as desired.

If hens begin to show lack of appetite, and "go off their feed," the rations should be reduced, and if a mash is fed it is best to make the principal reduction in the mash, for that is the meal that they get with least effort, and exercise is one of the best restoratives of condition and appetite.

When in doubt the novice should reread his instructions, and if he fails to find in them information that seems to suit the case, should not hesitate to ask questions. He should also try to make himself a good judge of food stuffs, for often the quantity to feed depends to some extent on the quality of the feed. Thus in feeding wheat I discovered a number of years ago what doubtless hundreds had discovered before, and thousands since, that hard wheat fed further than soft, and that red wheats, being generally harder, were more economical poultry food than white wheat. Again, in feeding damaged foods, one must sometimes make allowance for the damage; and, in feeding wheat screenings containing other matter, must estimate the amount of waste and feed accordingly. Also in feeding mashes; though a bulky mash fills the crop up more quickly, it must be fed more freely than a rich concentrated mash, when the intention is to make a full feed of the mash. If we suppose that the feeder makes generally what we may call a standard mash, and that in feeding it he allows one large iron spoonful to two fowls, if he makes a more bulky mash, that is, a mash with a larger proportion of such bulky and not highly nutritious stuffs as bran and clover, he must allow more. If he makes a highly concentrated mash with a large proportion of corn meal and of beef scrap or other meat, he must feed less than the usual quantity, for his fowls accustomed to cease eating when the crop has reached a certain stage of distention, are very apt to eat at first just as much bulk of the concentrated as of the ordinary mash. If they are of robust digestion it may not hurt them any. If they are not he may quickly have some bad cases of indigestion on his hands.

In using the bulky mash he may find that the fowls will not eat more than their usual bulk allowance of it, and if this is the case, and if it is necessary that they should get the same nutrition as before, he must increase on some other feed. As the reader may have guessed from what has been said, giving the mash more bulk is one way of satisfying the appetite of fowls without giving them more nutrition than they need. The occasion for this depends on the eating habits of the fowls, which vary as much as the eating habits of people.

The Three Prime Factors.

It would be possible to make a very long article of this, and then not have considered more than a very small part of the possible illustrations of adjustments of feeding. From what has been said I think most readers will see that the important factors in feeding fowls are common sense, familiarity with food articles and with fowls, and practice; and that the feeding of fowls is not a matter requiring special academic education, and familiarity with technical terms and scientific methods, but a simple, every day process in which a person of very limited education and utter ignorance of "science," as it applies to poultry feeding, may become highly proficient, and in which, in fact, the most successful feeders are men and women who give no attention to scientific expositions of feeding problems.

LESSON XV.

Poultry House Fixtures.

THE necessary fixtures of the poultry house are :

1. *Roosts — with or without droppings boards.*
2. *Feed troughs, boxes or hoppers.*
3. *Drinking vessels.*
4. *Nests.*
5. *Receptacles for grit, shell, etc.*
6. *Dust boxes — in houses with board floors.*

A poultry keeper may find places and use for all the articles enumerated, or he may get along with only a few of them. He may have his few fixtures simple and inexpensive— or may make the furnishing of his houses quite an item of expense when compared with the cost of the house and the value of fowls kept in it and of their product. He may make all fixtures himself, may convert old articles and utensils of various sorts to uses as furnishings for his poultry houses, or he may take his choice of ready made articles that run from plain to elaborate in construction, and from moderate to high in price. On a large plant there is a decided advantage as well as appropriateness in having the fixtures uniform throughout the plant. The poultry keeper works faster and easier when the same operation is to be performed in the same way all through. On a small plant it does not make so much difference, yet uniformity is always attractive. On the score of appearances, too, the fixtures should be in quality in keeping with their surroundings. Shabby or makeshift fixtures may not look at all out of place in a cheap, roughly built house, but they do look most decidedly misfits in a house with some pretensions to fine finish. On the other hand, fine fixtures do not go well with very plain houses.

The fixtures for a well finished house need not be elaborate. It is possible to have them simple and plain, yet well made and neatly finished, and quite as inexpensive too as rougher articles of the same pattern; and, all things considered, the poultryman is wisest who plans his house and provides his furnishings with an eye to simplicity, for complicated plans and elaborate fixings make it harder to keep a house clean, and make harboring places for the vermin of various kinds which infest poultry houses.

Droppings Boards.

In the list of fixtures roosts are mentioned as with or without droppings boards. The need of the droppings board will depend on the methods of the poultry keeper. If he keeps his house close and finds it advisable to remove droppings daily, or every few days, he will find it more satisfactory to use droppings boards. If he keeps his house open, and can allow the droppings to accumulate under the roosts as long as they make no odor, he should leave out the droppings boards.

Some of the farmers of Rhode Island divide the floors of their poultry houses in the middle, (the roosts being at one end and the door at the other) by a board set on edge. A cart load of sand is put in the half next the door in the fall. At intervals through the winter a few shovel-fuls of this are scattered over the droppings on the floor at the other side of the board. By spring all the sand has been moved, and is mixed with the accumulation of droppings for the entire winter, and the compost is carted off at the convenience of the farmer.

In these houses the roosts occupy about half the house. In the ordinary poultry house the roosts, according to number, extend two to three feet from one wall, usually the rear wall. Many poultrymen put a board on edge just in front of the roosts to keep the droppings from being scattered over the floor and the litter in front out of the droppings, and allow the droppings to remain for weeks without removing. If the droppings are of normal consistency and the earth of the floor or an applied absorbent takes care of the moisture in them, and if the house is thoroughly ventilated, there is no objection to this. But if droppings are soft and watery, or any fowls are sick, or if either for want of proper absorbents or lack of ventilation the smell of the droppings becomes objectionable they should be removed. To have stated times for cleaning up is well, but the poultryman should remember that his rules are made for the degree of cleanliness he wishes to preserve, and that the prime thing is to preserve that degree of cleanliness. He should clean as often as necessary. His rules merely represent what his general practice determines is necessary.

The board in front of the roosts may be left out and the hens allowed to scratch the litter back over the droppings. This is the practice that I prefer. The droppings will not be worked forward to any noticeable extent on a littered floor, for the hens scratch mostly away from the light, and pile the litter up at the back of the house. The coarser litter may be thrown forward with a fork, leaving finely broken stuff to mix with the droppings, and the mass may lie for weeks without any odor from it being discoverable. In very steady cold winters I have let the droppings lie four months. In warmer winters have found it necessary to remove often, but rarely oftener than once in four or five weeks.

If droppings boards are used they should have smooth upper surface, be wide enough to receive all droppings from the fowls as they sit on the roosts, and unless they have an unusually wide margin would have a strip on the front edge to keep droppings from being scattered. The droppings board under a single roost should be 20 to 24 in. wide; under a double roost 30 to 36 in.

The board should be 8 to 10 in. lower than the roosts. It is generally placed level. Occasionally it is made on an incline to allow the droppings to roll off, but most poultrymen prefer to clean the droppings from the level board. If droppings are soft it is necessary that boards should be kept well sprinkled with some absorbent such as dry earth or sand or land plaster; coal ashes and airslaked lime will answer, but the articles first mentioned are better.

If the manure is to be sold for tanning purposes no absorbent can be used on the boards, and as they quickly become saturated with the water from the droppings, the droppings boards in houses from which manure is saved for tanning are often repulsive in appearance even when supposed to be clean.

Roosts.

The roosts in a poultry house should be all together, all on the same level, and as low as may be without depriving the fowls of the use of the floor space below them. The old ladder-like arrangement of roosts was a bad one. The fowls would crowd for the top perches, crowd each other off, and in such accidents and in jumping from the upper roosts in the morning many fowls were injured. Usually one or two roosts the length of one side of the apartment are all that a pen of fowls require. The Rhode Island farmers alluded to above have roosts in half the house, but their fowls are expected to be out doors most of the time, the snow rarely lying long there. The conditions in their houses when the hens are occasionally snow-bound are not the best.

The form of the roost is not of as much importance as many suppose. The primitive roosts were round poles, and some still insist that they are better than squared roosts. Evidence to support this proposition is not abundant. Wide flat roosts, three or four inches wide, seem to

give the best general satisfaction, though a good many use roosts only two inches wide and either flat or more or less rounded on the upper side.

Whatever the upper surface of the roost, it should be thick enough to sustain the weight of the fowls without bending or breaking. An inch board will answer for short roosts, or for roosts for light fowls up to about 8-foot lengths. For heavy fowls a roost 8 ft. long and 4 in. wide should be quite 2 in. thick. A roost of such dimensions and length needs support

Strip Attached to Wall to Support Ends of Roosts.

only at the ends, but longer roosts should have support in the middle as well. The roost should be strong enough and its supports such that it remains level and firm when filled with fowls. A roost that sags is likely to break, and some of the

fowls might in such event, be badly hurt. Besides the sagging, springing roost is most uncomfortable, as any one may discover by watching the fowls on it.

For supports for roosts we have quite a variety. I use at the ends simple strips as shown in the cut, with notches in them to hold the roosts in place. These strips are fastened to the walls with screws, and are easily taken down when the house is cleaned. In fact all the fixtures in my houses are such that a compartment can be stripped bare in a very few minutes, a matter of considerable importance when fighting lice.

Just here let me say that with reasonable cleanliness and healthy hens given opportunity to dust themselves, I have never had any trouble with lice in the houses. But because of the number of persons reporting it as impossible to get rid of lice though they were very thorough in treating the premises with that end in view, I did, several years ago let my buildings get literally alive with red mites. Then stripping them of fixtures, whitewashing the walls, and using insecticides on roosts and nests, I had no trouble in clearing the premises of mites in short order. The way the houses were built and furnished made the work easy. I would not care to take the job of cleaning some houses I know of mites.

For a middle support for long roosts I use a similar strip attached by one end to the rear wall, and by the other to a strip hanging from a rafter.

There are several styles of roost brackets, (all I believe of the anti-lice type, with oil cups attached), on the market that are very good.

Some poultrymen attach the roosts to strips which hinge to the rear wall, so that the two, or more, roosts together swing back against the wall during the day.

Where droppings boards are used the roosts may be attached to the walls as just described, or may rest on the droppings boards. Various kinds of iron and wooden legs or standards to support roosts above the droppings boards have been devised. I think it may be said that in general the supports from the board interfere more or less with the removal of the droppings, especially when the ends of several roosts rest on the same support.

So far we have been considering only plain straight roosts. Quite a number of ingenious

Method of Supporting Long Roosts at Middle.

arrangements designed to prevent crowding on the roosts have been devised and reported as highly satisfactory, but these rarely take with any but the inventors. In fact, I could not now name a single one that had gained any popularity. There is rarely serious crowding on the roosts if roost room is ample and the roosts on a level. Give fowls an allowance of a foot, or quite that, of roost room each, and you will have little trouble with crowding. As hens sit close on the roost they don't occupy so much room, but some allowance must be made for opportunity to shift positions and get up and down.

Feed Troughs, Boxes and Hoppers.

Most of the feed troughs used are very simple. The accompanying cut shows cross sections of the styles most commonly used. The V-shaped trough and the single trough with low straight sides are oftenest seen, but I think the double reversible trough with straight sides is the best of all. Its superiority is marked on a large plant.

Cross Sections of Feed Troughs.

A v-shaped trough, a board fixed on edge to keep fowls out of trough. B shallow box trough. C double or reversible box trough.

Many different patterns of troughs have been devised to keep the fowls out of the troughs and to keep them from crowding while feeding. Some of these are shown in accompanying illustrations. I have used a good many such troughs, but went back for good long ago to the open troughs as much easier to feed in.

I discovered accidentally a few years ago that it was much easier to feed fowls in short wide troughs than in long narrow ones. I needed some additional troughs, and being pressed for time, thought I would make shift for awhile with a few of the shallow boxes in which small potted plants are sold, which I happened to have on hand. These boxes are about a foot wide and 16 to 18 in. long, the sides being about 2 in. high. I allow one such box to 8 or 10 fowls, and find that with the boxes a few feet apart I can throw or drop mash into them from a spoon or shake it from the pail much easier than into narrow troughs, and do it so quickly that the flock is fed before the crowding begins. I am still using some of these boxes and some narrow troughs, and the advantage of the wide short trough seems as plain as ever. Though I have not tried it, I think a box a foot square would answer for just as many hens as the oblong boxes I have. Occasionally when feeding a flock

of chicks I find that they have outgrown their trough accommodations. I give them some mash in the earthen saucers I use for water, if those happen to be

empty, and I notice that nearly half as many chicks as are pushing and crowding around a trough three or four feet long, will feed comfortably and quietly in a circle around an 8 in. saucer. The reason is easy to discover if you watch the chicks for a few minutes. At a long trough the fowls and chicks are constantly changing positions. At a short box or round pan all the food is within reach of all the fowls about it at the same time, and there is no inducement to move.

Protected Feed Troughs.

Sometimes the feed trough is attached at one end by a hinge to the wall of the house, and when not in use is raised and secured in position against the wall. The advantage of this is not

as great as would be supposed, for dirt and litter collect between the trough and the wall, and when the trough is let down a good part of the dirt is likely to drop into the trough, necessitating raising it again to allow this dirt to drop out. Taking one thing with another, more poultry men prefer the loose trough, and though some hang the troughs up on pegs or large nails when not in use, more leave them on the floor all the time.

A fixed feed trough in or next the passage is sometimes used, but this arrangement is quite

Dr. Nottage's Hopper for Dry Feed—Five Compartments.

Fig. 1—Cross Section. Fig. 2—Front View.

ing. Some poultry keepers keeping hens on the colony system, with free range, use hoppers large enough to hold a bag of grain.

Drinking Vessels.

Of these there is a great variety made especially for fowls, and a still greater variety made for other or general purposes are used for drinking vessels in the poultry yard.

Of the drinking fountains made especially for poultry, some are stone ware; some of earthenware; some of metal, usually galvanized iron. Most of them are of the self-feeding pattern, a receptacle for water over a shallow pan into which it feeds by pressure, keeping the pan full as long as the water in the reservoir holds out. Some have reservoir and saucer in one piece, others in two pieces, that they may be separated and more easily cleaned.

While a great many such drinking fountains are in use, the greater number of poultrymen seem to prefer an open vessel, at least for adult fowls. For chicks perhaps the majority prefer self-feeding fountains with shallow pans into which the chicks cannot get. These fountains too are better for fowls having large crests and beards or combs and wattles.

For an open drinking vessel for fowls or good sized chicks, almost anything that will hold the required quantity of water will answer. I use mostly 6 qt. wooden pails, but have a galvanized iron pan or two, and one old porcelain lined open kettle. On one of the largest plants in this vicinity all the drinking vessels are porcelain lined iron kettles holding about a gallon each. On another plant stone jars of about the same capacity are used. On a farm I visited a few years ago, I saw shallow cast iron pans, as I remember about 2½ or 3 in. deep and 8 in. square, which the owner had had cast at a nearby foundry for that purpose. The cost was I believe about 15 cents each, but after this lapse of time I would not say positively.

As between closed and open drinking vessels the latter seem to be preferred by most poultry keepers, except as noted above. Theoretically and in the eyes of the novice the covered

rare, and I have seen more than one plant in which it had been installed where the feeding mash was fed in movable troughs in the pens.

For feeding dry grains in bulk, and ground feed stuffs dry self-feeding hoppers are much better than troughs, and if feeding is regularly done in this way hoppers should be used. The illustrations show different methods of constructing hoppers. The size required depends on the size of the flock and the frequency of feeding.

Hopper for Fowls.

vessel is better because it is supposed to keep the water cleaner. Practically the open vessel is easier to keep clean, and further is less dangerous to the health of the fowls when not absolutely clean, because air and light, the great purifiers, get into it as they do not into a closed vessel. An objection some—mostly novices—make to the use of open vessels is

Hopper for Chicks.

Anti-Waste Feed Hoppers Designed by Subscriber to F.-P.

Dark Nest to Hang on Wall.

A—Exterior View. **B**—Interior View. **a**—block to hold nest in place.

than necessary to keep them from being easily upset, very little droppings will get into them. It is the wide shallow pan that catches the droppings.

Nests for Laying Hens.

Number of Nests Needed.—The old method was to provide almost as many nests as there were hens in the flock. Indeed I have before me an old drawing of a model poultry house for twenty-four hens in which there were twenty-four nests. It was early observed and continues to be observed, that no matter how many nests are provided, the hens usually all go to a certain few of the nests, and rather than lay elsewhere will crowd on those nests or sit near them waiting their turns.

Dark Nests to Go Under Droppings Boards.

Most poultry keepers still continue to provide many more nests than are used. I find a nest to every five or six hens enough, and have often allowed only one nest to seven or eight hens, say three nests in a pen of twenty to twenty-five hens. and found the allowance satisfactory, even when the hens were laying well. That, however, depends on the flock. Sometimes all the hens in a flock are quick layers, again they are slow to very slow, or the laying habits of the

Triple Set Skeleton Nests in Place in Poultry House.

hens are very uneven. So I allow as a rule one nest to a pen of three or four hens, two to a pen of six to twelve hens, and from four to six to a pen of twenty to twenty-five hens, according as they seem to need them.

Styles of Nests.

The nest boxes should be movable. Whenever more than one nest is necessary it is customary to make the nests in sections of two or more. Sometimes these are built under the droppings board, but even here the construction may and should be such that the nests are easily moved and taken out of the house for thorough cleaning and airing.

It has been a very common practice to make and place the nests so they would be quite dark. This is done in part because the hen is supposed to prefer a secluded place to lay, and in part to prevent the development of the egg eating habit among the hens.

To economize floor space as much as possible, it is customary to place the nests on the wall several feet from the floor; or if they are put under the droppings boards, these are usually placed high enough to allow the hens the use of the floor below the nests, though sometimes in a house with low north wall and roosts next this wall, the nests are on the ground, with the droppings board forming the top of them.

Leghorns and other high flyers will go as a rule to the highest nest accessible. I once nailed a small box in a corner close up to the roof in a pen of Silver Dorkings, and all but one or two very heavy hens would go to that nest though there were others more accessible. Hens of the larger breeds will often go to the corners on the floor of the poultry house to lay, no matter how many or how attractive nests are provided for them elsewhere. It is very difficult to break hens of that habit. In many of them it is hereditary, and the best thing to do is to either put a box — a common soap box is good — on the floor in the corner, and let them use it for a nest, or by fastening a nest to the wall a few inches from the floor try to

Double Skeleton Nests.

The nests as photographed were attached to an outer door to get full light and a position that would show construction. This frame is 12 in. wide; 28 in. long. Ends 10 in. high in front, 18 in. high at back. Front strip 4 in. wide; 2 back strips 2 in. wide.

ites, but go to one as readily as to another. When a hen gets up on the front rail and finds one nest occupied and the next vacant she almost always steps promptly into the empty nest. Just why she should do this I cannot say, unless it is because the divisions between the nests being so low in front, as long as she remains perched on the edge of the nest the empty nest is right before her eye.

The nests in most of my houses are on the side wall or cross partition near the front where they get the full light, yet I have not found the hens more disposed to go to the corners of the house to lay than when I tried to humor them by giving them secluded nests, and I have had very little egg eating in them. I find eggs broken, but not touched many times oftener than I find evidences of broken eggs having been eaten.

It would be premature to consider any general principle or fact as proved by my observations on these nests, but I am inclined to think that in trying to devise an easy nest to clean I inadvertently stumbled on a point which is of some use, i. e., that the nest on the floor, entered from the floor, and the nest with running board in front to accommodate the hens, are the great encouragers of egg eating, because in such nests the hens have better opportunities to spy out the condition of things in the nest, and also the waiting hens have a better vantage ground from which to quarrel with the hens in the nest than in nests like these, or boxes nailed to the wall. The hen in this nest has all the advantage of position.

My nest boxes are made with the bottom a little narrower than the ends, and the strips next it on front and back are placed about half an inch from the bottom edge of the end and division pieces. This leaves a space too narrow for an egg to go through, yet wide enough to

induce them to lay in it. After they begin to lay in this nest it may be raised gradually from the floor until it is at the usual height. Some hens, however, will make their nest on the floor as near the corner as they can, no matter what arrangements are made to tempt them to do otherwise, and all that can be done with them is to put a low box in the corner so that the eggs will not be rolled out or covered up.

For several years I have been using nests reproductions of photographs of which are shown herewith. These are my own design, and as far as I know none like them are in use except such as were made from them. I like them better than anything I have used, and poultrymen who see them seem to take to them. The object was to make nest boxes that were as near skeletons as possible, easy to keep clean, and easy to knock apart for thorough cleaning if that seemed necessary, and put together again. In use in my houses these nests have seemed to have some desirable effects, some good points which I had not anticipated, chief of which is that with them the hens seem to have no favorites,

drop through any nest material or dirt that cannot be easily lifted out with the hand. There are in these nests no corners formed by three sides, no places for dirt to mass and collect. The nests can be cleaned inside without removing them, or detaching any part of them.

Receptacles for Grit, Shell, etc. -

Where supplies of all these accessories are kept constantly before the fowls, the best way to do is to have self-feeding hoppers with as many compartments as there are articles used. Usually there are three—grit, shell, and charcoal. I use only shell, and for it have small boxes nailed to the wall near the door in each house, just high enough from the floor to let the fowls get at the contents easily. If I had more fowls or used more of these accessories I would use hoppers for them, but we have old butter boxes more than enough for the purpose, so what's the use of buying or making hoppers?

As to the use of these articles: Shell is generally agreed to be indispensable. Grit and charcoal are so considered by the majority of poultrymen, but I am free to say that in my own yards I have never found any advantage in the use of charcoal. I used a good deal years ago, quit because I could see no benefit from it, and have never been able to see that my fowls suffered for want of it. Advocates of charcoal with whom I have discussed this will insist that the fowls would be better for it, but that is begging the question.

Grit I used with shell until a few years ago, and quit it because I found that when constantly and liberally supplied with shell the fowls hardly touched the grit.

I would not conclude from my experience that no fowls needed grit and charcoal, but it seems very plain to me that mine do not. Fowls managed differently might, and of course mine might get in condition that would require them. So while personally I discard the two articles mentioned, as I leave out some of the tasks of poultry keeping that are generally done on the "better be sure than sorry" principle, I don't *advise* anyone else to do so. I merely say that these things do not seem to be always essential, and that if a man can have confidence enough in his own judgment to determine when they are needed, it is not necessary for him to constantly supply articles or regularly perform tasks merely to be sure that he does not err through omission or neglect. Each one can easily determine for himself how much grit or charcoal his fowls will take, and to what extent they seem benefited by them, or to suffer from lack of them.

Dust Baths.

In a house with an earth floor, no special dust bath is needed. Clear away the litter occasionally from a space near the door or window, where the sunlight falls on the floor, see that the earth here is loose, and the fowls will prefer such a place to the old fashioned dust bath. This for winter. For other seasons you need do no more than fork up a little spot here and there in the yards.

Where the houses have not earth floors dust baths must be provided. They may be made by putting a board diagonally across a corner and partly filling the enclosed triangular space with dry earth; or the enclosed space may be square or rectangular in form, two boards joining at an angle which projects into the floor being required to make the two sides of this dust box, or a box with sides and bottom may be used and shifted about as desired.

Failing a supply of dry earth, coal ashes may be used, but their effect on the skin and plumage of the fowls is bad. They take away the oil in them, leaving feathers rough and brittle, and the skin dry, and leave the feet and shanks in a condition in which they are especially susceptible to the attacks of the scale insect.

To add to the effectiveness of the dust bath in ridding the fowls of lice, lime, sulphur, etc., are sometimes mixed with it, and doubtless give it additional virtue, though the dry earth alone is sufficient provided hens have opportunity to use it freely.

LESSON XVI.

Poultry Fences and Yards.

THESE two subjects we have to consider together. The height, and to some extent the kind of fence required depends upon the size of the yard even more than upon the powers of flight of the fowls to be restrained. When fowls are confined to small yards the height of the fences must be adapted to flying capacity, for the fowls so closely restricted in movements will do their best to break bounds. When yards are large the fowls may be restrained with very low fences. I have had fowls that would quickly fly a six foot fence when in a small enclosure so surrounded never even attempt to go over the three foot fence of a larger yard, and I have seen Leghorns in a large yard where, on the side toward the road was a stone wall one could easily step over, that I was told never went over the wall — a statement which I could credit because of what I saw of the fowls in their yard, and did not see of evidences of their having been outside. This, however, we must regard as an exceptional case, and I would not advise anyone to trust to a low stone wall to keep any active fowls out of places in which there was something to tempt them, and where they might do some damage.

The low fence to be effective must be one which offers no inducement to the fowls to try their powers of flight. A fence of pickets or laths presents a top line on which the fowl can secure a footing. A wire fence of any of the styles in common use offers no such resting place if the stakes or posts are small or pointed at the top. This is one point in favor of wire netting. Other points are cheapness, durability, ease and quickness of construction, and adaptation to temporary fencing. This last feature of wire fencing is one that is only beginning to be appreciated. It is most conspicuous when low fences are used, though the high temporary fence may be made with but little more trouble.

The Simplest Fence.

Except for gate posts at the few places where there are gates, and for the fence of the fly of the house built for pigeons, I have no set posts for my poultry fences. All fences are on stakes driven into the ground. When the ground is soft we drive the stake right into it; where hard or stony we first make a hole with an iron bar. It is not necessary, as when using lumber, to have posts equally distant. I generally drive stakes four paces apart, but if at the point marked for a stake I find a stone the bar will not displace, move a few inches or a foot if necessary, either way. Except at end posts or gates the wire for temporary fences is fastened to the posts with only two staples, one next the ground and the other at the top of the wire. These staples are not driven in tight, only enough to hold the wire, leaving a quarter of an inch or more of the staples to give a good hold to draw it out by. For wider fencing proportionately more staples should be used, as the additional weight of wire increases the strain on those near the top. With wire three feet wide and less, the strain on the staples is very light.

Fences built in this way are easily and quickly built, and easily and quickly taken down and put away or moved. For Brahmas I have fences from two to three feet high, preferably two and a half feet. The widths varied because sometimes when I wanted an extra roll or two of wire I could not get thirty-inch stuff, so took what I could get. Two feet is rather low, though only old males are likely to cross it. Three feet is higher than necessary, and a little harder for the poultry keeper to walk over.

For Rhode Island Reds, Mr. P. R. Park uses four foot wire, placing his posts or stakes farther apart (as I recall it about twenty feet). With posts far enough apart the wire will slack enough in the middle to allow one to step over. A man of average height or above the average, not overburdened with flesh, will get around much quicker going over fences this way than opening and closing gates. A gate is a necessity if a wheelbarrow is to be taken through the yards, but even with gates all round it is easier and quicker for the average man to step over the fence—beside the gate. For a short man it is a different proposition.

In this style of fencing there are no boards, no part of the fence tight. The lower wire rests on the ground; where there is an elevation too abrupt for it to follow it will double over, where there is a depression which leaves an opening below it, it may be drawn down close with pegs driven into the ground.

A possible objection to fencing in this way is that males may fight through the fences. Mr. Park's Reds get used to each other, and do little damage. I have had no trouble with Brahmas except in a few cases where males began "scrapping" through the wire, and in a rush and spring together landed both on the same side of the fence. Then the fight was to a finish. No serious fighting through wire netting is possible. This year I had one male I was not willing to take any chances on, and between his yard and the next one containing a male I doubled the fence, the yards joining only for a short distance, and there was no fighting at all. This double fence was made just as the temporary fences I have been describing, with only a few inches between the two fences. Last year where there was danger of males damaging each other, I ran a second piece of thirty-inch wire above the first. The objection to that was that you could not walk over such a fence. The parallel lines of low fence prevent fighting, while not interfering with the method of going from yard to yard. The simple way of fencing poultry just described is applicable only when there is room enough to give good sized yards, and especially wide yards. It will not answer for such narrow yards as are usually used with continuous houses; nor in the limited space in which many must yard their poultry, nor where males with large combs are kept; nor is it advisable for permanent fencing.

If a fence is to remain in the same place permanently it is better to build it, though of wire, more substantially, to set the posts plumb and firmly, to fasten the wire on well, stretching it to fit; and I think it is better to put a six-inch board along the ground, especially if one wishes to keep the grass or the ground smooth, clean and well trimmed along the fence.

About Permanent Poultry Fences.

More and more poultrymen are beginning to agree that the permanent poultry fence is a bad thing—an evil to be tolerated, perhaps, in some places, but avoided wherever possible. It is only when poultry keeping is on a very limited scale, and the poultryman can keep his small yards thoroughly renovated—in fact, treating the yards as he does the house, that the evils of permanent fencing are done away with.

The great fault of permanent fencing is that the yards, unless very carefully looked after, soon become foul, while the fences so interfere with a thorough working of the soil that the soil either is not thoroughly worked or is worked largely by hand tools, and at great expense. The result of this condition is that the yards are generally not thoroughly worked over, and disease and filth lurk in the corners, about the posts, and under the fence boards, furnishing the unsuspected cause for many a supposed mysterious epidemic.

As in discussing the structure of the poultry house and the character and arrangement of the fittings, I tried to impress on readers the importance of having everything plain and simple, because this made it easier to be thorough in treating the house for lice especially—but, also, in all ordinary cleanings—so in regard to the arrangement of yards and fences I

would emphasize the importance, which as a plant grows old becomes necessity, of making it easy as well as possible to keep yards thoroughly clean. It isn't much of a job to spade over a large area on paper; but it takes time and lots of muscle to do the actual work on a comparatively small plant. Even when yards are so arranged that the greater part can be ploughed, there must be a strip along each side of every fence that has to be worked over with spade or fork,—a tedious job.

This difficulty of giving the soil of the yards proper attention is one of the strong arguments against the continuous house plan as an all year round plan. Some poultrymen, notably those growing winter chickens, and some of the large duck growers, use stake and wire netting fences for the outdoor runs connected with their brooder houses, and after the young stock is out of the brooders, take up all fences, plough the ground, and sow to some crop, usually winter rye. This annual renovation and disinfection of the yards has been an important factor in their continued success with intensive methods. It is more easily adapted to brooder house yards than to yards in which laying stock are kept, but unless a poultryman is very much crowded for room, or has a very large stock, it should be possible to get the laying hens out of their permanent or winter quarters for at least a few months in the summer and early fall, and so make an opportunity for a thorough cleaning up and purifying. If the house is so situated that yards can be made both front and back, and used alternately, the problem becomes easy. Temporary fences may be used. Yards in front of the houses may be used for a year or two, then all fences removed to the rear of the house, and the ground in front kept in cultivation or grass for a year or two. The character and extent of the land, and the requirements of the situation, have to be considered in determining just how to work the rotation, and how to arrange the chickens and the crops. On some soils a rapid alternation would be better; on others, yards might run for a series of years without any pressing demand for change. This is especially true of some of our porous, sandy sites in New England. Indeed I have seen some places here where if the land was not overstocked with fowls so that it would get too foul between rains, poultry could be kept on it indefinitely without any other purification of the soil than is brought about by natural agencies. This condition, however, would not obtain if yards were small, and the washing of the soil interfered with by post and boards of permanent fences, beside which the droppings would lodge instead of being carried away.

It is to be observed, further, of such a location, that the fertilizing elements which, retained in a soil unused, poison it for the fowls running on it, being either washed away or dissolved and leached through the light surface soil, are wasted and lost, while with an alternation of yards on richer, heavier soil the fertilizer can be made to contribute something to the income.

I know a very few plants on good land where stock has been kept low enough, and grass yards in such good condition that the bad results of permanent fencing have not developed, but most poultrymen who yard their fowls need to change the runs often, or else give as careful attention to the cleanliness of the yards as of the houses.

The Usual Permanent Fence.

The prevailing style of permanent fence for small to moderate sized yards is a fence six feet high, the first two feet of boards, the remainder of wire netting. Posts are usually set eight feet apart. With the wire no top rail is required. The netting is made fast to the posts and to the upper edge of the board part of the fence with staples. For such fencing the common two inch mesh poultry wire netting is used.

Fences on this general plan are sometimes made with lath in place of wire, but that style is not as good or as satisfactory. I used lath fences for the yards of a plant I built fifteen years ago, but after a few years experience with them, resolved never to do it again. My object in using lath was to have the shade which it would give the fowls in summer. It was all right for that, but it also made too much shade in the yards in winter. It would have been better to put for shade in each yard some sort of shelter that could be removed when not wanted. The great objection to a lath fence is that the wind soon works the laths loose, and in a comparatively short time they get to the stage where not even frequent circuits of the fences driving in the nails will keep them in good condition. By all means avoid the lath fence. Use wire, and

if shade must be provided, make shelters of boards or cloth, or plant trees in the yards. The trees answer permanently; the other shelters will do until the trees are of size to make shade. Japanese plum trees have been favorites with poultrymen. They make a quick growth, and for a few years bear well, but are short lived. Some poultrymen have planted plum, cherry, or peach trees, or some of all of these in their yards, alternating with apple trees. The other trees will have passed their prime by the time the apple trees are crowding them out, and can then be taken out, leaving a nice apple orchard.

A six foot fence is not always necessary for small yards. For Asiatics it is higher than required, and is also higher than needed for some American breeds; but if yards are small it is better to make fences high, unless it is certain they will never be used for fowls that can fly. The additional cost does not exceed half a cent per running foot of the fence, and the six foot fence is practically safe for all the popular varieties of fowls, while a five foot fence is not high enough for a small enclosure for Leghorns, and many fowls of all breeds but Asiatics can go over it if they try.

The six-foot fence, while generally safe, will not answer for light, active fowls that have acquired the habit of flying over it. For such various devices have been tried, some of which seem to work in one case, some in another. Rarely the fence is built to a greater height than six feet. Oftener a narrower strip of wire netting is placed at the top of the fence, in a horizontal position, being attached to horizontal strips of wood fastened to the tops of the posts. This wire extends out a foot or more from the perpendicular fence. The object is to prevent hens which have caught the trick from alighting on the top wire of the fence proper. Sometimes instead of wire netting one or more single wires are strung to cross pieces on top the posts, the purpose being the same, to have the fowls flying for the top of the fence strike them and be thrown back. None of these devices are absolutely sure. To be sure of retaining breeding fowls in small yards with six-foot fences the yard must be covered over with wire netting.

In this connection it may be well to point out that flying is with fowls very much a matter of habit. Chicks that are raised where they have no inducement to fly, or where the fences are so high that they could not fly over them until quite well grown seldom get into the habit. Those which find conditions and fences which encourage flying early acquire the habit, and it becomes difficult to break them of it. There are of course some differences due to breed and family, but on the whole fowls kept where the fences easily retain them while small rarely become troublesome as flyers.

Gates.

Gates are usually made like small sections of the fence of which they are a part. Different styles of self-opening and closing gates have been devised, but the old simple gate seems to hold its own. Probably because it is inexpensive and reliable. The hinges are sometimes of springs, or a spring is attached to the gate to shut it, but the poultryman who is wise in his craft will not rely on a spring. A strong breeze often swings a gate which is not securely fastened, fowls slip from one pen to another; there is confusion, annoyance, and often serious loss from such mischances. It is safer to have every gate fastened with a fastening that can be depended upon.

LESSON XVII.

Getting Ready for Winter.

THE ideal state of the work in a poultry yard is to be always prepared—ready for the special work of each season as it comes. When this condition exists, the work is easier, and results more reliable.

We may say in discussing the matter academically that this ideal condition ought always to exist, and that in as much as he fails to attain it, the poultryman shows poor management or poor judgment. But in practice we find even the best poultrymen able to maintain this ideal condition only occasionally, even when their operations are on such a scale that so far as it depends upon them, nothing that needs to be done need be delayed or neglected. When, as is oftener the case, the poultryman is diligently making the most of every promising means of adding to the proceeds of the year's work, a setback making a difference of only a few days in certain preparations or results may easily handicap him through the remainder of the season.

Besides such delays as this, there are occasionally others for which he may not be at all responsible. Of this kind are delays in getting out chicks, due to disappointing fertility in the first eggs set. The effects of such delays may extend through more than one season in spite of all that the poultryman may do to overcome them.

I call attention to these things not to discourage anyone, but because a full appreciation of possible difficulties in the way of any undertaking is nearly always a condition of success in it, and the average poultry keeper is too prone to put off special preparations until the occasion for them becomes urgent. A mistake at any season, such procrastination is doubly dangerous at this season, for fall weather is uncertain, winter may set in earlier than anticipated, and winter conditions often make it impossible to do work that needs to be done. There is less chance of recovering lost ground at this season than at any other. Hence the urgent need of forwarding the development of the stock, and the preparations for winter protection and comfort.

Keep the Young Stock Growing.

There may be some very early pullets that by moving about, and by light diet, need to be held back from laying until October, but the greater part of the young stock should be fed now all it will stand, and it should be able to stand very heavy feeding.

The conditions now are especially favorable to rapid growth. In northern latitudes where excessive heat is rarely long continued, growth should have been good right through the summer. Where summer heats are oppressive, the growth of the chickens may be very slow through July and August, but with September they take a fresh start, and to make up as far as possible they should now be pushed to the limit of safety.

With the cooler weather of this season we have still days that are long enough to get in three good meals, and still have time for the digestive organs to rest a little in the daylight interims. Later when the days grow so short that the meals come closer together the fowls will not take and assimilate as much food, and that is one reason why it is so hard to push them when it is

neglected until the failure of the pullets to begin laying early in winter plainly indicates the need of forcing. Then the keeper is often disappointed in results, the pullets not seeming to respond as they should to the extra food and special care given them.

It is of greatest importance that through the fall the fowls should be well fed. The need of good feeding at this, and at all times, would appear to be so self-evident as not to need to be thus specially emphasized, but for many years, and in the experiences of a very great number of poultry keepers, I have noticed a tendency to skim the feeding at this period.

The most common cause of such efforts to economize is that the poultry keeper is carrying a stock of growing fowls too large for his finances, and in his efforts to go into the winter with a certain number of possible layers, he not only keeps many pullets which ought to be sold for poultry, but, in order to go no deeper in debt than is unavoidable, he gives his stock a mere maintenance ration, which, in the case of the pullets, means delayed development, and in the case of the old hens, slow molting and retarded resumption of laying. The policy of short feeding is often pursued until the lack of results at the expected time points to something wrong, and then the poultry keeper expects in a few days of special feeding to make up for weeks or months of insufficient rations.

It may happen occasionally that it is advisable to feed short with early pullets that would otherwise begin to lay sooner than was advisable, (with the risk of a molt early in the winter), but such cases are comparatively rare. Most poultry keepers with most of their stock need to feed all the stock can stand.

The Best Way to Economize in Feeding.

The expense of feeding a stock of growing, and, as yet, unproductive pullets, is nearly always a heavy burden on the poultryman working up a stock, because the proportion of unproductive to productive stock is usually much greater than in a flock established for some time upon a given basis. To make the burden as light as possible, the poultry keeper should cull his pullets closely, retaining only those that are vigorous, strong, and well developed for their age. If, after such culling, he still has more than he can give proper care, let him sell a part of the remainder, and bring the stock down to what he can "swing."

Many poultrymen are reluctant to do this because they feel that in thus reducing their stock in advance of the season of its productiveness they are deliberately cutting off a large part of the most promising source of income. That would be the case if the pullets were all good, and if the whole number could be carried to maturity in a proper manner. I am not, however, talking now to those who are able to keep the pullets growing, but to that large class who try to economize in feeding at this season, and then wonder why they do not get results a little later. The most profitable course for them is to reduce the stock to what they can give liberal rations. It is a great deal better for one who is sailing close to the wind in his poultry business to go into the winter with 100 pullets ready to lay in November than with 300 that will not lay until February. For the 100 will give a profit all winter, while the 300 will not begin to pay for their keep by their winter laying. In sections where eggs command high prices through the most of the year, one may make perhaps as much on a flock of late pullets beginning to lay in February, and laying late the next year, as on earlier pullets that began to lay at the same age; but if he needs the income from the hens to pay his feed bills, and has to go into debt if eggs are not forthcoming, he should strain every nerve to get eggs early, and keep no more pullets than he can carry without seriously handicapping next year's work if eggs come slowly this winter. If one has room for them, and is able to handle them, late pullets may be very profitable. Not so the early pullet that lays late.

Keeping the stock down, or cutting it down at this stage, is one of the essential features of building a poultry stock or business up slowly. Just as many readers in mid-summer found that it had been easy to get out chickens enough to overcrowd their accommodations before the chicks were half grown, so about this season many are made to realize that they have been able to rear to present stage of development, and have accommodations for more chickens than they are financially able to take care of until they begin to produce eggs. The common practice is to go in debt for feed, and even then feed short. The better way is to reduce the stock.

Culling the Young Stock.

Apart from the point of a poultryman's financial ability to carry what stock he has, is the question of the policy of keeping it all. Nearly all poultrymen—even those of long experience and generally satisfactory success, hold more of their stock than is wise.

Unless a stock has been bred by very careful selection, and is very uniform in quality, there is almost certainly a considerable percentage of both pullets and cockerels not worth reserving for stock purposes. The very backward inferior specimens of both sexes should be relentlessly weeded out. There is no profit in keeping them. The novice who has thoroughbred stock is likely to think that all being of the same breeding, every specimen must have some value for stock purposes. The inferior pullets he has no use for himself he holds to sell to some one who wants low price stock. They are salable for such purposes if the price is made low enough, but I don't think that in the long run it pays to make such disposition of them. If one is selling thoroughbred stock and wants to make a reputation that will profit him in coming years he cannot afford to let such poor stock go for breeding, at any price — much less at a low price. Cockerels of like quality he holds to sell to the trade that buys at \$1.50 to \$3 each. Neither does this pay. Considered individually, there is some profit in the cockerel sold before spring at \$2.50 to \$3, but on a lot of cockerels of low grade it is generally impossible to figure a profit that will pay for giving them house room and attention. A few birds lost or unsold in such a lot offset the narrow margin of profit on the others. The novice with no established trade will as a rule find it safe to dispose of all but the best tenth of his male birds before winter. This will seem to many rather radical culling. Let those who doubt the wisdom of such policy keep account with the cheap cockerels they hold over. As to selling any considerable proportion of cockerels of that grade at this season, it cannot be done. The trade that takes them is on the whole a trade that buys only at the beginning of the breeding season.

If, then, the reader wishes to put his poultry keeping for the winter on the best possible economic basis, let him dispose of all pullets that are not thrifty and vigorous and likely to begin laying before midwinter, and of all but a few of his best cockerels. These with such old hens as he has selected to keep over should give him a stock that reduces his chances of loss to the minimum, while what he receives from the sale of the discarded stock may go a good way toward paying the keep of the remainder until it begins to be productive.

Putting the Stock Into Winter Quarters.

The pullets not already in winter quarters should go there as soon as possible now, for their laying will depend somewhat on conditions being good, and no further disturbance necessary.

They should not be crowded, but given as much house room as is to be allotted to them through the winter. It is generally found a mistake to crowd them into winter quarters, perhaps to twice the capacity of a house, thinking it will be time enough to reduce the number when they begin to lay. They should have as much house room now as when matured.

The Importance of Fresh Air.

To say that pullets should now be in winter quarters does not necessarily mean that the houses should be operated as in winter. If cold houses are used there will be no difference, perhaps; but if the houses are tight, warm, and are to be shut up in cold weather, the winter method of operating the house is not suitable to present conditions.

This is the season when colds seem to develop and become epidemic without such plain causes of colds as may be found later on. Most of the cases of epidemic cold developing now are due not to cold, but to heat. The houses are shut up too early, the air in them is close and bad, and the fowls and chickens accustomed to more open coops and houses during the summer, take cold. For years there has been hardly a case of colds reported to me in early fall that was not evidently due to lack of ventilation and fresh air, and reports of results of better ventilation have almost invariably shown improvement as a result of the more air treatment. Better keep doors and windows open until real winter weather comes.

Making Houses Ready.

While it is better to have houses in first class shape, clean, and the floor (if of earth) renewed, when the pullets are put into them, it is much better to put the pullets in the houses, and fix up afterwards than to keep them out until the houses are ready, especially if (as is quite generally the case) the pullets are by this time overcrowded in the summer quarters. The ideal way, as has been said, is to have everything ready at its proper time, but this is so difficult to accomplish that many times we have to take the course that seems to have the least disadvantages.

When detached houses are used it is much easier to clean up while the house is in use than when houses are on the continuous plan, but even in that case with a little ingenuity in shifting the fowls from pen to pen as cleaning progresses, the fowls being driven and not handled at all, it is possible to do the work almost as expeditiously as if the houses were empty.

With me the cleaning process consists in removing all of the earth floor that shows any mixture of droppings, brushing down walls and underside of roof with a broom, filling the floor with new earth, and making whatever repairs are necessary. Sometimes the interior is whitewashed, though that seems to me generally not to be necessary for cleanliness, but rather advisable because it makes the place look better, and makes the light better on dark days. These advantages make whitewashing well worth doing if time can be found for the work, but if something has to be left undone, let it be the whitewashing rather than the renewal of the floor, repairs, or alterations that will make the winter's work easier.

Look Out for Mites.

When cleaning up the house look out for red mites. They are most likely to be found on the undersides of the roosts, and about the supports on which the roosts rest, and about the nests. If they are present, indications will be plain, even before the mites themselves are seen, in the abundance of greyish white specks about their harboring places. If these specks, resembling fly specks, are noticed on walls or fixtures, you may be sure the mites are there. In that event, whether the house is to be whitewashed or not, give all the places where traces of mites are found a thorough swabbing, spraying, or drenching with water containing an insecticide that will kill them. I use Chloro-Naphtholeum, about a half teacupful to a three gallon pail of water. Some use Sulpho-Naphthol, some naphthalene flakes dissolved in kerosene, some straight kerosene, some one of the numerous other liquid insecticides and disinfectants on the market. Whitewash alone will kill all the mites it reaches if a bit thick, but if thin enough to go into the cracks and crevices is not as effective as the other things mentioned. Whatever application is used, if the mites were had go over the infested places again after an interval of three or four days, and again after another like interval, if, on examination, any mites are found. Two, or at most, three treatments at this season should settle the mite question until the return of warm weather next summer.

Renovating the Yards.

The yards being, in this latitude, little used in winter, it is not as necessary to clean them up at this time as it is to clean the houses, but if opportunity can be found now to turn over soil that would require turning over in the spring anyway, it is worth while to do it. The contaminated soil is thus turned under, and if there should happen to be much open weather in the winter the fowls have cleaner ground to run over.

If it is desired to grass a yard, now is a better time to prepare it than in the spring. Plough or spade and smooth the surface. Then just before it freezes up sow the seed. Keep the fowls off the land through the winter and until after the grass is well established in the spring. In this way you will get a better start of grass, and have the use of the land much sooner than if the seed is sown in the spring.

Laying in Supplies for Winter.

Dust.—If, as I think by far the best way, the floor of the house is used as a dust bath, no special provision for material for the dust bath need be made; but if floors are of wood or cement, and dust has to be supplied specially, a good supply should be stored before the ground freezes.

Litter.—If leaves are to be used for litter, they should be stored as soon as possible. The quicker they are collected and put away after they fall, the tougher they are, and the longer they last on the scratching floor. If allowed to lie exposed to the weather for some time, they become much more brittle, and are quickly pulverized by the fowls.

Farmers who have their own straw, of course have it stacked, and do not need to specially consider the supply for the hens.

Those who cannot get leaves, and have to buy other scratching material, are likely to find this the most favorable time to get their supply, and the poultryman who has provided a place for the storage of such supply, finds now what a convenience it is.

While I consider leaves the most satisfactory scratching material for those who can get a good supply with little trouble and expense, they are practically available only for those who can get them nearby. Those who buy stuff for scratching litter will find oat straw and corn stalks the most satisfactory — the straw to be used without cutting, the stalks to be cut into about six inch lengths. Most kinds of hay make less satisfactory litter; fine hay packs too close, while coarse long hay is tough, and mats and tangles.

Green Foods and Roots.—Cabbage is the best of winter green foods, and the most convenient to feed. A poultryman who does not grow his own cabbage should lay in a supply before winter, otherwise he is likely to have to pay too much for what he uses. Failing a supply of cabbage, good clover or alfalfa makes a substitute that insures the fowls will not suffer for lack of green food.

Of root crops, beets are the best for poultry, and large mangel or sugar beets the most satisfactory. These are seldom grown for sale in the localities where they would be most in demand for poultry, and unless the poultryman grows them himself his supply is likely to be uncertain.

Exhibition Fowls.

For most exhibitors the show season is still several months away, yet it is not too early to begin to prepare birds for show if one intends to show. Indeed, if there is even a remote possibility that one may want to show, or if he thinks it at all possible that there is in his stock a bird anyone else would buy to show, he should begin now to consider the matter, to provide against anything occurring to spoil an otherwise useful exhibition specimen, and by every means in his power to put such birds in good condition and keep them so.

The almost universal fault of novices in exhibiting fowls is to put off the preparation of the specimen to be exhibited until the show at which it is to be exhibited is close at hand. Then they find all sorts of things wrong. Birds so short in weight that it is hopeless to think of getting them up to weight; birds with scaly legs, with broken feathers, etc., and in many cases the owner has little idea how to remedy the trouble, and loses still more time in finding out.

Now many of the most common faults discovered by the novice when trying to select birds to show are faults that in a specimen of any value should be remedied whether the specimen is to be exhibited or not. Scaly legs should not be tolerated in a yard, nor should such lack of condition as exists when a fowl with a frame that should easily carry the weight required by the Standard is a pound or two short of that weight.

By taking the possible exhibition birds in hand now, they may as a rule be quite easily fitted and well fitted. With two or three months to make weight they will come on fast enough on ordinary good feeding; scaly legs may be cleaned up gradually and be in fine condition long before the show; broken or clipped feathers may be removed, and new ones have ample time to grow in their place. Besides this, special precautions may now be begun to avoid accidents to specimens that may be wanted to show. This is most necessary with the young males. They must not only be kept from injury by fighting, but a good specimen must not be kept where he will be bossed and cowed by another male even if the other is so much the boss that no special damage is done to comb or plumage. A male to show to advantage must show spirit, and though most of them have spirit enough when given a chance to develop and display it, a male that has been knocked about for months takes more than a few days or weeks to come out and show all that is in him.

There is still another reason why attention should be given to the selection and fitting of possible show specimens. It leads the poultryman to study his stock much closer than he is likely to do if he gives no attention to exhibition quality and condition, and though he should not show a single specimen, all the time and thought he has given to this work will be found when he comes to mate his fowls for the next season, to have been well spent. The matter of fitting birds for exhibition will be treated more at length in the next lesson.

The Poultryman Who Begins in the Fall.

I am often asked what time of the year is best to begin poultry keeping. Judging by results of first efforts I cannot say that it makes a great deal of difference, but the fall has always seemed to me the best time to begin, because beginning at this season experiences come in their logical order, and something of the handling of adult stock is learned before hatching and rearing questions press for consideration.

The poultryman beginning now, if on an old plant, has to take much the same steps in getting houses ready for winter as have already been mentioned. One building new houses, of course has no cleaning up or repairing to do, but unless buildings are already well advanced they must be pushed rapidly to have them ready for the stock before winter sets in.

It is best not to buy stock until the buildings are practically ready, for fowls coming to a new place will not stand confinement in makeshift quarters as well as fowls reared on the premises do, being continued longer than advisable in the summer quarters. In fact the stock in summer quarters may come along as fast at present as if in winter quarters, but the point is to avoid moving them just as they are about to begin laying, and to guard against too much exposure, when, as is often the case, the coops are unsuitable for cold, stormy weather.

With fowls brought to a new place, sickness may easily develop if conditions are specially unfavorable. Hence it is better to have the house all ready before a fowl is put into it, and not to get fowls until the house is ready for them. A great many do buy fowls and keep them confined in small coops perhaps for a month, while making the house ready. This gives the fowls a very poor start for the winter.

LESSON XVIII.

Exhibiting Fowls.

Practical Value of Exhibiting to the Exhibitor.

TOO many poultry keepers who keep poultry primarily for profit, or for poultry and eggs for the home table, regard the exhibiting of fowls and the breeding of fowls for "fancy" points, as of no particular interest to "practical" people, and of no actual value to them.

This is an error. Without conceding to "the fancy" that preeminence in the development of poultry interests which fanciers like to claim for it, everyone well informed in poultry matters must allow it credit for a great deal of the progress made and still making, and must also admit that a thorough knowledge, or even a fair knowledge of the characteristics of fowls and the principles of breeding for uniform results is rarely acquired by a poultryman who takes no interest in exhibition points and exhibits of many fowls. There are, of course, a great many so-called fanciers who know little of breeding, but the poultryman who takes no interest in "fancy" points, and does not breed at all for appearance—for beauty, either according to the general standards or according to some fixed ideas of his own, and still produces good fowls, is such a rarity that I have yet to meet the first one. Practical poultrymen who disregard "fancy" points, as a rule, breed absolutely without intelligent selection. A very large proportion of their stock is decidedly inferior, even when nominally their stock is thoroughbred, and I have repeatedly seen in the yards of such breeders very poor birds, both male and female, in the breeding pens, and good ones not used for breeding, or good males mated with inferior females, and *vice versa*, with the result that only a very few good specimens were produced when there was good stock enough in the yards, if properly handled, to have given the poultryman two or three times as many good young birds as he got by his way of mismatching, and many of them very much superior to any that he did produce.

Now through books and papers a poultry keeper who is sufficiently interested in a variety of fowls to "read up" on it, may learn a great deal without ever attending a show or making an exhibit; but he is sure to get a great many ideas that are wrong, to entirely overlook many points of importance, and fall much oftener than is necessary in assigning to various excellencies and faults their proper values.

Without exhibiting, a poultry keeper who will attend the shows and mingle with the fanciers there, will learn a great deal that self-taught he misses, and will learn more easily and quickly many of the things he would learn by himself; but it is the universal testimony of those who have gone through these several degrees of instruction in breeding and selecting for points that a personal experience in exhibiting when the exhibitor attends the show and gets the benefit of it is the best way to learn—so much better than any other way that there is no comparison.

In such experiences the results of errors in judgment in breeding, selection, and preparation of fowls for exhibition become conspicuous while the corresponding correct condition or method may be clearly illustrated by a more successful competitor. Then there is no place like the exhibition room for a breeder to learn to estimate the types and characteristics which

please him in his fowls at home at their true value, and without disregarding his individual tastes and preferences to learn to modify them to harmonize better with popular ideas. If one wishes to sell fine stock, or to gain a reputation for producing and having good stock he must keep his ideals somewhere near those of the rest of mankind interested in that kind of stock.

Exhibitions of poultry are now so numerous and so well distributed that there are comparatively few poultry keepers too far from any show to make an exhibit and look after it in person at least during a part of the time, and I would urge every reader of this lesson who keeps thoroughbred fowls to make it a point to exhibit at the most accessible show. If one begins early to make preparations to exhibit, and gets his birds in good physical condition they will have to be very poor indeed to discredit him. Where most novices "fall down" is in putting off selection and preparation of specimens to be exhibited until within a few days of the show. Then the birds go into the show in poor condition, and attract attention more by poor condition than by lack of merit.

I have at such length urged readers to exhibit not merely for reasons already given, but because so many breeders of thoroughbred fowls attach undue importance to the matter of winning at a show, and feel that it is a disgrace to lose and therefore poor policy to show unless one has a reasonable expectation of winning. Then assuming that there will certainly be many good birds in their class, shown in good condition, they conclude the wiser course for them is to keep their birds at home. There is pleasure and generally credit in winning, but wherever competition is strong many must lose, and there is no disgrace in losing with a good exhibit to a rival with a better one. And in the show room merit gets the recognition of visiting fanciers, whether decorated with prizes or among the unplaced. I might say much more to urge reluctant breeders to show, but I hope that what has been said will prove enough, and in passing to the matters properly in this lesson will only say further that the reader following these lessons who neglects to learn what he can in that way will get much less out of some of the more advanced lessons in the course than those who do.

Something About the Poultry Shows.

American poultry shows may be roughly divided into two general classes:—

The poultry exhibit held in connection with an agricultural fair.

The poultry show, proper, held by an association organized solely or primarily for that purpose.

Though there is a rapidly increasing number of exceptions it is still true in a general way that the exhibits at fairs, where they usually occupy a subordinate position, bring out a decidedly inferior class of fowls, are often judged by incompetent persons, and do not begin to afford the opportunities for instruction and comparison of ideas that are found in even the smallest of the special poultry shows.

For this reason readers who wish to exhibit for the sake of what they may learn by exhibiting are advised to exhibit at a winter show unless the poultry exhibit at the fair accessible to them is conducted in about the same way as a winter show, and is well patronized by fanciers in the territory from which it draws exhibits. A number of the more important fairs now run their poultry departments on such a basis, and some of them are as good or better than the winter shows in their vicinity. Occasionally there is enough local interest in the poultry exhibit at a small fair to secure suitable classification, the employment of a competent judge, and consideration of standard requirements in the placing of awards. At such a fair it is worth while to exhibit. But the general run of agricultural fairs, with primitive classification, lack of orderly arrangement, poor care of exhibits, and judgment according to no known standards and by men of no qualifications for the work, do not afford the opportunities for acquiring knowledge which I have in mind; and while I would not dissuade anyone from exhibiting at such a fair to help the exhibit, I would not want a reader to limit himself to such experience in exhibiting and think he had followed my advice.

Fowls Are Judged by the "Standard."

At all well managed shows in the United States and Canada, fowls are judged by the "American Standard of Perfection." This book is a collection of descriptions of varieties of fowls made to conform to a general model, compiled by the American Poultry Association, and is by

custom and general consent the common "law" as to requirements for the varieties included. A copy of this book it is essential that every exhibitor and every breeder of thoroughbred fowls should have. Trying to breed and exhibit without the information in this book is like trying to do any kind of work requiring accuracy without a model, pattern or plan. Probably four-fifths of the mistakes of new exhibitors are directly due to their failure to inform themselves about Standard requirements.

True the Standard contains errors, and errors are sometimes made in applying it. For these an exhibitor is not responsible. The exhibitor is responsible for his own failures to conform to the Standard requirements that are plain and unmistakable, and he can only be sure that he makes no errors here by consulting the Standard on every point which may concern his exhibit.

Applying the Standard in Selection of Specimens to Exhibit.

To a novice who has never seen the application of the Standard demonstrated in judging, and had the opportunity to have the demonstrations which specially interested him further explained by the judge or other breeders, many of the descriptions in the Standard are vague and indefinite, but with these descriptions he need not concern himself at this stage. Leaving them for the present he should give his attention to the points that are clearly and unmistakably plain, for these are, as a rule, the points upon which judges most nearly agree in the application of the Standard, and under any competent judge a specimen is almost certain to suffer if "off" in any of these points. In regard to them, knowing what the Standard says, even the novice may know what the judge will do about them.

The best way to study the Standard description of a variety of fowls is to have one or more males and females of the variety under consideration cooped where they can be handled at will, and examine each section in the birds as the description of it is read in the book. The better the specimen the easier it is to understand the description. It is advisable for the prospective exhibitor to give himself several drills of this kind to familiarize himself with the Standard requirements before he undertakes to select specimens to exhibit.

The descriptions state in a concise way, and almost without explanation, what is required in an ideal specimen.

Having selected one or more specimens which seem to be his best according to the description, the novice should next look up the disqualifications and examine carefully for them, for a bird that is plainly disqualified, though in every other way a fine specimen, and the disqualifying feature a very trivial one, is not only not given a prize, but in score card shows most judges quit scoring as soon as they find a disqualification, and the exhibitor is thus left without the record of the judge's complete estimate of the quality of the specimen, a distinct disappointment and misfortune when he shows to learn.

On page 28 of "The Standard of Perfection" is given the list of general disqualifications — that is, of disqualifications which are the same for all or many breeds. Preceding the description of each variety the additional special disqualifications for that variety are given.

To illustrate the method of looking for disqualifications:* Suppose a Barred Plymouth Rock is under examination. Turning to the list of general disqualifications, the reader sees at once that the first three do not apply to Barred Plymouth Rocks. Coming to the fourth he finds it reads thus:—

"In all breeds required to have unfeathered shanks, any feather or feathers on shanks, feet, or toes, or unmistakable indications of feathers having been plucked from the same."

Now the novice whose idea of a feathered leg is of a leg profusely covered with feathers is apt to let that pass without a thought; but he needs to give the point attention, and the legs and feet of the fowl a very careful examination, for tiny feathers are often found on the out-

*The reader must not understand that what follows is the method pursued by a judge, or an experienced exhibitor, or the method he will himself pursue when familiar with the Standard and with his breed. The expert knowing the disqualifications without reference to the book, and having them all in mind, sees the more conspicuous ones at a glance. The breeder will look next for those most common in his stock. The judge using the score card generally begins with the first section, and going right through the list, takes note of a disqualification when he reaches the section it is in.

side of the shank of a fowl of a clean legged breed, and frequently they are so small that it takes a very careful examination to discover them. Sometimes there is only a stub of a quill, but that is as fatal as more.

While examining for feathers he should also look for down between the toes of the fowl. By "down" is meant, as he will see by referring to the glossary of technical terms, a feather so minute that the quill is not visible to the naked eye. Formerly down disqualified the same as feathers, but now it is cut as a defect.

The next general disqualification in regard to clipped wings also applies to Plymouth Rocks. If any of the specimens under consideration have had their wings clipped there is ample time now to pull out the clipped feathers and let new ones grow in their place. Even if not full grown at the time of the show the new feathers show the quality of the wing. The reason for disqualifying for clipped wings is that if they are allowed to pass with a cut it is possible in some varieties by clipping a wing to remove a disqualification.

The next general disqualification which might apply is lopped comb. The glossary defines a lopped comb. Such combs are rarely found now on Plymouth Rocks.

Next, "decidedly wry tails," that is, the tail carried to one side. This is quite a common defect, and is often unsuspected. A badly wry tailed bird it is no use to exhibit, but one that is only slightly wry, or only occasionally carried wry, an exhibitor will take chances with, for it is the practice of judges examining such a bird to try to get it to carry the tail straight, and if it will do so for only an instant the tail will pass.

Next, "crooked backs." This is another fault often unsuspected by even exhibitors of some experience, but easily found by the judge who passes his hand over the back of the fowl.

Next, "side sprig or sprigs on the comb of single comb varieties." This is a very common defect.

Next, "decidedly squirrel tail," that is, the tail carried so high as to suggest the habit of the squirrel which carries its tail curving to the back. In short tailed breeds like Plymouth Rocks this defect is rarely conspicuous.

Next, "blind in both eyes." A very rare defect.

Next, "in four toed breeds, more or less than four toes on either foot." Not a very common defect.

Next, "entire absence of main tail feathers." The feathers will not be absent unless they have been removed. They do sometimes get removed accidentally. The disqualification is to cover the case of the exhibitor who would remove them to hide a fault or disqualification.

This completes the list of general disqualifications for faults which apply in this case. Turning to Barred Plymouth Rocks, we find the following special disqualifications:—

"Positive white in ear lobes; red in any part of the plumage; two or more solid black primaries, secondaries, or main tail feathers; shanks other than yellow with due allowance for fading with age, dark spots not to disqualify."

The search for these disqualifications leads to an examination of the ear lobes for white, of the entire plumage for feathers with reddish spots on them, of the stiff feathers of wings and tail, and of the color of shanks and toes.

In looking for these disqualifications the exhibitor will have given his birds a pretty careful examination, but he is not through yet. On pages 29 and 30 of "The Standard," is a list of cuts for the more common defects, by reference to which he will learn the common faults and find some for which a specimen may be punished so severely that as far as chances of winning are concerned it might as well be disqualified.

We will not go through these here in detail, but refer only to the more important ones which apply in the case. These refer to irregular barring and to black feathers. Irregular barring is very common, and there are very few Barred Rocks which have not some black or partly black feathers in the plumage, which an inexperienced observer might not notice at all, but which the judge as a rule quickly discovers. It is the common practice of exhibitors to remove these feathers before showing the fowls. I will not attempt here to go into the ethics of the practice, but pass the matter with the remark that it is quite useless for one who leaves them to show in competition, and that as the Standard is worded now their removal is not "faking."

For any other variety the prospective exhibitor should proceed in the same way, letting no

section connected with a disqualification pass without a careful examination, and paying special attention to the common defects mentioned for the variety he is considering. It takes time, and it is work; but it is work that must be done if one would compete successfully in the exhibition room, and is quite as necessary, if though never exhibiting he wishes to breed to Standard requirements. Without this careful examination, and the thorough knowledge it gives both of the variety and of the individuals handled, a breeder will soon find his stock more distinguished for its faults than for its excellencies.

Fitting Fowls for Exhibition.

Having selected such specimens suitable for exhibition as are required, the next thing in order is to make or keep them fit for exhibition. Occasionally a specimen can be taken from the yard and sent to a show without any preliminary fitting or handling, but most birds need something done for them.

Broken feathers should be removed that they may grow out again. Scaly legs should be cleaned up. Specimens short in weight or out of condition should have special care and feeding. For each variety, according to its necessities, provision must be made to get and keep the specimens in perfect condition. Fowls with feathered legs must not be allowed to scratch and break the feathers on the feet. White fowls especially must be kept clean. Males must be kept where they cannot injure their combs, and the keeper must see that they roost where they will not break the tail feathers. Often roosts too close to the wall completely ruin the feathers in the tails of the male birds.

For all this general preliminary fitting fowls should be kept in their usual quarters, these, if necessary, being arranged to insure, as far as possible, freedom from liability to accidents that might spoil their condition.

As the time when they are to be exhibited approaches, the fowls should be confined to the exhibition coops for a part of the time at least, that they may become accustomed to the coop, and should be handled frequently. The handling should be gentle and careful. If possible a novice fitting his fowls for exhibition should seek the personal advice of some more experienced exhibitor at every stage, and in no one point is it more important to be "shown" than in catching and handling the fowls.

Many a novice finds that his way of handling fowls results in the case of wild, shy, and nervous fowls in many feathers being pulled out or broken, and with such experiences the birds do not rapidly become docile and easily handled.

Unless the fowls are tame enough to be picked up readily almost anywhere they should be first caught from the roosts at night and put into small coops, preferably exhibition coops, something like that shown in the accompanying illustration.

To catch and handle them from such a coop have the coop at such height that the bird in it is easily reached. Then to catch the bird reach in with the left hand and take it, with its head toward you, by the legs at the hock joints, your arm passing under the bird so that as it is withdrawn from the coop its weight rests on your forearm, and the palm of your hand being upward. Don't catch by the thighs, or the bird may struggle, and in its struggles pull out feathers. If you take hold right with the hock joints in the hand, while the fingers grasp the shanks, the bird feels itself securely held, and is likely to submit at once, while such struggles as it may make cannot damage the plumage.

If unable to get the bird in that way, catch it with the right hand by the wing close up to the body, and drawing it toward you get the hold first described. Never attempt to hold the bird unless you have a secure hold that will not hurt it.

A Combined Exhibition and Shipping Coop.

Dimensions—height 30 in.; width 30 in.; depth 24 in.

Most birds respond quickly to firm and kind handling, and learn to like it, but occasionally one is found that is very intractable. Unless such a specimen is of remarkable quality it is not worth while to fit or show it.

If the birds have been given special care for some months to bring them naturally into show conditions, the work at this stage will not go much beyond training to make them gentle, to have them "coop broke," as it is called. But in the case of white fowls it is desirable that they should be washed, and if birds are to show to advantage with well washed birds they also must be well washed. The novice who leaves washing until just before the show is very likely to make a mess of it. The better way is to begin to practice, not necessarily on the birds to be exhibited, (any white fowl will do), long before the show, and be familiar with and somewhat skillful in the process before you try it in the final preparation of an exhibition specimen. Take a bright warm day in the fall, when the bird can be dried in the sun, for the first attempt, and when the general warm atmosphere makes it less likely that the washed bird will catch cold in being thoroughly dried off.

Suggestions From Experts.

Supplementing these general instructions, I quote from three of the best articles on preparing fowls for exhibition that have been published in this paper.

Mr. A. C. Smith, in an article on preparing birds for exhibition, says:—

"As it is impossible in this climate to allow birds to run in the fields during those months when shows are mostly held, we must imitate those conditions, and supply what nature furnishes when they are at range in some model pasture. While many poultrymen supply some of these things, there are few who realize the importance of fresh air and exercise. These are prime essentials to good health, and they are about all that is required to make a good coat, except wholesome food. To neglect giving the birds plenty of exercise, or even forcing them to exercise if necessary, is to abandon our greatest help in conditioning fowls. Fresh air is a subject that has been discussed but little if at all by the poultry press in connection with the condition of exhibition fowls. The necessity of a good supply of this abundant and inexpensive article is most emphatically urged upon all poultry keepers. It will affect the coat both as to hardness of feather and lustre. The reader has but to experiment for a few days with a well ventilated hen house and a poorly ventilated one to see the effect upon the fowls. Keep the windows closed, or nearly closed, both day and night, and watch your birds as to hardness of feather, lustre, and color of head parts, and then try a little judicious ventilation, and note the difference in the tone and appearance of your birds. Such an experiment may be confined to your own house instead of being carried to the poultry house. Close your sleeping room up tight all night, and your own feelings in the morning will demonstrate the necessity of a supply of pure air for the fowls at all times.

"Green food is another essential which birds crave, and it should be supplied in good quantity. This leads us to the subject of feeding fowls that are being prepared for exhibition. All foods should be sweet and wholesome. Fowls are not swine, and will not thrive upon the care usually accorded that much abused race of animals. Good judgment must be used as to the amount of food. Too much food means too much flesh, and fowls too lazy to take the needed amount of exercise.

"To get the required amount of exercise in confined quarters, a litter of leaves, coarse hay, or rye straw should be placed upon the ground to the depth of four or five inches. A few oats should be scattered in this as soon as the birds are fairly off the roost in the morning, if it is during the short days of winter. Then as soon as the mash can be prepared the birds should receive about two heaping teaspoonfuls each. This small quantity warms them up and sets the machinery of their digestive organs to work, but is not enough to destroy their appetite for more. This mash should be made of ground oats and corn meal, or corn meal, flour middlings, and bran, or acme feed. The proportions should be governed by the quality of the goods. A mash that is so light in substance that it does not cling together is not rich enough; neither is a tough, dough mass what is desired. This mash should be seasoned lightly with salt, but no

spices whatever should be used, as they tend to intensify the color of the head parts for a short time only, and to diminish it in proportion thereafter. It is also advisable to use a small quantity of bone meal in this mash every morning, and twice a week a little refined fish meal, say one-twelfth or so. This is a forcing food, and but little should be employed unless it is desired to bring females toward a laying state. Clover meal should be used once or twice a week in this morning mash. It is preferable to cut clover, as the latter is too bulky in the crop, and often clogs the passage to the digestive organs. The fowls should be kept scratching until noon, when the green food should be fed. Everyone has his preference; the writer prefers cabbages, as they are the greenest and tenderest thing to be procured in the winter months. Green food can be placed before them in two ways — it may be chopped, and a certain amount fed every day, or it may be placed before the fowls in an unlimited supply. If it is furnished without restriction, it must be kept constantly before the fowls, otherwise they are liable to eat too much when a new allowance is supplied. Between three and four o'clock the fowls should be given the heartiest meal of the day. It should consist of either wheat or barley, and should be well covered with litter. The exact time that it should be given depends upon the length of the day. The object is to give the fowls an hour or an hour and a half of exercise before they go to roost. Considerable can be accomplished by a selection of grains. If the birds are too fleshy, more barley and less wheat should be used for the evening feed. If the weather is very cold, and the birds in a normal state of flesh, a small handful of corn may be allowed each one just before it jumps upon the perch for the night. With fowls that are poor in flesh it is well to use more wheat and but little oats and barley for a scratching feed. Corn should be fed for the evening feed to birds in this condition.

"Young birds of the heavier breeds which are somewhat under weight should not be forced to over-exercise, (in such cases, increase of weight is the main point); but a moderate amount of exercise will prove advantageous in these cases, also. A great variety of food should be sought for such birds. The mash should have a greater proportion of corn meal, and a mixture of wheat and barley with a small proportion of oats should be used during the day to make the birds exercise. Broken sweet crackers of all sorts may be used in connection with corn meal and bran as a soft food to good advantage. In cold weather sunflower seeds and buckwheat in small amounts are good agents in securing the desired object. The last two are also very instrumental in procuring that lustre so desired by the best exhibitors. Beef tallow is very good to give a lustre to the coat. Too much is not beneficial to the general health of the bird, but a piece one-half the size of an English walnut every second day will answer the purpose and prove a great treat to the birds.

"The quarters for the birds during this preparation should be all that quarters for any fowls should be—dry, sunny, well ventilated, but free from drafts. It would be well to clean them a little oftener than usual. No chance should present itself for the birds to soil their plumage, as the natural has more life than the washed plumage. To that end the droppings should be removed a little oftener than usual, and no soft or green foods left where the plumage of the birds can come in contact with them.

"It is hardly necessary to say that these birds must be kept absolutely free from lice, and in particular cases like these nothing in my opinion answers as well as a thorough dusting once a week with lice powder.

"The males and females should for obvious reasons be conditioned in separate compartments, if not in separate houses. The males usually do better with one to three females, of course only those which are of no consequence for exhibition purposes. The females may be conditioned together to the number of six or eight, but when more than that number are placed in the same pen all do not seem to thrive.

"Grooming is sometimes resorted to in order to give the bird a sleek appearance; one which has had plenty of fresh air and exercise seldom requires much, however. The best implements for such work are the hands or an old silk handkerchief. The feathers should be rubbed very lightly as they show the effects of the least wear very quickly.

"The mention of any tonics, washes, drugs, and what may be termed 'brilliantines,' has been carefully avoided, as the course here described will do all that those things will do, and all that is necessary in forty-nine cases out of fifty. Nothing is absolutely required except the every

day stock of the cook room, and a quick eye for the condition of the birds and the houses, to enable you to set up as finely conditioned a string of birds as any of your contemporaries."

How to Wash a Fowl.

Mr. E. Wyatt, in an article on preparing fowls for exhibition, gives the following detailed instructions for washing fowls:

"All white birds need to be washed before being sent to the show, and this should be done two or three days before sent on their journey. To wash a bird is a difficult thing, and may rightly be called an art. If it cannot be done right, it had better not be done at all, for the birds will look ten times better by not being touched than if they were washed and a bad job made of them. Those breeding white birds have often noticed when passing through a show, many white birds looking smoky in color, the feathers sticky, not sitting right; in fact, looking very unnatural indeed. The matter was that they had been washed, and that by an inexperienced hand, whose birds would have looked better if they had never been washed at all. And so it goes, if it cannot be done right it had better be left alone.

"The first thing necessary is to prepare a kitchen for the work, and start a good brisk fire in a wood stove. Remove all the unnecessary furniture; warm plenty of clean rain water, and set three good sized tubs in position around and close to the stove. One needs a good assistant, and no better can be found than a good patient woman. One must have an assistant, for many things will need tending to that can't be done by one person. First, have all the birds ready, so that no inconvenience will be caused by having to go to the hen houses for the specimens just when they are wanted. After having removed all the dirt on the feet, if there be any, a good fanning is necessary so as to get all the dust out of the feathers that is possible to do so before applying the water.

"Tub No. 1 should be filled half full of water, lukewarm, as near blood heat as possible, or a little warmer will not hurt. Put the bird gently into the water, holding it there either by the feet or by the sides of the body, depending on its disposition. If the bird has never been washed before, it will not know what to make of it at first. It may want to fly, or many other things.

"Just then, the operator will have to exercise that highest of all virtues—patience. Take it easy for awhile; hold the bird down in the water, partly immersed, and in a while begin applying water with a good sized sponge. With this rub the feathers with the web as they lay; never rub against the lay of the feathers. The best way to hold a bird in the water is, when seated on a chair close to the tub, to face the birds towards you, and wash away from you. You will find it a very difficult job to get the feathers *wet*. After applying water with the sponge for a while, then begin using the soap. Castile or Ivory soap is good, but I always use Colgate's shaving soap on my White Cochins, and White Cochins are the hardest breed of all to wash on account of the great length and fluffiness of their feathers. With free use of water and soap get the feathers all over—neck, breast, back, cushion, wing, tail, thighs—as wet and soapy as you can. Use the sponge freely, and wet and wash the feathers right to the skin until you get all that dry and fluffy appearance out of them. Then they are properly wet.

"Continue rubbing with the sponge, and applying the soap, turning the feathers over and over, and getting at the entire surface of every feather if you can. By so doing, you will get all the dirt out of the feathers, and the next step is to get out the soap.

"Tub No. 2 should be in waiting, half full of clean lukewarm water, as before. Here the bird is put, as in tub No. 1, and washed thoroughly, so as to get out all the soap. After rubbing with sponge, and using clean water freely, take a dipper and keep pouring the water out of the tub over the bird, letting it fall with a little force from about a foot above the bird. This will part the feathers and cleanse them from the soap. Do this all over the bird. If you do it right, one tub of this kind of work will be enough.

"Tub No. 3 should also be handy, and in it some cold water with just as much bluing as the good wife uses for bluing the white clothes. Into this the bird is put as before, and rinsed with the cold bluing water. The water should be just cold enough to be chilly. The reason for this cold shower bath is for the same purpose that men take them after taking a

plunge in a warm bath—it prevents catching cold. After going through these three operations the bird is ready for drying, which is not by any means the least important part of the work.

“After taking the bird from tub No. 3, put the bird on a board placed on top of the tub, and by means of the hands squeeze all the water out of its feathers you possibly can. Remove the bird then to the top of a box, or a chair, placed very close to a good brisk fire, and begin toweling it with warm dry towels, so as to absorb all the moisture out of the feathers that you can.

“Now the bird is ready for drying. Keep it before a brisk wood fire, but not so near as to curl the feathers, or you will spoil them so that they cannot be remedied. With a strong palm fan let the assistant begin the drying, first fanning one side and then the other. This part of the work is gone on with until the bird is thoroughly dried. The fire needs to be brisk, the bird kept turned around, and the fan going all the time, and it is surprising how soon the feathers will dry and open up so nice and fluffy. The fluff, the back, and under the wings will be longest in drying. Holding a wing up with one hand, and fanning with the other, will soon make wonderful changes. If the work has been successful thus far, little difficulty will be experienced in getting the birds dry and putting on the finishing touches.

“And now we will suppose the bird is nice and dry, and that the feathers are free from soap. It is a difficult job to get the feathers wet and soapy, and a difficult one to get the soap out again. All it requires to accomplish both is time and patience, and good clean warm water. But if, on drying, it has been found that the feathers are sticky and do not open nicely, which will not be the case if the work has been done right in first place, put in order again another fresh lot of clean warm rainwater, and rinse over again as before, and proceed with the bleaching and drying again.”

What to Do On the Way, at the Show, and Home Again.

On these three points Mr. Smith, generally reputed one of the best fitters and handlers of exhibition fowls in the country, gave our readers a few years ago the following advice:—

“Mistakes which seriously handicap a bird are often made in the mode of shipping to a show. Most anything will do for a shipping coop, for some people. The most common mistake is shipping male birds in coops that are not high enough, as the bird will take a stretch now and then, and if he runs across anything new is liable to jump, he will strike his comb against the top of the coop, and when this sort of exercise is practiced for a few minutes that ornamental fixture becomes anything but ornamental. The coops that some leading breeders and exhibitors ship in have solid instead of slat tops, which are sure to injure any but the firmest and smallest of single combs.

“Experience has shown the writer that single comb males of the American class should have a coop 28 to 30 in. high, and not less than 17 x 18 in. on the floor. Males of the rose comb varieties may be shipped in coops 4 to 6 in. lower. For males of the Mediterranean class, nothing short of 22 to 24 in. in height should be used, and for some birds the coops should be even higher. But one bird should be shipped in a coop or compartment, no matter how long they have run together, or how friendly they may seem. The confinement in narrow quarters never improves, and often destroys the good feeling that has heretofore existed between them.

“The larger and more successful exhibitors, as a rule, accompany their birds, or send an attendant to care for them whenever they exhibit. Some of these exhibitors go so far as to say that they will never show a single bird unless accompanied by a competent handler. Those who are acquainted with the many duties and cares of the average show official can readily understand that if our birds are to get extra care we must supply it. The wisdom of accompanying birds or sending an attendant is born of experience.

“Your duties do not cease when your birds leave your yards, and begin again when they arrive at the exhibition hall. It is most necessary to have a watchful eye upon the coops and birds when in transit. Expressmen are much more likely to keep the coops right side up when under the eye of the owner, or one supposed to be the owner, and the messenger less liable to bury the coop under baggage when you occasionally peep into the express car.

“As soon as the birds arrive at the show room they should be moved to some comfortable place, and the show cages made ready for their reception, if this has not already been done.

The cautious exhibitor will wash all drinking and feeding cups in as hot water as he can procure. This is quite necessary to prevent roup, canker, and other contagious diseases, unless you furnish your own cups, a thing it is not always convenient to do. Plenty of sawdust should be placed in the bottom, as no chicken or fowl will stand in form upon a substance too hard to catch the nails. Then if your birds are white the cage should be rubbed free from dust and dirt. It is better to fill the drinking and feeding dishes before the birds are placed in the cages, as they are much disturbed by the change, and it is well not to trouble them any more than necessary until they become accustomed to the surroundings.

"It is to be supposed that the birds have been in preparation for the show for some time, that they are free from vermin; that the plumage is clean, as well as head, legs, etc. If the legs and feet have not been cleaned, they may be now by applying castile soapsuds with a nail or tooth brush. These suds should be rinsed off, and the legs rubbed dry with a soft rag. To bring the color of the legs out, a small quantity of cotton seed oil should be thoroughly rubbed in. The rubbing should be thorough, as the oil will hold all the dust and dirt that strikes it. The dirt that often collects under the scale may be easily removed after the washing by using a common wooden toothpick.

"Lotions are often applied to the face, comb, and wattles, to intensify the color. If the bird is in the pink of condition it will scarcely be necessary to more than wash these parts with a sponge dampened with tepid water. The effect of most of the washes used to brighten the head parts depends upon the quantity of alcohol contained. Many use alcohol diluted with water; vinegar is often used. The effect of this liquor is due to the acetic acid, which is part of its composition. Acids and alcohols brighten the color only for a short time—a few hours at the most. After the action the reaction sets in, and these parts become paler instead of brighter. These agents have but the effect of making the bird appear in perfect condition for a very short time. After that they appear to less advantage than if they had been left to do their own coloring. It may be said without fear of contradiction that the application of these sharp acids and hot lotions is not worth the trouble. It is my honest belief that their application has not changed an award or misled an intelligent judge in the last ten years. About the best thing as well as the simplest that can be used for this purpose is a very small quantity of vaseline well rubbed into the place of application. This will intensify the color, especially in a room of a temperature as high as that which human beings usually inhabit.

"The food furnished at the average poultry show is limited to hard grains of one or two kinds. This is not sufficient variety, even for three or four days. It is highly important to supply the bird with grit and oyster shells, as well as an allowance of green foods. It is a good plan to furnish the regular warm morning mash. This will involve but little labor if all its ingredients are mixed dry, put in a bag, and taken with you. It should be the attendant's duty to clean the coops in part twice a day at least, and put in a fresh supply of sawdust occasionally.

"Of all the evils of the show room drafts work the greatest harm. In fighting them, a piece of brown paper, or several folds of a newspaper, will be found very effective. Drafts come from all directions, but those that come through a hole or crack in the bottom of the coop are the most apt to escape notice. These cause many colds. They may be prevented by tacking a piece of pasteboard over the opening.

"In some show halls the temperature is allowed to fall many degrees at night. A change in temperature of twenty to thirty degrees in a few hours does not agree with fowls as a rule. It is advisable in such cases to cover the top and front of the coop at night, after the room becomes somewhat cooler than it has been during the day, always having, of course, some ventilation. Such a proceeding is also advisable when the hall is left lighted during the night, as the birds rest better, and appear fresher if the coops are darkened during the night.

"Getting the fowls home is fully as important as getting them to the show. As they have been so closely confined for several days, they are less vigorous than when taken out of the yards, and consequently more liable to disease. The care should not slacken for one minute until the birds have been well established in their regular quarters for several days, and it becomes certain whether or not they are the worse for their experience."

LESSON XIX.

The Fattening of Poultry.

WHAT is fat? My dictionary describes it, and tells me that it is a part of animal tissue, and is also found in plants. From advocates of "scientific" feeding, more may be learned about it. They discuss it as a food element and as a body constituent, and though we may not follow them through all their ideas, let us give them credit for having made the people of their generation more familiar with the qualities of food and the requirements of the animal organism.

Fat in the organism is an extremely concentrated reserve supply of nourishment stored for emergencies, and sometimes, also, by its disposition under the skin, made to serve as a protection from cold. Indeed, when stored in large quantities the bulk of it is usually deposited next the skin, though a good deal is distributed through the muscular tissues, and sometimes large quantities accumulate about the internal organs. Nature's problem in the disposition of the fat on a person, animal, or fowl is very like that of a man who has to find place for a store of materials in a workshop in which practically all the available room is required for the work carried on and materials actually being used. But a small quantity of fat can be stored in the body without detriment to it, or interference with its functions. Wherever placed, it is a dead weight to be carried — more or less of a burden. An excessive accumulation of fat between the muscular tissues and about the joints and the juncture of sinews with the bones impedes the action of the limbs. Large deposits of fat about the internal organs seriously interferes with their functions. Again, the sense of fullness occasioned by such a never failing reserve is apt to dull the appetite, and the tendency to inactivity combines with this to weaken the digestive organs and so gradually destroy the vitality and vigor of the organism.

From the point of view of the poultry breeder and egg farmer, fat, in excess of the small reserve necessary to offset irregularities in feeding, production, and temperature, is a bad thing. From the point of view of the poultryman about to sell, and of buyers of table poultry, fat — and a great deal of it — is desirable.

The fowl in good breeding or laying condition is not, as a rule, in good table condition. The chicken, as it runs on the farm or in the yard, lacks the plumpness and smoothness of a fatted chicken. The lean fowl or chicken, though tender in flesh, is dry meat and not especially appetizing. When hard meat it is quite undesirable. So for table purposes poultry should be somewhat fat. How fat, is a question for individual tastes, or market demands, to determine.

In some foreign countries, notably in France and Belgium, there is some market demand for excessively fat fowls, and the process of fattening fowls for this demand is something of an art, requiring considerable skill, good judgment, and first of all, fowls constitutionally well adapted to it. In England, the taste for fat poultry is less pronounced, and a less degree of fattening suffices, but still a good deal of attention is given the art of fattening. In this country very fat fowls are not wanted to any marked extent. In this respect we are behind or not, accord-

ing to the point of view. What our markets require for first class poultry is poultry fat enough to cook well in its own fat, but not so fat that much of the fat still remains after the cooking. Comparatively few people here have any taste for an overfat fowl. To most people poultry fat, except in small quantities, is nauseating, and, of course, the internal fat removed when the fowl is drawn is of no special advantage to the consumer. What the consumer wants is a suitable amount of fat, properly distributed next the skin and through the tissues, so that in cooking, its oil penetrates to every part of the meat, but yet the fat is not anywhere in such quantities that it remains after the cooking, and gives its taste to the meat. To accomplish this, a fowl, especially for a roasting fowl, must be quite fat — much fatter than our average good poultry. Hence we may say that there is little danger of making young poultry overfat by any ordinary means unless the process of fattening is protracted far beyond what is necessary. With old fowls it is different; many of those seen in our markets are excessively fat, and the fat not at all well distributed, but the greater part of it waste — fat which adds to the weight of the fowl without increasing the quantity of edible meat, or improving its quality.

From what has been said I think it will be clear that fat in market poultry is valuable chiefly as an accessory quality. The fat itself, except as it occurs in small quantities in the muscular tissues, is eaten by comparatively few people, but people want their poultry quite fat because the lean meat of the fat fowl is, other things being equal, superior to the lean meat of a lean fowl. There is another reason for this besides the effect of fat in the cooking, which has already been referred to. The lean fowl is lean because of insufficient nourishment, or because its activity hardens the muscles and prevents the accumulation of fat. After maturity the fat fowl may begin to fatten because of a constitutional tendency that way, even on a very moderate amount of nourishment, (though while growing, few will fatten unless conditions are especially favorable), but the subsequent accumulation of fat depends on whether the natural tendency to fatten is aided or discouraged by the poultry keeper.

The stock that is to be kept for laying and breeding purposes should be allowed to accumulate but little fat. Stock that is to be marketed the grower generally wants to have ready for sale at the most convenient or most favorable time. If he has stock all of the same breeding, and well bred, he is likely to find it much the same all through. If a part of the chickens quit growing early and begin to fatten, it is likely that most of the stock will do so. Generally such stock is best fattened and disposed of at once, though sometimes it pays to hold it for a special market and high prices, for, as a rule, stock that begins to fatten young under ordinary conditions and diet does not grow much more frame or muscle. It is the fowls that grow the frames first, then round them out with muscle, and then begin to lay on fat that make the largest and finest poultry at maturity. Such stock a grower often wants to fatten a little in advance of its natural tendency, and to accomplish this he resorts to various artificial means, some very simple, others more difficult.

Beginners generally, and a surprisingly large number of poultry keepers of some experience overrate the importance of special food in fattening, and attach too little importance to conditions and inherited tendencies. The latter question in particular is almost neglected, and in consequence in this country poultry grown especially for the table is too apt to come from stock which is considered suitable for producing market poultry only because it is plainly not suitable for anything else. As a result of the general use of many birds not at all satisfactory from a market poultry standpoint, far too large a proportion of our poultry can never be fattened properly, no matter what foods are used, and not a little of it cannot be fattened profitably, the process requiring too long a time, too much food, and too many individuals falling out by the way because the digestive organs will not stand the heavy feeding and close confinement necessary to make them lay on fat.

To fatten quickly, easily, and profitably a fowl or chicken must first of all be plump. A chicken that is plump at any age can generally be fattened at any age. A chicken that has a "lanky" period during its growth it is almost impossible to fatten during that period. The best illustration of this is seen in the Asiatics, especially the Light Brahma. Under three months of age they may be fattened quite readily. From three to six or seven months they tend to put everything given them into frame, bone, and muscle, and cannot be fattened, even in close confinement in such a short period as suffices after the frame is developed. Shut

them up close and feed heavily at this period and they grow weedily and often become ill formed. In many other breeds, and especially in those having Asiatic blood in their make up, the same condition obtains with regard to many stocks, and sometimes is conspicuous in a part of a flock, and as notably absent in the remainder.

In fattening poultry, therefore, we have to consider first the chickens, fowls, or other poultry to be fattened, whether they fatten readily or with difficulty.

Next we must consider the season, the time of year and the prevailing conditions. Just as all hens tend to lay in the spring, nature tends to make all fowls lay up a supply of fat in anticipation of cold weather with its sometimes heavy drains on the capacity of the digestive organs to meet all physical requirements. Often fowls which could not be fattened at any other time will fatten then.

But, as those who will closely follow current comments on market conditions will discover within a very short cycle of years, the weather in fall has much to do with the fattening of the poultry crop of the country. If the general mean temperature is high poultry does not fatten so readily. If the weather is seasonable, with crisp, cool nights the fowls of all kinds eat more heartily of the heating, fattening foods given them and take on fat much more rapidly. The general crop is, to be sure, fattened by somewhat primitive methods, but the conditions affecting it also have their influence on the work of those who try more direct and efficient methods, at this and at all seasons. In a very hot summer it is frequently impossible for growers to get chickens as fat as they want them and as is usual.

The conditions under which poultry is kept while fattening are of at least as much importance as the food. To facilitate fattening their activities must be kept as low as possible. They must be confined in small yards, in pens indoors, or in fattening coops, according to the system used.

The food used is generally a food containing starches and fats in larger proportion than is advisable when the question of maintaining condition with a view to future usefulness has to be considered. In fattening the digestive organs by heavy feeding and lack of general exercise for the fowl are weakened. It rests with the judgment of the operator to see that they are not weakened to the danger point before the fattening process is finished, for in that event he may lose all the profit on the operation, even if he saves the stock.

The Simplest Method of Fattening.

The soft roaster growers of what is known as the "South Shore" section in Massachusetts, who produce the finest poultry brought to the Boston market, continue the same system of feeding from the time their chickens leave the brooders until they are sold to be dressed and marketed immediately. Their bill of fare is of the simplest, and the principle upon which their system is based of the soundest.

Cracked corn, beef scrap and water are always before their chickens. Green food is supplied as convenient. Cabbages are used quite freely when grown at home, but I do not think are purchased very extensively. Green rye, sown in the fall on the land about the houses is available whenever the ground is bare, and with many growers this is the main reliance for green food. Their chickens are grown on this diet, and fatten on it as they reach the fattening period of their lives. As they are especially wanted for early summer there is rarely occasion to hasten fattening. Indeed, these chickens are quite as likely to come on a little faster than the grower wants them to, and so be ready for market rather in advance of the period of best prices. While they may be held for a short time after they are well fatted, this is rarely done, for the overfat chicken is not desired, and after the chicken is once well fatted the risk of disease in fat fowls, intensified by the fact that all through life the roasting chicken has been handled with a view to the quality of the meat rather than to strength and vigor, makes it inadvisable to hold it long.

The principle upon which these South Shore soft roaster growers work is this:

To make the best growth and remain soft meated the chicken must be quiet and contented, not disposed to forage or roam about much, but still inclined to take

exercise enough to keep it in healthy condition through its short life. They give it abundance of food. The food is always before it. They give it opportunity to go quite a distance, and trust to the abundance of food to restrain its inclination to wander, while the opportunity to move about is relied upon to induce it to take exercise enough to keep it from going out of condition before it is marketed.

This principle, rule, or method, whichever we call it, is perhaps no better in results in poultry than some of the more elaborate ones, but it certainly produces a fine article at the minimum cost for food and attendance. It should be noted that it is the object of these growers to produce chickens in which the meat *has always been soft*. Their method does not contemplate improving the quality of a hard meat fowl by softening hard muscles, and interspersing them with fat. With them the fattening is strictly a finishing process intended to be carried only as far as necessary to furnish the fat to cook the meat on the fowl.

The Next Step Toward Special Fattening.

The soft roaster growers, as a rule, intend all their chickens, cockerels, (caponized), and pullets alike for market. Their system, as generally operated, does not produce the largest possible chicken from the possibilities with which they start. There is no need that it should, for the method they use gives them chickens large enough for the general demand. But, when a poultryman is growing stock in which the different sexes, or birds of different quality are to be devoted to different purposes, this method does not apply so well. The object, then, is to build up good strong, vigorous, and usually, too, large bodies; and this must apply to all the stock, for not until mature, or nearly so, can the selection of individuals for the different purposes be made. Chickens handled for this purpose for many months would not readily adapt themselves to the method of heavy feeding and reduced activity. They would come to it in time with the inducements it offers them, but when a poultryman has reached the point of culling out the chickens that are to go to market, he usually wants to fit them for market, and dispose of them as quickly as possible. To accomplish this he confines them somewhat closely, and feeds more heavily and more fattening foods.

In the case of partly grown chickens of the small and medium sized breeds, this kind of forcing is likely to give temporarily very rapid growth with a slight accumulation of fat. I used to take Plymouth Rock, Wyandotte, and Buff Leghorn chicks, weighing a pound to a pound and a quarter each, confine them in lots of about forty, in pens 8 ft. square, with yards containing about 300 sq. ft., and feed heavily on corn cake, wheat, and cracked corn, and put eight ounces of weight on each of them in a week. This was my system of handling chicks to dress for broilers. If my orders for broilers left any to grow a little too large for that purpose they were kept under about the same conditions—perhaps a little more exercise and more variety of food for a few weeks, then again given a week of finishing to fit them for “frys,” and at this second fattening they generally put on much more fat.

The method I use at present is more particularly adapted to older fowls, though it slightly improves the condition of those taken from the yard to be killed for our own table at a stage at which they do not readily fatten.

When cockerels are well grown, I plan to have a few fattening all the time until all destined for the table have been used. They are simply shut in a small pen or coop, fed mash the same as the rest of the stock once a day, and for the rest have cracked corn and water before them all the time. On this treatment most of them will fatten as fast as we care to have them, in from one to two weeks, the average being about ten days. If it should happen that any are not killed within two weeks we are quite sure of finding them overfat.

These chickens are full fed and in good condition before being shut up. I think they will run a little harder meat than the soft roasters, as grown by the South Shore method, but there are many specimens just as soft, and the average is very much better than that of ordinary good table poultry.

Other Simple Methods.

When a very rapid increase of fat is desired, and especially when the chickens to be fattened are a little lacking in condition, the fattening process may be hastened in various ways.

When only a small number of chickens are being handled, a very rapid fattening may be made by feeding on a baked johnny cake of corn meal, with occasionally some beef scrap containing much fat or pork cracklings. For a large number of chickens the preparation of johnny cake is too troublesome. Feeding entirely on mash of corn meal and beef scraps may work satisfactorily on chickens that can stand it, but heavy mash feeding exclusively is not to be recommended to a novice. The part grain diet is safer.

Fattening on ground dry feed mixtures is probably not to be recommended for quick work with chickens that have been fed by another system, for if they do not take readily to it valuable time is lost. It should be noted in the instructions already given that the fattening process is simply an extension of the regular system of feeding to which the stock is accustomed. So in dry feeding the feeder trusts in part to confining the chickens more closely and in part to a little more fattening food of the same kind he has been using and fed much the same way to bring about the conditions he seeks. Mr. Park used to fatten his cockerels on a mixture of equal parts corn, oats, and barley, ground very fine and fed dry in hoppers, the cockerels meantime being confined to a grass run and liberally supplied with beef scrap, water, and, sometimes, milk. I presume they would fatten as rapidly by this plan as by mine, but cannot say definitely.

About Machine Fattening.

Of this system of fattening I do not propose to treat at this stage of these lessons. Later on it will be taken up and considered in a special lesson.

Fattening Old Hens.

If I give in precept what I practice I have not much to say about fattening old hens. My experience has been that when through laying for the season which is to be their last with you, the best thing to do with them is to dispose of them at once, whatever their condition. Those that are fat will gain little by keeping. Those that are thin cannot be fattened in a short time, but must be brought up in condition first. Those that are in good condition might gain enough to warrant fattening if considered by themselves, but with the others, and in view of the fact that whatever the scale of operations, I have nearly always had younger stock to which it was worth while to give additional room, I have always felt that I made no mistake in disposing of the old hens in a bunch, letting them go as they were, and I think most poultrymen will find the same thing true.

If, however, one wants to fatten his old hens the best plan is to confine quite closely and feed heavily a ration about the same as they have been getting for a good laying ration. More corn and more meat foods may be added, but with old hens it is not best to feed too heating foods, for they cannot stand it as the young stock will, and a few hens going off their feed and dying will cut into the profit so much that it would have been as well not to try to fatten.

LESSON XX.

Selling Market Poultry and Eggs.

TO DISPOSE of the products of the poultry yard to best advantage often calls for as much knowledge, skill, and judgment as their production. This is a fact that too many "producers" fail to grasp. In common with the mass of producers in all agricultural lines, poultry keepers, especially those located a long way from the best markets, are apt to regard the middlemen and the transportation companies as predatory individuals and concerns levying tribute on goods as they pass from producer to consumer. Much is said of "the middleman's profits." It is assumed that they are large and sure, and the poultry keeper is prone to feel that if in any way he can retain the part of the final selling price of his products which represents the difference between what he gets and what the consumer gives, his business will be much more profitable.

In general there is more error than truth in this view of the case as it applies to the person giving all or much of his time to poultry keeping; and I am not sure that the statement will not apply to all classes of poultry keepers who sell eggs and poultry for table use. Even those located close to good markets often find it unprofitable to try to dispose of their produce direct to consumers. There are, of course, a great many instances where it pays better to sell direct, but still I think the number of cases in which it pays better to sell goods through the regular channels of trade is very much greater. Both from my own experience and from what I have seen, I am so convinced of this that I think one should make all his plans and estimates on that basis unless he is absolutely sure of a direct market under unusually favorable conditions.

Ordinarily the producer who sells direct to consumers, thereby keeping for himself the various amounts which usually go to commission and wholesale dealers, retailers, and transportation companies, does the work of all these himself; and often it costs him more to do it than the difference in the wholesale and retail prices.

He does not always realize this. With his mind intent on "the middleman's profit," it may not occur to him to figure out just what it costs him to sell his produce direct, and how much more he could probably produce by giving all his time to production.

When It Is Advisable to Sell Direct.

If the quantities to be sold are small and can be conveniently delivered without taking time which might more profitably be given to something else; or

If the poultry products can be sold from house to house with other stuff, as milk or vegetables;

If the quantities to be sold are large enough to make daily deliveries;

It may be more profitable to sell direct, though there are very few places where it is possible to make a large route for poultry and eggs alone profitable enough to warrant giving it the time of a man and team. There are many poultry keepers who, while keeping a few fowls, or a stock not large enough to require all their time, find it good policy to sell direct to consumers,

but as the amount they produce increases, the relative conditions change. Where at first they put time in the selling of goods that otherwise would have been unoccupied, as their business increases the time given to preparing and delivering for private families is time that could be used to better advantage right in the poultry yard.

It should be said, also, that the personality of the poultryman is of some importance in deciding such a question as this. Qualifications as a salesman count for as much in disposing of products as other qualifications do in producing them. As some people can produce chickens and eggs cheaper than others, get better results for the same investment or work: so some can sell better than others—can work goods off quicker, and often get better prices as well. Like several other matters we have considered during the year, the question of the best way to dispose of produce finally resolves itself into a question of what a certain individual can do under certain conditions, and the general advice I have given is what fits the case for most individuals in the greatest number of conditions.

Taking up now the special consideration of the different methods of selling poultry products:

Selling Eggs and Poultry to Private Customers.

This means, as a rule, the delivery once or twice a week of an approximately uniform quantity of eggs during the greater part of the year. Most families economize on eggs for a few months when prices are highest; indulge in them more freely when prices are lower, but during the greater part of the year use the same number of dozens per week. The total number of regular customers a poultryman can take, can never be much greater than the number he can supply when eggs are scarce.

A few families will use poultry once or twice a week, and a few such customers can take the poultry product from quite a large plant if hatches happen to be so distributed through the season that there is something to dress every week. The average family buys poultry about once in two or three weeks, and while such orders help out, unless a route has a goodly proportion of customers buying poultry once a week or oftener, it does not pay to supply it with poultry,—speaking now of a poultry and egg route. If other produce is sold the case may be different.

Selling to Large Consumers of Eggs and Poultry.

Some private families trade would come under this heading, but under it I refer more particularly to hotel, boarding house, restaurant, and soda fountain trade. Opportunities to sell at a premium to this class of trade are not generally as good as they were before the days of modern cold storage methods. The more careful candling and grading of eggs by commission houses has also had its influence on the situation. These and the fact that many such consumers have arrangements with some poultryman for supplies of eggs, make it sometimes hard to find customers of this class. Another thing that works against the poultryman looking for this class of trade, is that so often poultrymen agree to furnish eggs, and within a few weeks or months find themselves unable to keep to their agreement, and the customer is left in the lurch.

If one happens to know or to get in touch with a good customer of this class, supplying this trade is one of the most satisfactory ways of disposing of eggs, but I doubt whether it would pay to spend much time looking for it. The prices obtained from this trade are sometimes as good as the best from family trade, often a little lower, but as the goods are taken in larger quantities the lower price may be actually better.

Probably the best trade of this kind for eggs, and certainly the best for poultry, is at the summer resort hotels in the north, and the winter resorts in the south. For practically all sales direct to consumers poultry must be dressed.

Marketing With One Middleman.

A most satisfactory arrangement when it can be made, is to sell direct to retailers who supply a high class grocery or provision trade. There are many such in every large city, and some in almost all towns, and as they can easily get fancy prices for fancy goods they are

willing to pay something more than regular market prices for goods that suit their trade—provided they can depend on getting them regularly, and always up to quality. For all they can work off in the ordinary course of trade such firms will usually pay the highest market price, taking goods as they come, up to the amount their trade calls for. But if they can be sure of a steady supply of extra choice goods they can make a specialty of them, push them and extend their trade in those lines to the joint profit of producer and distributor.

The common obstacle to making arrangements of this kind is the inability of the producer to keep the volume of his produce steadily up to what he has agreed to furnish; repeated disappointments of this kind make these firms shy of conducting bargains with poultrymen unknown to them or whose ability to live up to their agreements remains to be proved. Hence the poultry keeper looking for a market of this kind is apt to find them quite unresponsive to the inducements he offers them.

The best way to deal with this trade is not to attempt to get it until by experience you know just what you can be reasonably sure of being able to supply week in and week out through the season or the year, and then make an arrangement on that basis. Such an arrangement does not necessarily mean a contract for only what can be supplied when production is at the lowest point, for when production is lowest consumption is generally lowest also, and when production is greatest and prices lowest, consumption is greatly increased. A retailer who wanted two cases of eggs a week in November and December, might want four in April. A producer producing a case of eggs a week in November and December, might have the four cases a week in April, and as many as were wanted during three-fourths of the year, but if he could not meet the retailer's order for the season of slack production, and some one else could, the other party would get the trade. To put it another way, the producer must find a retailer whose needs it is within his ability to supply regularly. Such a customer he can hold if his goods and his dealings are right; but if he can but partly supply a customer his hold on that business is far more uncertain.

Considering this fact with the general disposition of poultry keepers to enter into arrangements of this kind in the spring, and the too common necessity for dropping out of them before the summer is over: while I would certainly not advise anyone to let slip a contract of this kind that came his way, I would emphatically advise one not to devote much time to looking for such customers until experience had shown what quantities of produce he could safely engage to deliver.

It may seem to some that it is as well to endeavor to get this trade for such periods as one can hold a customer each year, looking up a new customer each year if necessary, but as a rule customers of this class are not so easily obtained that one can afford to do this.

Marketing With Two Middlemen.

I can best illustrate this by describing the method of marketing the soft roaster crop of the South Shore section, to which reference has been made a number of times in these lessons.

There few of the growers dress their poultry. It is sold alive to a few firms, some of which are also growers, and these firms dress the stock and distribute it to the retailers. By this method the inequalities of production are quite generally equalized. The grower is not under necessity of supplying a definite number of fowls each week, or at any regular interval. He holds his fowls until they are ready—at their best. The collectors, being in constant touch with many producers, know just what each has and approximately how many he will have ready at any given time, and arrange their collections accordingly, with the result that the trade is satisfactorily supplied, and the producer gets the benefit of a near connection with the retail trade without any of the difficulties of maintaining such connection which beset him when he sells direct to the trade.

The opportunities to sell in this way are not general. They may, however, be found almost anywhere where production is considerable enough to make collecting worth while, and a good retail trade near enough to take the produce while still in first class condition. There are many communities in the territory tributary to the large market centers where collectors of eggs and poultry will handle them for the producer to better advantage than he can handle them for himself.

Marketing Through Common Trade Channels.

Through the country at large poultry products after they leave the producer pass through several hands before reaching the consumer. In many places collectors send wagons all over the country surrounding their headquarters. In other places country merchants receive poultry and eggs direct from farmers, generally in exchange for goods, and forward them to buyers at central points. From these they go to commission houses in the large cities, or to the packing concerns that handle poultry and eggs, and by these are distributed to jobbers and retailers, an article frequently passing through four or five or more hands before reaching the consumer.

Now because each party who handles the article has to be paid for his services, it does not follow that the producer will save by dispensing with those services. He will not unless he can perform them himself at less cost. This he may do in special cases, but usually it is more satisfactory to sell through the general channels, and it is always the better way unless one is sure he has a better arrangement and with reliable parties.

The poultry keeper whose products pass through numerous hands before they reach the consumer, and who perhaps receives not more than half of the retail price, is apt to feel that too large a proportion of the price goes to those who have labored least. Such a view of the matter is superficial. I would not dissuade anyone from attempting to get all he can out of his produce, but I do believe that the mistaken feeling that middlemen get more than their fair share of the profits on poultry tends to keep down the production of poultry, and I want to contribute what I can to the removal of that feeling. Nearly always the poultry keeper profits most by giving his attention principally to production, and putting out his produce through the best channels of trade that reach him, whether these take it through many or few hands.

Holding Produce for High Prices.

Here we have another matter in which producers, endeavoring to get as much as possible out of their product, may make a mistake.

With the perfecting of modern methods of cold storage, the market for limed and otherwise preserved eggs has quite disappeared. There is practically no market for eggs held in producers' hands at prices that will make it worth while to hold them. Whatever may be said of the profitableness of preserving eggs for home use during the period of least production, to hold them to sell at that time is so seldom profitable that the poultryman is wisest who dismisses it from his thoughts, and markets his eggs fresh at the best going prices they will command.

Poultry should be marketed when ready for the use for which it is intended. Broilers and roasters should go at the weights, (and this means weight in good condition), at which they will bring the best prices, and the wise poultryman who is looking for trade in table poultry hatches his chickens as nearly as possible to have them ready when they will bring most money. They may be held a little while, or worked off a little early, according to condition and prices. One does not have to be exact to a day and an ounce; but to sell to best advantage, any lot of chickens has to go about the time it is fit. If held longer it is fed without profit, and may go back and be held at a loss. A fuller consideration of the points that arise in this connection must wait for future lessons on broilers and roasters.

Selling Poultry Alive.

When sold to a special class of trade, poultry is usually dressed by the producer or collector. When sold to the general trade, it is dressed or sold alive, according to circumstances, the principal determining matters being the custom in the vicinity, and the grower's judgment as to which way will give him best returns. Some markets want nearly all live poultry; some nearly all dressed. St. Louis belongs to the former class; Boston has been a conspicuous dressed poultry market, taking comparatively little live poultry, but conditions are changing somewhat, and a great deal of poultry is coming here alive now, and many growers tell me the returns on live poultry are close enough to the returns on dressed to make it a matter of indifference so far as profit is concerned, which way they ship. This has not long been so. Until quite recently a grower who sold good poultry alive for this market generally sacrificed a good part of his profit.

In shipments of live poultry, returnable slatted coops are used, the express companies returning the coops free of charge.

Methods of Killing and Dressing Poultry.

Poultry sold to a private or special trade may be dressed any way the trade will take it. Poultry to be sold dressed to the general trade, should be killed and dressed to suit the market to which it goes. As far as I am informed, all the more important markets want fowls with heads and feet on, and undrawn. There are good reasons for this; the undrawn fowl if properly starved before killing, keeps better than one that is drawn and the air thus admitted to the cavity of the body. The head and feet left on a fowl serve to show more of its age and condition than the average customer would discover without them. In selling dressed poultry to private or special trade, heads and feet are often removed, and occasionally fowls are drawn, though this is rarely done except for customers who request it. If one is selling fowls both ways, the best way to arrange the prices is to weigh all fowls undrawn and charge those whose fowls are drawn the price for undrawn plus a small charge for drawing. When selling dressed poultry to private trade I used to weigh and tag all carcasses singly or in pairs as required, after they were cooled. Then for customers who wanted them drawn we selected the weights wanted, and charged on the original, not on the weight after drawing. I don't think it would be found satisfactory to attempt to make a price for drawn poultry and one for undrawn.

Ratio of Prices for Drawn and Undrawn Poultry.

If a poultryman is selling his poultry all drawn, and wanted to know what to make his price with relation to the price for undrawn poultry, the best way to arrive at it is to weigh an average lot of undrawn poultry, draw and weigh again. Then take the value of the poultry undrawn at the market price, add to it the charge for drawing, divide by the number of pounds the lot weighed drawn, and the resulting figure is the price per pound for the drawn poultry.

Scalding or Dry Picking?

Poultry to be sold in the eastern markets should be dry picked, for dry picked poultry usually sells better and brings a few cents more per pound than scalded poultry. For western markets scalded poultry is preferred for home consumption, but the surplus that is shipped east works out better if dry picked. The method of picking therefore will be determined by where the poultry is to be consumed.

Poultry dressed for private trade will go just as readily scalded as dry picked, unless scalding is badly botched, and as picking after scalding is much easier than dry picking, it is quite generally the practice of those who sell direct to consumers even in this vicinity, unless they have enough to require the services of an expert picker, or to keep themselves in practice dry picking.

How to Kill.

If fowls are to be sold with heads off they may be killed by cutting off the head, in the good old fashioned way.

If the head is to be left on, they should be killed by bleeding through a cut made generally into the roof of the mouth, and penetrating the brain. The method of making the cut has been often described, and some descriptions of dressing fowls have been quite profusely illustrated with photos of different stages of the operations of killing and plucking. The practical value of either words or pictures in teaching such operations seems problematical. When we consider how much practice with expert personal instruction it takes to make a skillful picker, we cannot make a very high estimate of the value of such instruction as it is possible to give on paper. I would advise every one who wants to learn to dress fowls or to learn another or better method than that with which he is familiar, to go to an expert picker for a practical demonstration, if it is at all possible for him to do so. I give herewith several statements of killing methods as given by different experts, and those who must learn by the book may take their choice.

Sticking with the Fowl Held Under the Arm.

In one of the most popular methods the fowl is held under the left arm, breast up, the mouth held open with the fingers of the left hand, while with a knife held in the right hand a cut is made first across the roof of the mouth at the base of the brain, then the knife is turned and a deep cut made to penetrate the brain. The first cut severs an artery from which the fowl begins to bleed to death. The cut into the brain produces insensibility, and causes the feathers to relax so that they may be easily removed.

Then the picker sits down and begins to remove the feathers. This process is rapidly or more slowly performed according to the skill of the operator and the condition of the fowls. A fowl in good condition with full plumage, is generally easy to pick, but the impression given by some writers that if the fowl is properly stuck the feathers come out easily, and if feathers do not come easily the fault must be in the sticking, is wrong—according to the testimony of professional pickers. The pickers say that the same lot of fowls may pick hard in the morning, easy in the afternoon, or vice versa, and this when the sticking is the same and several pickers are working together, so that it is not reasonable to suppose that they are all sticking wrong, even if there were any probability of a single expert doing so. I emphasize this point because a novice who tries sticking and dry picking and finds it not so easy as from the books he got the impression that it was, is likely to puzzle himself over the method of sticking, concluding that he must be at fault there. He may be, but it does not follow necessarily, and he should be able to understand the situation better if he knows that even with experts picking is sometimes hard and slow, and that when rapidly done it is done by *skill* and *hard work*. A skillful picker will remove most of the feathers from a fowl with a few sweeping motions, but it will take him longer to get the feathers that remain, and if the fowl is full of pin feathers their removal takes some time, no matter how skillful the picker.

The New Jersey Method.

To kill and pluck a fowl by the New Jersey method, Dr. P. T. Woods gives the following directions in "Profitable Market Poultry," published by the Cyphers Incubator Co., a book which contains much of interest and value to those growing poultry for market:—

"Provide two barrels, one for blood and waste feathers, and the other for the feathers that are to be saved. Place these against the side of the wall of the killing house. Have a good sharp knife with a medium sized blade, an ordinary pocket knife will answer. * * *

"A nail should be driven in the wall above the center of the barrel intended for blood and waste feathers, at a point a little higher than the head of the picker. A noose of stout cord a few inches long is attached to this nail. The fowl's feet are secured in this noose, so that the fowl hangs up by its legs against the wall, on a line about level with the operator's shoulders. The fowl should hang in such a position that the operator can readily grasp the head and neck with the left hand, the arm in an almost horizontal position, with the elbow against the side of the body. * * *

"Grasp the neck of the fowl with the thumb and forefinger of the left hand, draw the hand gently downward until it strikes the angle of the jaw, forcing the fowl's mouth open without choking it. Hold the mouth firmly open with the third finger. The knife is first introduced into the throat, and with a couple of quick motions up and down, the larger arteries at the side of the neck just below the ear, are severed so that the bird bleeds freely. Now, hold the knife at an angle with the bird's bill, pointing toward the back part of the roof of the mouth in a line with the eye; with a rapid movement drive the knife through the roof of the mouth into the base of the bird's brain, and give a quick half turn to the blade."

As has already been said, sticking may best be learned by personal demonstration. If that is out of the question, and it is desirable to learn to kill that way, and to dry pick, practice on fowls to be consumed at home until sufficient skill is developed to enable you to turn off a good looking carcass. Meantime pick by any method you know, or hire someone to pick for you, but don't botch the killing of a lot of fowls you want to go to market and bring good prices. Badly dressed poultry will not bring first class prices.

How to Scald a Fowl.

For the novice, scalding is the easier method, and if he has a proper equipment, and uses fair judgment in scalding, he need not spoil the looks of his poultry in the scalding.

If the fowl is to be sold with head on, kill as described above, or make the cut in the neck, severing the head just back of the ear from the body, without cutting the skin more than is necessary to insert the knife.

To scald, have a kettle or other vessel of water just below the boiling point. Have the vessel large enough and enough water in it, to maintain an even temperature and to give room to souse the fowl well and quickly. I used to scald in the set kettle in which we cooked our mash. This was a fifty gallon kettle set in brick work. We would put six or eight pails of water in it, put enough fire under to bring it almost to the boiling point, and cover the kettle until the water was ready. Usually what coals were under the kettle at that time would keep the water hot while we scalded what fowls were to be killed — about thirty to forty at a time. In any case a few pieces of small wood added would keep the water right.

We cut heads off, so had only to take a fowl by the feet, plunge under water and swish about and up and down once or twice, and take out. With a well feathered fowl the water scarcely touched the skin, but the feathers were well wet and steamed up, and were very easily removed.

If a fowl or chicken was poorly feathered or had bare spots we plunged it into the water quickly and took right out. This gave a poor "scald," but avoided damaging the skin.

The common trouble with scalded poultry is that the water is either too hot or too cold, or the scalding done in so small a vessel that the feathers cannot be wet without the skin being scalded.

When the head is to be left on, the fowl must be taken by both head and feet and the feathers wet without the hot water scalding the head, otherwise the head would present a most unattractive appearance.

Cleaning and Cooling.

Whatever method of killing and plucking is used, the carcass should be clean, well plucked, and made as attractive as possible. Slipshod and slovenly dressing will make good poultry grade low. There are several things which detract from the appearance and selling value of poultry as it reaches the consumer.

The first of these is the fitting of poultry for killing. It should be kept without food for at least twenty-four hours before killing, that the crop and intestines may be empty. If the crop contains food the carcass looks bad, and the food souring in it may taint the meat. If the intestines are not empty their contents may affect the meat of the parts near them. For looks, quality, and keeping properties, the starving before killing is necessary.

Many fowls well killed and well plucked, are not made clean before being sent to market. Blood is left on the head and mouth, and often manure on the feet, and bloody smears on the skin. The carcass should be clean, the parts to be cut off as well as what is to be eaten.

A great deal of dressed poultry begins to spoil before it reaches consumers, or spoils quickly in their hands, because it has not been properly cooled. This is the trouble, too, with much of the poultry the grower thinks is first class, while dealers and buyers rate it lower. Poultry that has not been properly cooled spoils quickly, and is apt to be flabby and insipid.

Place the carcasses as soon as dressed clean in cold water. Running water is best, but still water changed a few times will do. In hot weather it is best to use ice. Thorough cooling requires several hours. It will do no harm to keep the carcasses in the cold water all day, or over night, and that may be advisable if the weather is warm. If the weather is cool enough it is better to take the carcasses out of the water when cool, and hang in a cool place until ready to pack them.

The object of cooling is to get the animal heat out of the body as quickly as possible. If this is not done decomposition sets in almost at once, and advances rapidly, and the poultry which leaves the producer's hands apparently in fine condition reaches its market in bad shape, the shipper gets returns for a lower grade of stuff than he shipped, and often concludes that the parties he shipped to were dishonest, when the fault was all his own.

LESSON XXI.

Selling Exhibition Stock and Eggs for Hatching.

FEW keepers of thoroughbred fowls do not have some opportunities to sell stock and eggs for hatching at better prices than would be obtained from common stock. Nearly all want to take advantage of such opportunities. A great many regard them as beginnings of a trade which may develop to proportions which will warrant their giving their time exclusively to this business.

Advertising.

Some opportunities to sell come without "advertising." To all who see it a nice flock of fowls is its own advertisement, and is sure to excite in some a wish to have some of the same stock. Whether this unsolicited demand for stock and eggs would alone become worth while, depends mostly on the location. In a section where the poultry interests are as yet little developed, it would not be likely to amount to much for some time. In places where the interest is good and growing, a poultryman located where many passers by see his stock, will sometimes be able to do quite a large trade without advertising in the public prints, but in most cases the man who wants to sell fowls and eggs to any substantial amount must make announcement of that fact through mediums which reach many more people who want to buy than see his stock accidentally. Where one man may build up a local trade without advertising a hundred to get the same volume of trade must advertise judiciously and continuously.

The poultry papers are unquestionably the best mediums for advertising poultry and eggs. They circulate almost wholly among people interested in poultry and possible buyers of stock and eggs. Some of them have a proportion of sample copy and premium circulation to people who do not read them, but, as a rule, the papers go to persons especially interested in poultry and in the habit of looking through their poultry papers for advertisements of anything in this line they may want. Farm papers as a class are far below the poultry papers as mediums for advertising poultry, though a few farm papers giving especial attention to poultry are good. Daily and weekly local papers it is seldom worth while to advertise poultry in. Occasionally one will make something of a specialty of poultry advertising, especially in the Sunday papers, and give very good returns, but these cases are exceptional. Oftener the money spent in advertising in them might as well be thrown away. Some years ago I ran three inch ad. for a month in the height of the egg season in one of the best positions in a daily paper without making a single sale. At the same time an ad. published in a poultry paper published several thousand miles away was bringing me customers right in my home town who read the local papers every day, yet never saw the ad., because they were not thinking of poultry when reading it. When they took up their poultry paper they looked all through it, looking particularly for ads. of breeders near them.

Which Poultry Paper, and How Much Space.

The best advertising medium for the beginner should be the paper having the largest circulation in his vicinity and section, for until he makes a reputation that extends beyond his own locality most of his sales are likely to be to people living not far from him. This rule will not, however, always hold good for large — and much less for small advertisers. In some papers the small advertiser has little show, every effort of the publisher being directed to drawing the attention of readers to the larger advertisers; in others, small advertisements are relatively as profitable as large ones. In any paper, though, a small ad. may run for some time without attracting attention or making sales, hence the beginner in advertising should keep his advertising expense within what he is able to stand though no sales are made, for while it is true that the volume of business done through a paper has some relation to the amount of space used in it, large ads. alone do not always attract attention in the way the advertiser wants them to; and if a poultryman with no reputation and no experience in advertising relies upon the pulling power of size in his ads. he is likely to be disappointed. In a paper like *FARM-POULTRY*, with the small ads. classified and given a place in the body of the book on reading pages, the small classified ad. is the best beginning for most small advertisers.

How to Write an Advertisement.

Your advertisement should be a brief plain statement calling attention to what you have to sell, and generally giving your prices or range of prices. The object of the advertisement is not to sell the stock directly through the advertisement. It is simply an announcement for the purpose of putting you in communication with persons who want goods of the kind you have to sell. Occasionally buyers order direct from an ad. Oftener some correspondence passes before a sale is made. The prime object of the advertisement is to bring you the names of possible customers, and that is the most that a paper can do for an advertiser; further results depend upon himself.

Whatever the expert advertiser may do, the beginner should avoid fantastic effects either in statement or in mechanical arrangement of an ad. Make your statement straightforward, to the point, and without a superfluous word.

Answering Correspondence.

Every letter received from an ad. should be given some sort of reply promptly. The average inquirer writes to a number of advertisers at the same time, and those who reply at once stand the best chances of making sales. As a rule, the reply should be limited to matters pertaining directly to the business transaction. Many persons in writing about stock or eggs ask for more or less information on other matters. These questions may properly be passed with the statement that you cannot take time to reply to them. To decline to reply to such questions, and to give straightforward replies to pertinent questions, is the best policy.

Have neat and appropriate stationery, letter heads bearing your name and that of the breed or breeds of fowls you keep, and as much general information about them as seems appropriate and can be used without crowding too much printed matter on the page, and envelopes with your name, address, and the name of your yards, or farm, or of your breeds. It pays to be modest in these announcements. Don't proclaim yourself a specialist in any breed or variety until you really have gained some recognition as such. I get many letters from poultrymen calling themselves specialists in the breeds they keep, asking me the most elementary questions about those breeds, and about the general principles of breeding; and I often wonder what sort of letters these specialists write to their business correspondents, and how the letters read to the latter. I am sure the prospective customer must often see through the pretensions implied in the use of such terms and the exaggerations in the letter head notices of the stock, and a customer is lost when otherwise a sale would have been made. If you are new in the business and feel tempted to make as strong claims in your advertising as some of those who have been at it much longer, remember that only those as new or newer than yourself are likely to fail to see through it, and you virtually limit your sales to this class, while, if you really have good stock a plain and unpretentious statement of the fact is likely to bring you a proportion of trade from those who really know something about it, and know when they get what they order and good value for their money.

The beginner is apt to think that he can only sell to novices, anyway. This is a mistake. Many a beginner has stock that older hands are glad to get, and will pay him more for than beginners would. The profit in the thoroughbred poultry and egg trade depends on selling to those who can use good stock and will pay for it. A trade that is limited to low priced stock can be a profitable trade only when conducted on a very large scale.

The Question of Values.

How much better than market prices one may obtain for eggs and stock depends upon several things, most important of which are — the stock — the demand — the poultry keeper himself.

The basis of values of poultry and eggs is their market value. Whatever can be obtained for them over and above market prices represents generally the amount of the premium some one is willing to pay on some superficial quality he sees in the stock or on expectations of what he hopes to realize from it. The beginner who grasps that fact will find it easier to adjust himself and what business he does in thoroughbred poultry and eggs to the conditions of the business.

The market values of eggs and fowls are their bed rock values. There is an open market for eggs and table poultry, and in this market, with an occasional slight exception, one man's stuff brings the same price as any other stuff of the same quality. When we come to breeding and exhibition values we have values from an entirely different standpoint. Mr. B., who is a beginner in poultry, has stock from Mr. M., who, we will say, is a leading breeder of White Wyandottes. His stock is better than that of Mr. P., who has some reputation as a breeder of White Wyandottes, but not equal to that of Mr. M.

Now if values in this line were absolute, or governed by fixed standards, Mr. B. should be able to sell his stock for the same price as Mr. M. does, and for better prices than Mr. P. does. But Mr. B. usually finds that he has to sell such fowls and eggs as he does sell at lower prices than those P. gets, and away below those of M., whose stock is practically the same. He may happen to have a better bird of M.'s stock than M. has, yet he cannot begin to get the price for it that M. would. There is nothing strange and nothing wrong in this situation. The prices of "fancy" stock are governed to some extent by quality by the fancier's standard, but to an equal or greater extent by the reputation of the seller. This reputation is based on the results of years of breeding, exhibition, and selling of stock, and while the degree of reputation depends on these things, the extent of the reputation depends more on the individuality of the man in question, on his ability to sell goods, and on the volume, persistence, and effectiveness of his advertising.

The reputation which enables a breeder to get very high prices for what he has to sell represents years of hard work and the investment of a good deal of money, and it is something that cannot be transferred. It attaches to the breeder rather than to the stock.

The beginner must be satisfied at first to sell stock for less than older breeders are selling stock of the same or inferior quality, but he ought not to put prices so low as to discredit his stock, or attract only the cheapest trade. It is better to market it than to do that.

About the specific prices to be fixed, it is hard to advise, and equally difficult to describe the sort of stock that should be used to fill an order at any specified price. Accurate knowledge along this line comes, to those to whom it does come, only through experience in buying and selling and observation of the purchases and sales of others. It depends very much on judgment of quality, and it is in this respect that a great many beginners fail, mistaken judgment leading them sometimes to give culs where they should send some of their best birds, or to use very valuable birds to fill orders at low prices. There is no intentional dishonesty or special favoring here, and the seller himself suffers more than anyone else from his mistakes, but the efforts of people who know neither quality nor values to do business in thoroughbred poultry have a most unsettling and deplorable effect on the general trade in what we may call the low grades of good stock. Much of this trouble would be avoided if poultry keepers would refrain from selling stock until they were in a position to supply the produce of their own breeding.

If I were to attempt to give rules to govern in the sale of stock, I would give a few simple

rules like the following, which I wish it understood are offered simply as suggestions, though stated more in the form of rules. Few rules could be given to suit all cases, but each may apply the suggestions as far as he sees fit:

1. Never sell a fowl that you need unless you are sure you can replace it with a better one and make something on the transaction.
2. Never send out an unhealthy, undersized, or deformed fowl on a mail order. To persons who see the stock and know its faults, and buy understandingly, such stock may be sold — though it is a question whether it pays the seller to dispose of it for stock purposes at any price.
3. If you are entirely new in the business and can get an expert's advice in the matter have him sort over what stock you have to sell, and give you the approximate values of each lot. Some people have their birds scored and sell by the score, but private scoring is so much in disrepute through the abuses that develop in connection with it that it is probably as well to sell by description.
4. Always describe a fowl fairly; you may lose some sales by doing this, but in the long run will hold more customers.
5. Always sell stock on approval, giving the purchaser the privilege of returning the fowls promptly if not satisfactory.
6. If you find you cannot fill an order with stock of the quality you know should be used, return it or advise the customer of the situation, state what you can do, and await instructions. Don't try to piece out an order with inferior birds and take chances of the customer accepting them.
7. Keep the stock you have to sell in good condition, and keep it separate from the stock you reserve. Have at least enough of it to fill one or two short orders where you can get it easily, at a moment's notice, if need be, and send it away in condition that will not discredit you.

Shipping Stock.

Coops for shipping fine fowls are now sold in knock down bundles so cheaply that unless one has lots of spare time it is cheaper to buy them than to make shipping coops. They come in a variety of sizes, and can be put together in a few minutes. If one is making only an occasional shipment, and it is not worth while to purchase a supply of coops, any light box of suitable size may be used, but if it is an object to advertise oneself through these shipments, care should be taken to use neat, clean boxes.

For shipments that are to be on the road only a day or thereabouts, a little less grain than would be fed the number of fowls in the coop if at liberty, may be thrown on the floor of the coop, it having been previously covered well with chaff, and a good sized piece of mangel or of cabbage will furnish succulent food that makes watering in transit unnecessary in moderate weather. In extremely warm weather do not ship. Do not send fowls off in a cold snap. For long journeys water cups must be provided, fastened in the corner of the coop in such position that the water may be poured in through the space in the top. Grain for long distance shipments may be put in a small bag tied to the coop in such manner that the expressman can get at it easily. Vegetables should be placed in the coop.

When shipping, notify the customer so that the notice will reach him either with or a little in advance of the fowls. Do this though you may previously have advised him when you would ship. If you know or have reason to suppose that the customer is "green" about handling stock, advise him in your letter to be careful about giving water freely at first. Tell him briefly how it has been fed, that he may avoid a radical change. Urge him to keep the new birds isolated from the rest of his stock for a week or two. This last is a special measure of self defense. If the customer has latent disease among his stock, your healthy birds put in with the rest might contract the disease in virulent form, and you would be blamed for having sent him sick stock, when, as a matter of fact, the fault was his.

The Season for Sales of Stock.

The breeder who has a large and long established trade makes some sales the year round. The beginner's sales of stock are usually limited to a few months immediately preceding the

breeding season. December, January, and February will see the most of his sales, and he need not feel discouraged if he finds no demand until well on in January. The class of trade he will get at first does not buy freely until signs of spring begin to be in evidence. A few warm days at any time after New Years is apt to have a marked effect on inquiries for stock.

Selling Eggs for Hatching.

Like the trade in stock, the egg trade is for most poultrymen limited to a short season. Comparatively few shipments of eggs are made until the season is far enough advanced to make it likely that the weather will be somewhat settled by the time the chicks are hatched.

If one sells eggs he should sell from the same matings he uses himself. He may occasionally reserve a few birds in special matings, but even so, these special matings should be experimental rather than in the way of reserving the cream of his stock, unless the eggs sold are offered at a price away below the value of eggs from the birds reserved.

Many breeders who hatch large numbers of chickens for themselves make a practice of dividing the eggs equally day by day, reserving half and using half to fill orders. Others whose egg trade is larger in proportion to their ability to supply it, find it necessary at times to ship all or nearly all of their eggs just at the season they most want them for themselves, or else return many orders. A breeder who sells himself short of eggs at the best hatching season runs the risk of crippling himself for stock at the end of the season.

Whatever practice is followed, the seller must be fair to his customer, remembering that it is chances the customer buys in eggs, and giving him "a square deal" both with reference to himself and to other customers.

And whatever breeders of reputation may do about sending out inferior looking eggs from fine specimens, the novice in the business will find it his best policy to send out none but good looking eggs.

In the matter of guaranteeing fertility, most breeders do not guarantee fertility, and replace eggs that fail to hatch only when from what they know of the way their eggs are hatching they feel that they ought to do so. Some guarantee a certain per cent hatch, if the infertiles are returned to them.

For shipping eggs the boxes and baskets made especially for that purpose are, all things considered, most satisfactory to use.

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Nothing on Earth
WILL
Make Hens Lay
LIKE
Sheridan's Condition Powder.

Given to newly hatched chickens it insures their health and makes them strong. Persist in its use and the pullets will lay early and through the winter, when eggs are high. Invaluable for molting hens.

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FIRST LESSONS IN POULTRY KEEPING

SECOND YEAR COURSE.

BY

JOHN H. ROBINSON,

Editor FARM-POULTRY.

SECOND EDITION.

PUBLISHED BY

FARM-POULTRY PUBLISHING CO.,

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FIRST LESSONS

— IN —

POULTRY KEEPING.

SECOND YEAR COURSE.

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BY

John H. Robinson,

Editor FARM-POULTRY.

Author Poultry-Craft, The Common-Sense Poultry Doctor, Broilers and Roasters, Winter Eggs.

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Lessons In Poultry Keeping.

SECOND SERIES.

LESSON I.

Inbreeding and Line Breeding.

IN TAKING up these two closely related subjects, I anticipate that the treatment of them which the facts bearing upon them require will be in a measure disappointing to many readers. Outside of those who have made a somewhat thorough study of the principles of breeding, comparatively few people can be found who will come to a consideration of the subject without a prejudice against inbreeding, while among novices in poultry breeding "line breeding" is very commonly regarded as an elaborate scientific system of mating by which expert fanciers produce their finest specimens.

Both of these attitudes are wrong. The prejudice against inbreeding, though ages old, almost universal, and supported by religious and social teachings, will not stand impartial investigation. A reasonable test of inbreeding, with due regard to recognized general principles of breeding, while it will not invariably give results which confound the claims of those who oppose it, will do so often enough to discredit their arguments, and demonstrate that their position is not tenable.

Systematic line breeding, according to a prearranged "scientific" system designating the exact lines to be followed, and approximately the individuals to be used, is rarely practiced by the best breeders. Their "line breeding" plans are designed not to perpetuate certain blood lines, but to secure certain results or establish certain characteristics. If the results they seek can be best obtained within the blood lines which they are breeding they keep to those lines, or rather within certain lines; but they regard adherence to a particular line of breeding as a good thing only as long as it furnishes the best route toward the goal they seek—the best means of attaining the ends for which they are working. At any time that they see results in other lines which make it appear that blood from those lines might be introduced into their stock to advantage, they try to get such breeding specimens of those lines as seem most suitable for their purpose. They use this new blood at first experimentally to learn what results will come from the introduction of the new blood. If results are satisfactory the new blood is gradually distributed through their whole stock, and with its introduction begins a new general line of breeding to be followed only as long as it gives better results than are to be obtained by other matings.

Now while the breeder does not bind himself to follow a certain line or system, and, theoretically, is free to introduce new blood at any time, in practice he does so only at long intervals. The reasons for this will appear further on in this lesson. The two facts I wish to impress before taking up the special consideration of each of our subjects are:

- 1.—That inbreeding is neither a necessary evil nor necessarily an evil.
- 2.—That there is no virtue in line breeding except as it secures and fixes certain desired results.

What is Inbreeding ?

Inbreeding is breeding from fowls that are near kin. If the practice is continued through a number of generations it is in-and-in breeding—if one wishes to be precise in speech, though common usage tends more and more to the simpler term.

Inbreeding in fowls extends to unions of the nearest kin — sire and daughters, dam and son, brother and sisters.

Objections to Inbreeding.

Primarily the objections to inbreeding are based, as has been stated, on social and religious arguments. As these can apply in a question like this only in so far as it can be shown that they affect physical condition we need not enter into them here. It is sufficient to consider the subject solely from the physical standpoint, and as it practically concerns the poultry breeder.

It is claimed by those who oppose inbreeding that it produces certain and rapid physical deterioration. That it leads inevitably to degeneracy and sterility. They will admit that by inbreeding some superficial, "fancy" points may be obtained in greater perfection, but claim that inbreeding cannot be carried beyond a very few generations except at the expense of vigor, stamina, size, productiveness, and that if persisted in it leads surely to the extinction of the line. In support of their position they refer to instances cited by early writers of the Darwinian school, to the conclusions of leading investigators of that period, to occasional experiences with or experiments in inbreeding poultry, and to the very evident fact that a great many stocks of pure bred fowls are deficient in stamina and "practical" qualities. The fact that many mongrel stocks on farms and elsewhere which breed indiscriminately, quickly deteriorate is also cited in this connection.

How the Objections to Inbreeding are Disposed Of.

First let us take up the points just mentioned in the order in which they have been given.

Even if the later scientists of the Darwinian school, and some of its leading exponents in these latter days, had maintained the early attitude on inbreeding, it would be pertinent to observe that few of the examples upon which they based their earlier conclusions are of more authority than the ordinary newspaper story of like occurrences, and that none (I believe) will stand such a test as would be required were they presented today as new evidence.

But, inasmuch as the leading scientists of this school, on further investigation of the subject, concluded that inbreeding did not necessarily lead to bad effects, and modified greatly their earlier views about the advantages of crossing—that is, of uniting wholly unrelated or different lines of blood, the reference to their views is chiefly interesting as showing how little the condemnation of inbreeding rests upon a careful and thorough investigation of the subject.

What is said of experiences and experiments in inbreeding merits more attention. As to the experiences: There is no doubt that there have been countless instances where inbred fowls have shown lack of stamina and general deterioration. But we have to take account also of like results where inbreeding is carefully avoided. Any impartial observation covering a great many cases will show that these results are so common where inbreeding is avoided as to suggest that the real cause or causes of them must be sought elsewhere.

Experiments in inbreeding poultry made by those who advise against it have—so far as I have seen the reports of them—invariably shown quickly and unmistakably the evil effects they anticipated; but I have never yet seen a report of such experiment which showed that it had been planned with an understanding of what was required to make a test, nor have I ever known an instance where a man who had gone on record in condemnation of inbreeding either attempted to reply to criticism of his experiment which showed where it failed, or by further experiment with conditions corrected attempted to verify his results. That this statement constitutes a severe arraignment of the advocates of what (as far as the numbers who accept it go) is the popular side of an important question, I am well aware; but as a poultryman who, after years of breeding in which inbreeding was carefully avoided, because the weight of authority on poultry culture seemed to lie that way, began to test the matter

for himself, and as a result of repeated experiments arrived at the conclusion that the opposition to inbreeding had little real support either in fact or reason, I make the statement deliberately, for I question whether there is any other important matter upon which poultrymen take opposite views, where the side having the greatest numerical support—the popular side—can muster so slight a support in facts and logic.

To the general argument that the stocks of fancy fowls said to be inbred are often lacking in stamina and practical qualities as a result of inbreeding, the reply is that though so often assumed as the cause of deterioration, no one to my knowledge has ever even attempted to show it—to prove it in any case. The reasoning in this connection invariably is that if inbreeding has been practiced that is all that is necessary to account for deterioration. Every thing wrong is charged to inbreeding, and no effort made to connect a trouble with any other cause, though there may be other and more probable causes obtruding themselves upon the attention of anyone making even a most cursory study of the case. The statement already made about experiences in inbreeding applies with equal force to the general argument about lack of vitality in inbred stocks. Such lack of vitality and the loss of practical qualities which often goes with it are not the peculiar and inevitable results of inbreeding, but are the common results of breeding from poorly developed specimens that are good in some superficial point prized by fanciers, and are just as likely to be found in the progeny of birds that are no kin as in the offspring of those that are near akin.

The use of flocks in which indiscriminate breeding is the rule to illustrate an argument against inbreeding furnishes no substantial support to such an argument, for it is just as appropriate to assign degeneracy in such flocks to violation of principles of breeding about which there is no dispute.

The truth is that the case against inbreeding does not rest upon trustworthy evidence, but derives most of its strength from the prejudice against it which poultry breeders almost without exception bring with them to their first efforts in breeding fowls. Before a breeder is in a position to begin to breed intelligently, and to put in practice the principles of breeding, he must divest himself of all prejudice in the matter, and consider it at least possible that inbreeding is as safe as well as a sure way of arriving at certain results. In the statement of the case for inbreeding which follows, I will try to make the reasons which justify it as clear as the facts which disprove the general argument against it will be to anyone who gives it a full and fair test. To those who will not be convinced by argument and statement of facts I can only recommend a practical test.

Inbreeding and Practical Qualities.

That "like begets like," is the fundamental principle in breeding for definite purposes. Every theory, rule, principle, law, method, and system of successful production of live stock depends more or less on this fundamental fact, and must take account of it.

An interpretation of facts which fails to consider it, a rule which excludes it, advice opposed to it, is theoretically unsound, and practically defective.

The idea that inbreeding is useful or necessary to develop "fancy" points, but detrimental and destructive in other respects involves two absurd assumptions:

- (1).—That in the progeny of a union of fowls (or animals) near akin the universal law that "like produces like," is operative in regard to one class of characteristics, but inoperative with respect to another.
- (2).—That in the progeny of a union of fowls (or animals) not near akin, the law "like produces like," operates as to the qualities in which in matings of related fowls (or animals) it is not operative.

Such contradictions in the facts bearing upon the operation of a supposed law or principle would, if they actually existed, make the practical application of that law or principle so unreliable and uncertain that it could not be made a fundamental principle.

But there is no such contradiction in the facts. It has repeatedly been shown that "like produces like" in practical or substantial, as well as in fancy or superficial qualities, both when the individuals used in the mating are near akin and when they are no kin.

This does not mean that the progeny of a mating are exact duplicates of their parents, or

uniformly of an intermediate type, or that desired qualities are always reproduced. In operation the law "like produces like," is modified, as we shall see, by the fact that it includes the more remote as well as the immediate parents, but, as we shall also see, these modifications of and seeming variations from the law are strictly in accordance with it, and afford no basis whatever for assuming that the law fails to operate in regard to any characteristics or qualities.

That it often happens that fowls in which some superficial qualities have been improved or intensified by inbreeding have at the same time deteriorated in size, stamina, and productiveness, no one familiar with the phenomena of breeding poultry would deny. But — as has already been pointed out — it also often happens that size, stamina, and productiveness are diminished in fowls that are not inbred. In such cases the explanation given — and it is the correct explanation — is that lack of size, stamina, and productiveness are due to breeding from birds lacking in these points. They may also be due to external causes, but these need not be considered here.

Now if in mating unrelated fowls it is necessary to select for size, stamina, and productiveness, if we wish to reproduce those qualities in the offspring, it is also necessary to use the same care in selecting for matings of related fowls. And if by selecting for a mating of unrelated fowls, specimens having the size, stamina, and productiveness we want in their offspring, we, as a rule, get those qualities in the offspring; then if we select in the same way for a mating of related fowls, we may reasonably expect to get offspring like their parents in these essential qualities. We not only may reasonably expect to get them, but we do get them as regularly as we get results in any other kind or class of qualities. And the reason many who inbreed for fancy points, and some who make experiments in inbreeding, note a loss of "practical" qualities is that they failed, in making their matings, to provide for the retention of those qualities.

To cite the available evidence in support of the propositions I have just laid down would extend this lesson beyond reasonable limits, but I can assure the reader that every statement I have made can be amply supported, and also that if he needs or wants first hand proof he can readily obtain it by testing the matter for himself, observing that a proper test requires that the immediate parents be not deficient in any quality it is desired to have conspicuous in the progeny.

Why Inbreed ?

So far I have been trying to show that inbreeding is not necessarily a cause of deterioration and practical or in any other qualities, and so to convince the reader that inbreeding is a legitimate and useful means in breeding poultry. Now I want to take the reader one step further and show him that inbreeding is not merely a method to be considered equally with the practice of constantly or periodically introducing new blood, but that it is a better method — in fact, the only method by which high excellence and uniformity can be reached and maintained.

Reference has been made to the fact that the operation of the law "like produces like," is not limited to the qualities of the immediate parents, but include also those of more remote ancestors.

According to a law, known as Dalton's law of heredity, based upon observed facts of heredity, the general rule is that an individual inherits:

One-fourth of his qualities from each parent.

One-sixteenth from each grandparent.

One sixty-fourth from each great-grandparent.

One two hundred and fifty-sixth from each great-great-grandparent.

An individual has two parents, four grandparents, eight great-grandparents, sixteen great-great-grandparents. Then

From 2 ancestors in the first preceding generation he inherits one-half of his qualities and characteristics.

From 4 ancestors in the second preceding generation he inherits one-fourth.

From 8 ancestors in the third preceding generation he inherits one-eighth.

From 16 ancestors in the fourth preceding generation he inherits one-sixteenth.

From 30 ancestors in the four preceding generations he inherits fifteen-sixteenths of his characteristics and qualities, leaving but one-sixteenth of his inheritance to come from the progres-

sively increasing numbers of ancestors in all earlier generations. From each of the 64 ancestors in the fifth preceding generation an individual inherits only approximately one five-thousandth of its characteristics. Hence the influence of this and earlier generations is so slight that it may be disregarded. An undesirable feature which had not appeared in a stock for five generations is practically eliminated.

The mathematical statement of this law has never—that I know of—been applied to poultry breeding for the purpose of verification. Breeders familiar with the law observe that results in breeding seem on the average to correspond very closely with the results indicated by this law, and are satisfied to accept it.

It should also be said that a parent does not transmit alike to all offspring. There is no absolute rule—at least none that is known, and in breeding for special results expectations are based on the probability that a certain proportion of the offspring of a mating will have the qualities or characters sought.

To illustrate:—Suppose a breeder of feather legged fowls finds in his flock a pullet that is absolutely clean legged. We need not inquire here how such a pullet might be found in such a flock, and be of the same breeding as the others. It might happen. From this pullet he concludes to try to make a clean legged strain of the variety. He mates her with a male of the same breeding having the lightest leg feathering. He hopes from such a mating to get a few chickens bare legged like the hen. Most of the chickens he expects to come more or less feathered on the legs. What would be of most use to him would be a cockerel clean legged like his dam.

According to the general law stated above he may reasonably expect about one-fourth of the progeny of this hen to inherit from her, but whether they are to be bare legged or inherit other qualities is uncertain. But suppose he gets one bare legged cockerel. Next season he mates this cockerel with his dam, and may reasonably expect a good proportion of the progeny of this mating to have clean legs, for both parents and one grandparent have that feature. From this mating he may have clean legged specimens of both sexes, and mating these together he may expect clean legs to preponderate, for the parents, the grandparents, and half the great-grandparents were clean legged.

Now suppose that not seeking to make a clean legged stock the breeder carelessly, or to get some other quality of the clean legged bird which he desires to fix in his stock, or, suppose that by some chance mating of which he may not know the blood of a clean legged fowl is introduced into a line of feather legged ones. Clean legs and scantily feathered legs are bound to appear in the progeny for several generations, no matter how careful he may be in future matings, but if he avoids using them, and is careful not to introduce blood in which the same fault appeared more recently than in the line from which he is trying to eliminate it, it will take him only a few years to get it virtually stamped out. The rare chance of inheriting it from the ancestor that brought it into the line may bring a clean legged specimen occasionally for many generations, but they will not come in sufficient numbers to seriously affect results.

Let us make now the general application of the law we have examined as it affects a single quality.

The breeder of fowls has to deal with many desirable and many undesirable qualities. If he breeds systematically to definite standards for a number of years he secures a certain uniformity of desirable qualities, and may also have a similar uniformity of undesirable qualities, though from the fact that his selection with regard to undesirable qualities is a negative selection that is likely to be much greater variety in faults (as he considers them) than in merits.

He may mate together a male and female that are as nearly alike as possible in every respect. In proportion as they are bred on the same lines, and have the same ancestors or many of the same ancestors in common, they may be expected to produce chicks uniformly like themselves. But if they are entirely unrelated the chances of their reproducing their type are very much reduced, and if—as is often the case—one or both of them came from stock in which the ancestry presents a variety of different types, the results are apt to be very discouraging, for, as the law given indicates, a fowl may have thirty different ancestors, each of which may have an appreciable effect on his inheritance of qualities.

By inbreeding, by mating fowls bred on the same lines, the number of ancestors is reduced,

and thus the number of different kinds and degrees of attributes which the fowl may inherit, are reduced, while its inheritance of qualities common in its ancestry, is increased and intensified. Of course this applies to faults as well as to merits. It is because inbreeding increases or fixes the faults as well as the excellencies of the line that when it is practiced by those who do not give proper attention to selection to avoid weaknesses, or whose methods of handling fowls are injurious, it may make their stock deteriorate more rapidly than if they were constantly bringing in new blood. Indeed the frequent introduction of new blood tends to a general mediocrity in the stock, without either striking excellence or marked degeneracy in any respect.

The breeder, however, is not working for mediocrity, but for excellence, and the highest excellence obtainable. To get this experience has demonstrated that inbreeding — and very close inbreeding — is necessary.

What is Line Breeding?

Line breeding may mean many different things. The phrase is used very loosely. It is common in advertisements and circulars. Breeders speak of their stock as "line bred," or line bred for so many years. So used the term conveys no definite information.

In varieties in which special matings are used to produce exhibition specimens of the different sexes, each sex is produced according to a general system of line breeding, the males and females of the different lines being of distinctly different color types. Often a breeder of such varieties, speaking of his stock as bred in line means only that his stock has been bred always from birds of the appropriate type and general line of breeding.

Again, when a breeder says he breeds in line he may mean only that his present stock contains some of the same blood as that with which he started, or as that from which he dates his line breeding. The stock may not have been bred at all systematically, but he calls it line bred because he can follow a certain line of blood back through it.

But systematic or "scientific" line breeding is something quite different. As a rule it begins in the discovery of a single bird of unusual excellence and breeding power, or prepotency. The breeder who is intelligently seeking for certain results may make many efforts to start a satisfactory line of breeding, but not until he begins to get satisfactory results does he settle down to one line. The others are merely tentative.

Having produced, or procured, and discovered through its progeny a specimen fit to become the head of a line, the breeder proceeds systematically to perpetuate this line. He studies to get the type of the opposite sex best suited to use with his phenomenal bird to reproduce its excellencies. Its finest offspring of the same sex especially are mated as far as possible to maintain in at least a few of each generation the highest possible development of the excellence reached in it. At the same time other matings are made both along the same blood lines, and with promising combinations, that in case at any time the main line, or the direct line as maintained in the finest breeding specimens in each generation should prove unsatisfactory or need reinforcement of the same line of blood, there may be abundant material from which to select.

Breeding in this way many of our best breeders continue a single line of breeding through many years. Sometimes it is a male line that is kept unbroken; sometimes a female line. Sometimes there is not direct continuity in either male or female line, but an irregular alternation according to the judgment of the breeder as to the best way to use available birds.

Rarely is the breeding according to a prearranged schedule. Results of matings are too uncertain for that. The successful matings, however, and those which produced birds which became of importance in their line are a matter of records, which constitute in a general way the pedigree chart of the stock. This, briefly, is line breeding as practiced by the most successful breeders and fanciers. They breed closely, often breeding in and in, again and again, but always intent on the points of excellence they prize most, and never maintaining a line merely for the sake of continuing it. As I stated at the outset, with the intelligent breeder a system is a means to an end, and any special system or line of matings is to be followed only as long as it appears to be the best means to gain the ends sought.

Theoretic Line Breeding.

We come now to line breeding as most beginners and some more advanced students of breeding problems want it: That is, line breeding according to a prearranged schedule, the special object of which is to avoid the evils of inbreeding.

Having read what I have said on the subject of inbreeding, the reader hardly needs to be told that personally I believe the rational way to avoid the evils alleged to result from inbreeding is by constant rigid selection, and that if this is practiced a systematic plan of producing specimens of certain degrees of consanguinity to be used at pre-ordained stages of the system is superfluous, and as this belief rests on repeated tests in my own flocks as well as a considerable volume of testimony from others, to me the practical value of work of this kind seems very small. In my mind the whole science of breeding resolves itself into the selection of the best specimens, and provided due attention is given to all essential qualities the matter of relationship may be safely disregarded. In practice, the selection of the most suitable specimens to mate together will generally keep a breeder who has a large stock of high degree of merit within his own stock without often calling for consecutive matings of very closely related birds. The rule of making strength in one sex compensate for weakness in the corresponding section in a mate of the opposite sex, if followed, keeps the breeder clear of the error of mating related birds having the same serious defect, a mating which is wrong whether birds are related or not.

However, for the information of those interested, I reproduce herewith I. K. Felch's "Breeding Chart" and an illustration of the practical application of it, which he furnished this paper several years ago. Even though one may not think it necessary to adopt such a system for the purpose of modifying the effects of inbreeding familiarity with a chart like this may be made useful in several ways, and especially in indicating a method of diagramming a record of matings, and in illustrating the variety of matings that may be made using the same lines of blood. Such a chart also illustrates admirably the point made in the discussion on inbreeding of the reduction of the number of ancestors accomplished by inbreeding.

The explanation of the chart and the system I condense from two articles on the subject by Mr. Felch. It may be noted that apart from the difference of opinion as to the effects of inbreeding, Mr. Felch's advice about breeding strongly reinforces what I have said about the necessity of care in selection, and the importance of considering a line or system of breeding as the means, not the end. Mr. Felch says:—

We know that we can take a single pair, and raise thousands in the same vigor, form, and beauty of plumage as the pair we start with; but this demands that our selections shall be of the best and most healthy specimens of their race, and that they shall be kept under the most favorable conditions.

Our chart shows how a pair and its progeny can be bred, without resorting to breeding that would be termed incestuous. The art of this consists in being able at all times to produce a flock that is one-half the blood of the original pair.

By a careful examination of the chart it will be seen that all groups to the right of the center have a preponderance of the blood of the male used in the first mating, and all groups to the left of the center have a preponderance of the blood of the female, the figures showing just what the proportion of blood is, while the center groups are each and all just one-half the blood of each of the original parents.

Experience has taught us that to breed for three generations the same blood is disastrous. Were we to mate male and female from group 3, and to repeat the mating in the progeny for three generations we would produce sterility and lack of vigor. But our groups 3, 7, 11, and 16 are all one-half of the blood of each ancestor, and sound, vigorous, and productive, because of the method of their production, and just as strong as group 3, which was the direct issue of the original mating.

Throughout we persist in an unbroken line of males, as demonstrated in the black lines of the chart. We establish a line of breeding that will be wonderful in its like producing like quality. In the first product, group 3, there may not be a single male to present the type of No. 2, nor may there be a pullet in the type of No. 1, but by breeding back we secure the original types of both, by which when we make the second group of one-half bloods we find both males and females to our liking.

Felch Breeding Chart.

Or it may be that in group 3 we have discovered a type we admire above that of the original pair. If so, such should be our standard, and in subsequent matings we should take care to select only birds of that type, until all our matings result in that uniform type, size, and color.

To make the chart clear we say that each dotted line represents the female as having been selected from the upper group to which it leads, while the solid line shows the male as having been taken from the upper group indicated. Each circle represents the progeny of a male from the upper group to which the solid line from it leads, mated with a female from the upper group to which the dotted line from it leads.

Female No. 1 mated with male No. 2 produced group No. 3, which is one-half the blood of sire and dam.

Females from group No. 3, mated back to their own sire No. 2, have produced group No. 5, which is $\frac{3}{4}$ of the blood of the sire, No. 2, and $\frac{1}{4}$ the blood of the dam, No. 1.

A male from group No. 3, mated back to his own dam, No. 1, produces group No. 4, which is $\frac{3}{4}$ of the blood of the dam, No. 1, and $\frac{1}{4}$ the blood of the sire, No. 2.

Again we select a cockerel from group No. 5 and a pullet from group 4, or vice-versa, which will produce group 7, which is mathematically half the blood of each of the original pair, No. 1 and No. 2. This is a second step towards producing a new strain.

Felch Breeding Chart Applied to Line Described in Text.

Females from No. 8 mated back to the original male, No. 2, produce group 8, that are $\frac{1}{2}$ the blood of No. 2, and a cockerel from No. 4, mated back to the original dam, No. 1, produces group No. 6, that is $\frac{3}{4}$ the blood of the original dam, and only $\frac{1}{4}$ the blood of the original sire.

Again we select a male from No. 8 and females from No. 6, and for a third time produce chicks (in group No. 11) that are half the blood of the original pair. This is the 3d step, and the 9th mating in securing complete breeding of our new strain. In all this we have not broken the line of sires, for every one has come from a group in which the preponderance of blood was that of the original sire. Nos. 2, 8, 13, and 18 are virtually the blood of No. 2.

We have reached a point where we would establish a male line whose blood is virtually that of our original dam, and we now select from No. 6 a male which we mate with a female from No. 4 and produce group 9, which is $\frac{13}{16}$ the blood of the original dam No. 1, and $\frac{3}{16}$ the blood of the original sire.

Again we select a male from No. 9 and a female of the new strain, No. 1, and produce group 14, which becomes $\frac{21}{32}$ of the blood of the original dam, thus preserving her strain of blood.

A male from No. 13, which is 13-16 the blood of the original sire No. 2, mated to females from No. 10, which are 5-16 the blood of the original sire, No. 2, gives us group 17, which is 9-16 the blood of said sire.

While in No. 16 we have the new strain and in No. 18 the strain of our original sire, No. 2, we have three distinct strains, and by and with this systematic use we can go on breeding for all time to come. Remember that each dotted line is a female selection and each solid line the male selection.

To make all this plain to the novice, I shall, in showing by the pedigrees of individual fowls how to follow my diagram, number both males and females by the number of the group as seen in the chart, they being of that group; while in the list of names will be added $\frac{1}{2}$, $\frac{3}{4}$, $\frac{7}{8}$, etc., as the case may be, the fraction showing the extent of the preponderance of the blood of the strain, the balance of the unit being the percentage of the strain mated; — all names commencing with A being of Honest Abe, No. 2 strain; all names commencing with W having in excess the blood of Lady Washington and her strain; other names representing one-half the blood of each of these two strains. This middle ground or reservoir of blood, we create of our two strains, that we may both preserve line breeding as applied to the individuals, and when we see fit to break the individual line, may still maintain the line breeding of the strains.

We now proceed to name the individuals and create their pedigrees.

The Male List.

Honest Abe, No. 2, our original sire.

Adam Wall, No. 3, ($\frac{1}{2}$); sire, Honest Abe, No. 2; dam, Lady Washington, No. 1.

Walsingham, No. 4, ($\frac{3}{4}$); sire, Adam Wall, No. 3; dam, Lady Washington, No. 1.

Advocate, No. 5, ($\frac{3}{4}$); sire, Honest Abe, No. 2; dam, Julia, No. 3.

Warwick, No. 6, ($\frac{1}{2}$); sire, Walsingham, No. 4; dam, Lady Washington, No. 1.

Acrobat, No. 7, ($\frac{1}{2}$); sire, Advocate, No. 5; dam, Lady Wiley, No. 4.

Aaron Burr, No. 8, ($\frac{1}{2}$); sire, Honest Abe, No. 2; dam, Anna, No. 5.

Waldermier, No. 9, (13-16); sire, Warwick, No. 6; dam, Lady Wiley, No. 4.

Albert, No. 12, (11-16); sire, Aaron Burr, No. 8; dam, Calve, No. 7.

Gen. Adams, No. 13, (13-16); sire, Aaron Burr, No. 8; dam, Anna, No. 5.

Gen. Walker, No. 14, (21-32); sire, Waldermier, No. 9; dam, Kate, No. 11.

Wallace, No. 15, (9-16); sire, Albert, No. 12; dam, Winfred Lass, No. 9.

Gen. Arthur, No. 18, (21-32); sire, Gen. Adams, No. 12; dam, Kate's sister, No. 11.

The Female List.

Lady Washington, No. 1, original dam.

Julia, No. 3, ($\frac{1}{2}$); sire, Honest Abe, No. 2; dam, Lady Washington, No. 1.

Anna, No. 5, ($\frac{3}{4}$); sire, Honest Abe, No. 2; dam, Julia, No. 3.

Lady Wiley and sisters, No. 5, ($\frac{3}{4}$); sire, Adam Wall, No. 3; dam, Lady Washington, No. 1.

Lady Weeks, No. 6, ($\frac{1}{2}$); sire, Walsingham, No. 4; dam, Lady Washington, No. 1.

Calve, No. 7, ($\frac{1}{2}$); sire, Advocate, No. 5; dam, Lady Wiley, No. 4.

Winfred Lass, No. 9, (13-16); sire, Warwick, No. 6; dam, Lady Wiley, No. 4.

Lady Wallace, No. 10, (11-16); sire, Acrobat, No. 7; dam, Lady Weeks, No. 6.

Kate, No. 11, ($\frac{1}{2}$); sire, Aaron Burr, No. 8; dam, Lady Weeks, No. 6.

Lady Wade, No. 15, (9-16); sire, Albert, No. 12; dam, Winfred Lass, No. 9.

Countess, No. 16, ($\frac{1}{2}$); sire, Albert, No. 12; dam, Lady Wallace, No. 10.

It now becomes easy to mate up our pens.

Pen No. 1 — sire, Honest Abe, No. 2; dam, Lady Washington, No. 1, — produces group No. 3, half-bloods.

Pen No. 2 — sire, Honest Abe, No. 2; dams, Julia, No. 3, and sisters, by Honest Abe, No. 2, produces group No. 5, three-fourths blood of Honest Abe, No. 2.

Pen No. 3 — sire, Honest Abe, No. 2; dams, Anna, No. 5, and sisters, by Honest Abe, No. 2; 2d dam, Julia, No. 3, by Honest Abe, No. 2; 3d dam, Lady Washington, No. 1, — produces group No. 8, seven-eighths blood of Honest Abe, No. 2.

Pen No. 4 — sire, Adam Wall, No. 3, by Honest Abe, No. 2, out of Lady Washington, No. 1; dam, Lady Washington, No. 1 — produces group No. 4, three-fourths blood of Lady Washington, No. 1.

Pen No. 5 — sire, Walsingham, No. 4, by Adam Wall, No. 3, out of Lady Washington, No. 1; dam, Lady Washington, No. 1, — produces group No. 6, seven-eighths blood of Lady Washington, No. 1.

Pen No. 6 — sire, Advocate, No. 5, by Honest Abe, No. 2, out of Julia, No. 3, by Honest Abe, No. 2, out of Lady Washington, No. 1; dams, Lady Wiley, No. 4, and sisters, by Adam Wall, No. 3; 2d dam, Lady Washington, No. 1; produces group No. 7, one-half the blood of each strain.

Pen No. 7 — sire, Aaron Burr, No. 8, by Honest Abe, No. 1, out of Anna, No. 5; dams, Lady Weeks, No. 6, and sisters, by Walsingham, No. 4; 2d dam, Lady Washington, No. 1, produces group No. 11, one-half the blood of each strain.

Thus do I name pedigree and mate up to and including the fourth generation, leaving the reader to mate the remainder of the chart.

Up to this point it is line bred both individually and as to the strains, and so is it line bred on the Honest Abe strain both as individuals to the end of groups 17 and 18.

But we now break the female line by producing a male of her line as her heir, and mating him, Warwick, No. 6, to Lady Wiley, No. 4, to produce Waldermier, No. 9, and his sisters, Winfred Lassess, continuing the male line by mating Waldermier, No. 9, to Kate, No. 11, thus producing Gen. Walker, No. 14, and his sisters as seen in group 14. In all this we have preserved the preponderance of the blood of Lady Washington strain.

Now the whole strength of this line of breeding stands on the breeder being able to produce a group of half-bloods from within his own flocks.

To make the strain line of breeding more plain:—Suppose we follow the rule many do of buying a foreign pullet to produce a group of half-bloods, and her set of pullets are bred back to the sire, or a male of his strain, these three-fourths blood pullets again bred back to a male of the sire's strain. This would be breeding in line to one strain, which is just half the force of our chart. These three males being different males of one strain, this would be only *strain breeding*, not *line breeding with an unbroken line of sires*. If our selections are carefully made, ever keeping in mind the types we start with, or the cherished types of our strain, then this breeding in line to one's strain may prove as forceful in results as adhering to a line of sires — from sire to son.

LESSON II.

Some Common Phenomena of Breeding.

IN the last lesson we discussed the subject of heredity in its relation to systematic methods of breeding to special standards. In this lesson we are to consider various phenomena of heredity as they practically concern the breeder in his work.

Since the selling and buying of eggs for hatching purposes has become so general, the old question, "Which is the mother of the chick—the hen that laid the egg, or the hen that hatched it?" has become of less interest than the question,—Which is the breeder of the chick, the man who produced and mated the stock from which it came, or the man who hatched and reared it?

Without attempting to make a final answer to that question, let me say that the production of fine fowls requires a combination of skill in mating and skill in growing. To produce the finest stock we must have first of all parent stock of fine quality, properly mated, but the product will not equal or even approach the excellence of its ancestors unless it is properly handled as it grows. It is important that the reader should keep this fact constantly in mind both when applying principles of breeding, and when looking for confirmation of those principles in the results of his matings, for if the conditions under which a fowl is grown are unsatisfactory the result may be a bird very different in shape, color of plumage, vigor, etc., from what it might have been under conditions providing for the full development of its possibilities; and conditions adverse to full natural development are apparently not limited in their effects to failure to fully develop the qualities directly transmitted from the parent stock; but there is some reason to suppose that features eliminated from a stock by careful selection sometimes reappear in ill nourished, ill cared for chickens, when they would not have developed under better conditions. Such a point as this is of course difficult to demonstrate, for we cannot show positively in what way any given individual fowl might have developed differently under different conditions. But comparison of chicks from the same breeding stock, hatched and reared by different parties, often shows them so different that it is hard to believe they could have been produced from the same parents.

Hence, for a proper appreciation of the laws of heredity, we must discriminate between results as found in well developed specimens and results as found in ill developed specimens.

Prepotency in Breeding.

As a rule, pure bred fowls transmit to their progeny a much greater proportion of their individual excellence than mongrel fowls, and pure bred fowls that have been carefully bred in line transmit their qualities to their offspring more surely than those that have been bred in a haphazard way. This is because of the cumulative breeding back of them, and is easily explained by the general law of heredity given in the last lesson.

The fancier and careful breeder, however, are not working merely for fair to good average results in the transmission of breed or variety characteristics. Their constant endeavor is to bring the average of the stock as near as possible to the best prevailing types, and while working zealously toward this end they are still seeking for new, improved, and advanced types.

The law of heredity we have discussed deals with the problems of heredity only in a general way. In its general application it seeks to secure uniformity by having an ancestry as solidly as possible in representation of the qualities sought. As far as is known there is no way of telling beforehand what qualities will appear in any mating or generation, or in what combinations or proportions. While, as has been said, it is a general fact that good breeding tells plainly in the product of a mating, it is also true that it does not show an equality of results. Some fowls have special power to mark their progeny like themselves, either in general appearance or in one or more important characteristics. This power is not dependent upon quality or stamina. It is found in fowls of all degrees of quality and vigor, but as it is prized only when found in those of some special merit it is apt to be passed without recognition in others.

A fowl which has this power to "mark" its offspring like itself is said to be *prepotent*. The combination of quality and prepotency in the same individual, while comparatively rare, occurs often enough to have a very conspicuous influence on the development of our stocks of thoroughbred fowls. A prepotent bird may transmit only its other qualities, (or some of them), to its progeny, or it may transmit its prepotency also, giving a line of stock remarkable for great excellence and the power of transmitting it.

This prepotency is not the same thing as the cumulative breeding power which is gained by careful breeding, though the two may so unite that it would be practically impossible to distinguish between them. The difference between them is easily seen when a fowl is found that is notably superior to its ancestors, and marks this superiority on its progeny to a much larger degree than our law of heredity indicates would be the average influence of a parent. It may also be seen in cases where an objectionable feature persists in a stock to a much greater extent than is usual. Though in most cases objectionable features disappear at about the rate the law indicates, it happens quite often that when a fowl with some specially good qualities and one or more pronounced faults is bred from in the expectation of breeding the good quality into a stock, and the bad quality out of it as quickly as possible, the fowl proves to be prepotent as to the bad quality as well as the good, or, perhaps, prepotent as to the bad quality and not as to the good, and the effort has to be abandoned. The prepotent fowl can be known only through the results obtained by breeding it. Some fowls seem to be prepotent however mated, others are prepotent in some matings and not in others. The reasons for this cannot be explained, but the breeder can ascertain the facts, and frequently can learn them in time to make good practical use of them. It is generally considered the best policy to continue a mating that has given especially good results as long as the fowls in it are fit for breeding. When a fowl of good quality proves an unsatisfactory stock getter in one mating, a breeder generally tries it mated differently the next season, and every season as long as fit for breeding, until he gets such results as the quality of the bird leads him to expect it might give if properly mated. In all work of this kind, the greater one's experience in breeding, and the more thorough his knowledge of the stock he is working with, the oftener he is likely to make matings that give satisfaction, though none know better than the breeders of greatest experience and skill how often their most careful matings produce stock not up to their expectations.

The Ways of Heredity.

There is quite a prevalent opinion among breeders that the female marks her progeny especially with size, shape, and practical qualities, while the male gives them color, comb, and superficial characteristics. How this opinion arose, we do not know. That it is erroneous, a little experience in crossing breeds of fowls, or observations on human families of our acquaintance, will quickly convince most people. The latter test is easier to make, for anyone can at any time make it mentally.

Students of the features of heredity recognize several very common phenomena:

The male offspring resemble their sire, and the female offspring their dam.

The male offspring resemble their dam, and the female offspring their sire.

The offspring, both male and female, or either, resemble a grandparent more than either parent.

The offspring may, in any point considered, inherit from both sire and dam, their quality being, in some degree, intermediate between the parents, or, in case of a quality in which the parents are alike, being in excess of either.

These are the most common and conspicuous features of heredity. In the breeding of pure bred fowls, so like in many respects, it would be difficult to trace the influences of individual parents and grandparents clearly enough to distinguish such phenomena in ordinary cases, but they may be seen occasionally when birds of marked prepotency are used for breeding, and they are traced with ease in many matings of crossbred fowls, especially in points of strong resemblance or great difference.

I think the reader is now ready to believe that the phenomena of heredity are very complex. The different features of heredity just mentioned do not occur independently and separately. All of them are sometimes observed, and in many degrees, in the progeny of a single mating, and all may be accounted for by the general law of heredity given in the preceding lesson, when considered in connection with a few other breeding principles, such as prepotency, which we have just discussed, and reversion or atavism, which will be discussed a little further on.

The point I wish to introduce here is that the law of heredity or inheritance is responsible for variations from established or favorite types as well as for the perpetuation of those types. It is often assumed that in the production of stock there are two warring tendencies—the tendency for like to beget like, and a tendency to variation, that is, to the production of features differing from those found in the parents. These, supposedly different and antagonistic tendencies are for the most part simply different manifestations of the same general law of heredity, though there is no doubt that many variations in the way of special development due to especially favorable conditions are at least in part transmitted to offspring.

Let us see how variations, not due to external conditions, arise:

All that the fowl is as it begins life as a chick it is by inheritance. In every part, feature, characteristic, quality, and possibility it is like some ancestor. We found in studying the question of inbreeding that the fowl inherited an appreciable part of its qualities from some thirty nearest ancestors, and that the chances of a characteristic not found in any of these being produced were very remote. Still there is a chance that a feature long absent in a stock, though common in its remoter ancestors, may reappear in some of them at any time; and I have heard of a few instances in which it appeared that a characteristic of some very remote ancestor had reappeared in a very large proportion of the stock produced in a season. This reappearance of features supposed to have been completely eliminated is what is called *reversion*. It is rare in stock that is carefully bred and new blood introduced with caution, but is quite common when birds of similar type but very different breeding are mated, or when radically different types of fowls are crossed. The beginner who in his eagerness to avoid inbreeding buys males and females from different breeders and puts them together without knowing anything of the breeding tendencies of either line of stock, is very apt to get some chicks that “take back” to distant ancestors in which qualities not now wanted were conspicuous; and he generally concludes that some of the stock he got was not “pure.” While it is most common to have but a single feature reappear, once in a while one bird or a few birds are produced like a remote ancestor in many points.

Now suppose that in place of simple reversion to a single ancestral characteristic which one familiar with the stock or with the history of the production of a variety or breed will easily recognize as such, a combination of features of two different ancestors takes place, or a mingling of an old with a modern feature. In such a case it may be possible to analyze the new character or type, but it may be impossible to do so, and in that case we have a variation which

we cannot explain. It is perhaps not unnatural to suppose that what we cannot explain is due to causes we cannot appreciate or understand, but in this case I think we can see something of the general method of variation even where we cannot trace every variation to its sources.

We can control variation in just the same way, and to much the same degree as we can heredity, of which variation is one manifestation. That is, strictly speaking, we cannot control it at all, but relying on the general law—on average results—we generally secure likeness in the features we prize most, and avoid variations except in conspicuous characters. Yet in many cases, having once found that a fowl, or the fowls of a certain line are strongly prepotent in any direction, either for impressing high excellence according to established standards or for the development of new and better types that knowledge may be made of great practical and commercial value. The ability to discover and to use prepotent fowls and types that are better or more attractive than those prevailing is one of the best personal assets a breeder of fowls can have. It depends very much upon a knowledge of the phenomena and the principles of breeding. Most of our successful breeders have a pretty thorough practical understanding of the subject, though few can be found who can give a good systematic presentation of what they know about breeding, and nearly all cling to some ideas about breeding which I have little doubt they would quickly discard if once they put all their knowledge and thoughts about breeding together in such a way that the inconsistencies in them would be clear.

To the novice in breeding the first use of a knowledge of the principles and phenomena of heredity should be to give him a more correct view of the actual status of so-called pure bred stock, and through this to make him slower to condemn breeders for faults in stock bought of them. When a novice buys breeding stock it is sometimes subjected to several conditions not favorable to best breeding results. The change of climate and environment may or may not be advantageous. The effects of such changes are different with different individual fowls. The same change may be beneficial to one, indifferent to another, detrimental to another; and these results may be directly reflected in their progeny. With such small lots of fowls as are usually purchased for breeding, it may happen that all are affected alike, and if the change is in any degree detrimental the breeding results may be disappointing. The tendency in such cases is to go back to obsolete types and characters, and quite a variety of these may reappear at the same time. Sometimes these results occur at first, but after the fowls become accustomed to the change they breed right. For this reason it is best not to condemn good fowls on the first season's breeding under new conditions.

Very often the care and feeding the novice gives his breeding stock are not favorable to good breeding condition and results. Add to this the fact that many novices practice buying from different breeders to avoid inbreeding, and mate the birds without any knowledge of them, and we have a combination of causes for reversion to obsolete types and characters, and it is not difficult to account for the skepticism with which after a season or two breeding this way, many a novice regards the statements of older breeders as to the proportion of birds of good breeding quality produced from their matings.

The Mendel Law.

For several years past breeders of live stock have been showing more and more interest in some experiments made years ago by a German scientist named Mendel, which have only recently began to get the attention they deserved, but which now seem in a fair way to be considered of more importance than is actually warranted. The "Mendel law" is very glibly discussed and applied by not a few people who have not grasped the meaning of that law at all, and are equally uninformed about many of the cases in which they attempt to apply it.

Two years ago I gave in FARM-POULTRY a statement of Mendel's law, and some observations on its application to poultry breeding and practical value to poultrymen. The number in which this appeared was almost immediately out of print. So many calls for the article have been made that as it is right in line with the subject of this lesson, and as it seems advisable to have it in permanent form, I reprint here that part of the article relating exclusively to the Mendel law.

As preliminary to a correct understanding of the scope of the investigations of Mendel, and of the possible application of his law in poultry breeding, it is necessary to understand that the greater number of Mendel's experiments in crossing were made with peas, and that his observations were in most cases confined either to noting the results with respect to reproduction of a particular character from a union of specimens differing in that character. Thus, he would cross a tall and a low variety of peas, and observe and classify resulting plants according to height. He would cross a variety having the seed round and smooth when ripe with one having wrinkled seed, and note the character of the seed from the resulting plants. And so on through a variety of minor differences. In a few cases he made comparisons for two pairs of characters, and found that the mathematical proportion discovered for the single pair was still maintained, but there was nothing in his work at all approaching in complexity the task of the poultry breeder who might undertake to make an application of Mendel's law to such number and variety of characters as we have in fowls.

Anything like a general application of Mendel's law to the phenomena of poultry breeding is at present out of the question. Indeed, though a mathematician might find mathematical expression for the application of the law to many varying characters, it would be practically impossible to separate the offspring of a mating made with such an end in view, and to identify the fowls equivalent to the factors in the mathematical statement. For the present — and perhaps for all time — poultrymen must work with Mendel's law as he worked with it, applying it to but one or two characters at a time.

However it may seem to those not versed in the histories of breeds and varieties, to experienced breeders this limitation of the application of the law will not appear to diminish its practical value. The experienced breeder knows — none better — how all but impossible it is to make rapid advance in the development of more than one important feature at a time. What the Mendel law gives promise of being able to do for the breeder of poultry is to help him to make more rapid and more certain progress point by point. As Bateson puts it, Mendel's "*work relates to the course of heredity in cases where definite varieties differing from each other in some one definite character are crossed together.*" * * * It was found that in each case the offspring of the cross exhibited the character of one of the parents in almost undiminished intensity, and intermediates which could not be at once referred to one or other of the parental forms were not found.

"In the case of each pair of characters there is thus one which in the first cross prevails to the exclusion of the other. This prevailing character Mendel calls the dominant character, the other being the recessive character.

"That the existence of such 'dominant' and 'recessive' characters is a frequent phenomenon in cross breeding, is well known to all who have attended to these subjects.

"By letting the crossbreds fertilize themselves Mendel next raised another generation. In this generation were individuals which showed the dominant character, but also individuals which presented the recessive character. Such a fact also was known in a good many instances. But Mendel discovered that in this generation the numerical proportion of dominants to recessives is on an average of cases approximately constant, being in fact as three to one. With very considerable regularity these numbers were approached in the case of each of his pairs of characters.

"There are thus in the first generation raised from the crossbreds seventy-five per cent dominants and twenty-five per cent recessives.

"These plants were again self-fertilized, and the offspring of each plant separately sown. It next appeared that the offspring of the recessives remained pure recessive, and in subsequent generations never produced the dominant again.

"But when the seeds obtained by self-fertilizing the dominants were examined and sown it was found that the dominants were not all alike, but consisted of two classes: (1) those which gave rise to pure dominants; and (2) others which gave a mixed offspring, composed partly of recessives, partly of dominants. Here also it was found that the average numerical proportions were constant, those with pure dominant offspring being to those with mixed offspring as one to two. Hence it is seen that the seventy-five per cent dominants are not really of similar constitution, but consist of twenty-five which are pure dominants, and fifty which are

really crossbreds, though like the crossbreds raised by crossing the two original varieties, they only exhibit the dominant character.

"To resume, then, it was found that by self-fertilizing the original crossbreds the same proportion was always approached, namely, 25 dominants, 50 crossbreds, 25 recessives. * * *

"Like the pure recessives, the pure dominants are thenceforth pure, and only give rise to dominants in all succeeding generations studied.

"On the contrary, the 50 crossbreds, as stated above, have mixed offspring. But these offspring, again, in their numerical proportions, follow the same law, namely, that there are three dominants to one recessive. The recessives are pure like those of the last generation, but the dominants can by further self-fertilization and examination or cultivation of the seeds produced, be again shown to be made up of pure dominants and crossbreds in the same proportion of one dominant to two crossbreds."

In illustrating the application of Mendel's law, Prof. T. H. Morgan, in an article on "The Determination of Sex," in the *Popular Science Monthly*, for Dec., 1903, makes this example: "If a white mouse is crossed with a wild gray mouse all the offspring of this cross will be gray like the wild mouse. The gray color of the gray mouse is said to be *dominant*, and the white color (inherited from the other parent) does not appear, but is supposed to be present in a sort of latent condition. It is said to be *recessive*. If now these primary hybrid mice are interbred, some of their young will be white, and the rest gray in the proportion of one to three. If these white mice, when they become grown, are interbred, their offspring will always be white as well as all their subsequent descendants. Some of the gray mice will also breed true, but the rest that are gray hybrids will, if interbred, give rise to some white and some gray in the proportion again of one to three."

We do not understand that in this illustration Prof. Morgan assumes to state facts about the crossing of white and gray mice. We take it that the case is an assumed one, except perhaps as to the statement that the progeny of the first cross would be all gray.

Now it is a question which some poultrymen may be able to answer partly from past experience in breeding, whether Mendel's law will apply to any characters in poultry, and if so, to how many and to what characters. The writer has made a good many crosses, observing results chiefly with reference to the laying and table qualities of the stock produced, but in connection with these things has taken casual notice of other points which might be supposed to come under the operation of the Mendel law — if that applies. (Bateson takes pains to emphasize and to reiterate that the law does not appear to be of universal application). We have observed some results, for instance, with regard to color or some other character which suggested that Mendel's law might apply in some cases — matings of certain individuals — and might not apply in similar cases in which different individuals were used. For instance, we once made a cross of White Leghorn on Light Brahma in which all the progeny were white, the color of the Leghorn sire. We have had other crosses in which the colors of the females of the male's line were approximately reproduced in his female offspring, while the male offspring resembled the color of males of the variety of their dams. Again we have had both males and females, without exception, of color type intermediate between the variety colors of sire and dam, and also intermediate in size, in shape, in size of comb, in size of tail, etc.

But these were not crosses of varieties. They were crosses of breeds. To reproduce Mendel's experiments with reference to color of fowls we must take two varieties differing only in color, as, say, the Black and the White Wyandotte, Leghorn, Hamburg, Cochin, Langshan, or Minorca. While we cannot at present refer to a record of such a cross, our impression is that cases which would seem to confirm the Mendel law are extremely rare. The variety of results we have seen in color, considered in connection with the limited range of Mendel's experiments, suggests that though he simplified his statement by the introduction of the terms "dominant" and "recessive," the introduction of those new terms made the relations of his observations to certain older principles obscure. Bateson calls attention to the use of the terms "dominant" and "recessive" as a clever avoidance of "the complications involved by the use of the expression 'prepotent,'" but it seems to us that by ignoring "prepotence" the facts are placed on a false basis, for it is not possible that the law may be found to apply to the phenomena of prepotency rather than to heredity in general. Bateson approaches, but does

not reach this conclusion when in the more technical discussion of the subject to which he devotes the latter half of the paper from which we have quoted, he mentions a number of cases which, like those in crossing poultry which we have referred to, plainly do not accord with Mendel's results, and follows with this conclusion: "Dominance, as we have seen, is merely a phenomenon incidental to specific cases, between which no other common property has yet been proved. In the phenomena of blended inheritance we clearly have no dominance. In the cases of alternative inheritance studied by Galton and Pearson there is evidently no universal dominance."

Now if the principles discovered by Mendel are not of wider application than to the crossing of such definite varieties differing in one or a few definite characters, they would be of little importance to poultrymen generally, for very few poultrymen are practically interested in the development of types from crosses of varieties. The making of new breeds and varieties of poultry is generally accomplished by mingling several quite distinct breeds often differing from each other in nearly all sections. Each breed or variety used is used for a definite purpose—to introduce some special character or feature of its own, or to make in combination with another some new character intermediate between the two.

It has long been a common saying among poultrymen that in a first cross we get a certain uniformity, but that in breeding together the progeny of this first cross we get a great variety of results. Outside of the few breedmakers, those who make crosses have generally given up trying to get uniformity out of the progeny of a cross, and if they like a certain cross content themselves with renewing it as often as necessary. It cannot yet be said that the Mendel law suggests general rules for, or plans which may be universally applied in bringing orderly development out of the seeming confusion produced by the breeding together of crossbred fowls. Nor can it be said that what it does suggest as to how a mating, which produces a desired character as a dominant character, may be used and followed up to best advantage is at all new to poultrymen. It does, however, suggest the introduction of a new method in breeding which no doubt has sometimes been used accidentally, but which, so far as we are aware, no breeder has ever recognized or advised. And if the Mendelian principles are demonstrated to apply to the phenomena of breeding generally, and not merely to the crossing of distinct varieties, their influence on breeding operations through the introduction of this new method cannot fail to be of great practical value.

To explain what we mean:—There does not seem to be any good reason why we should not consider what Mendel called "dominant" characters as prepotent characters. In their breeding operations poultrymen have been accustomed to attach importance only to those individuals possessing the character they sought to fix, and have found that some birds will reproduce that character, and some will not. By continued breeding and careful selection they finally eliminate all the specimens that will not reproduce the desired character acceptably, but in any case in which the principles discovered by Mendel operate the breeder who works for positive results begins his work with, say three-fourths of all the stock from a certain mating showing a decided character, while only an unknown third of that three-fourths will reproduce the character with certainty. On the other hand—if the principle of Mendel applies—all of the stock which has this character different will reproduce the different character in its progeny.

Certainty in results is secured by working not with the individuals having the dominant character, but by using those having the recessive character.

The poultry breeder generally discards those specimens which differ in any desired quality from their parents—if he knows them. Sometimes he uses a "chance" bird and finds him a very strong breeder. May it not be because in respect to a certain quality or qualities he is what Mendel calls a "recessive?"

And is it not worth while for poultrymen to study their matings in the light of Mendel's discoveries and see whether the "science of breeding" cannot be made more accurate and satisfactory by seeking out and using the specimens that retain a desired quality when most of their kin in the same generation lose it rather than by working, especially with the specimens which come from the mating most fruitful in producing specimens with any given desired characteristic?

To illustrate by an example:—

Suppose a breeder of fowls of a five toed variety secures two males of that variety having only four toes on each foot, and with these males as a starting point proposes to change his stock from five toed to four toed.

Now if Mendel's law is a law of prepotency he might get opposite results from the matings of these two males with one hen each. He might have the progeny of male No. 1 all four toed like the male, and the progeny of male No. 2 all five toed like the female. If then on inbreeding individuals from each mating he found the variations as to toes approximately according to Mendel's results, this would be the situation: From the progeny of male No. 1 he would have seventy-five per cent of four toed chicks, and only twenty-five per cent of five toed chicks. From the progeny of male No. 2 he would have seventy-five per cent of five toed chicks, and only twenty-five per cent of four toed chicks, but,—the four toed chicks from male No. 2 would be the ones of most service to him, because he would know that they would reproduce themselves with certainty, while only an unknown in every three of the four toed chicks of the progeny of male No. 1 would be pure bred as to the number of toes required.

Thus it will be seen that if it could be established that the Mendel law applied to some things in poultry breeding, a breeder acquainted with this law who should produce from a mating, or discover that a chance mating had produced a lot of chicks divided with respect to any particular character, as the offspring of Mendel's crosses were divided, might reasonably assume that he had found an instance where the law applied, and proceed to make his matings accordingly.

We can see, too, how the discovery that this principle applied in any particular case might be of great importance in the preservation of established characters. One of the greatest difficulties in breeding poultry is to hold points gained while making changes in other points. The knowledge that certain individuals, or the entire progeny of a certain mating, or line of matings, was especially strong in capacity to withstand change as to any particular point, would be extremely serviceable.

Then, too, as has probably already occurred to many readers, where Mendel's law applied a breeder might find his best course in working for some special point, to breed first for its contrary or opposite; in other words, to try to make it a "recessive" character, and so determine the individuals possessing it in purity perhaps several seasons earlier than would otherwise be possible.

It is too soon to say yet just where and how Mendel's law applies, but it is certain that it does apply in some cases, and altogether probable that investigation will show it of great use to poultry breeders. To make it useful to themselves poultrymen must familiarize themselves somewhat with it and with investigations along the same lines, and must also do what they can in the way of making observations to discover whether or not it applies with respect to any particular phenomena of breeding.

LESSON III.

Market Duck Culture.

Introductory.

IN this lesson we consider duck culture almost exclusively as it pertains to a single breed of ducks, the White Pekin, which so far surpasses all others in popularity, that market duck culture in this country is White Pekin duck culture. In our fowls we have in each class a number of varieties, and also have several classes which are either adapted to the same uses, or could without much difficulty be made so; but in ducks we have nothing else that would take the place of the Pekin.

Another peculiarity of modern market duck culture is that it is devoted exclusively to the production of "green" ducks, that is, of ducklings to be marketed at ten to twelve weeks of age. At that age the ducklings have frames almost as large as when full grown, and will dress four to six pounds each, five pounds being about the average weight. Much of this weight is fat, and the proportion of edible meat on a duckling at this age is much smaller than on one of the same weight at four or five months of age, but the profit in duck culture is all in the green ducks, and the duck specialists devote themselves to it exclusively. The older ducks which come to market are mostly from the west and south, grown in small lots on farms, generally under conditions which do not fit them for the green duck trade.

Pekin ducks are much easier to handle in large numbers and in limited quarters than chickens. They grow so much faster that the brooding problem is greatly simplified, and if conditions are at all favorable, and care anywhere near right, they are very free from disease. The common ducks do not grow anything like as fast as the Pekins. Some of the other pure bred varieties may equal the Pekins in growth, and at intervals someone interested in another variety endeavors to start a boom for it, but so far the results have not been flattering. What temporary enthusiasm may be developed does not extend far, and soon dies out. Since the introduction of the Pekin duck no large grower has taken up any other variety, and, I believe, no large success has ever been made with any other duck.

The breeding of Pekin ducks for show and sale for stock purposes receives little attention at present. In the early days of their popularity, when there was a very lively boom in duck culture, poultrymen who went into ducks carried on the duck business on much the same lines as their other poultry business. Some few continue to do so. But the more successful growers of ducks for market generally abandoned the other branches of the business, finding it more satisfactory and more profitable to devote all their time to market ducks. Those who continue to advertise and sell exhibition and breeding stock and eggs for hatching are mostly poultrymen who handle other fowls also.

For those who succeed in it, duck growing is probably the most profitable line of poultry culture, but the field is more limited than the trade in eggs or in broilers, roasters, or fowls. For this there are several reasons. Duck growing on a large scale is a very new industry. It was not until the Pekin duck appeared that tame ducks began in this country to be considered

especially desirable for the table. The native duck left to itself frequented streams and puddles that were often filthy, and ate food which imparted strong odors and tastes to both its flesh and its eggs. Any duck left to itself develops the same habits, but the grower of the large improved breeds of ducks finds it worth while to keep them up and see that they are cleanly fed. For the meat of such ducks the demand constantly increases, though the demand for duck meat will always be much less than for chicken, because duck is too rich for a great many, and too expensive for many more. Thus the consumption of ducks is limited, and New York city is probably the only market in the country which can use all the green ducks which might be sent it. Outside of large cities and popular resorts the demand for ducks is light. A poultryman who could easily dispose at good prices of several thousand chickens will find the same market requiring only as many hundreds of ducks.

Hence for most of those who read this lesson the question must be of the production of a few hundred ducks as a part of their undertakings in poultry, and it is on this basis that we will treat the subject, making only occasional or incidental reference to the methods of the large growers. Anyone wishing to start the business in a large way ought to learn it first on a large duck farm. One who begins with a few and raises not more than 200 to 300 at first can get along very well by applying the information here given.

Pekin Duck.

Location for Duck Growing.

For growing the young ducks for market no water except for drinking purposes is needed. The ducks grow faster when kept from the water. For the breeding stock, and for ducks grown for stock purposes, water is not absolutely necessary, but results are generally more satisfactory if the ducks can have access to a stream or to the margin of a pond or lake. Many duck growers who have such a location build the houses near enough to the stream to admit of making yards partly in the water. When the stream is shallow the fences may run right through it. When it is so deep that fences can be used only near the bank the yards may run a short distance into the water. Contrary to the common idea, ducks neither require nor thrive in damp quarters. Though they like to frequent streams and marshy places, they need well drained ground to which they can go when tired of the water, and the house site should be as dry as for hens.

Buildings and Fences.

Houses for ducks are built on the same general plans as hen houses. A building 12 to 16 ft. wide, about 6 ft. high at the sides, and 8 or 9 ft. in the middle, is perhaps the most satisfactory style when many pens are to be kept in one house. For a single pen almost any sort of out-building will do, and if a house is to be made especially for the ducks, it need not be other than of the cheapest boards, covered with roofing material or shingles to keep out the wet. It is not necessary that the house should be warm, but it must be dry.

When a number of pens are kept in the same building, it is more convenient to have a passage along the rear wall. The partitions between pens and along the passage need not be

House for Breeding Ducks.

more than 2 to 2½ ft. high, and openings through them are necessary only when the feed troughs are placed along the walk, when a slatted opening in the partition enables the ducks to get at the food in the troughs. When this arrangement is made the trough occupies about half the length of each pen. It is easy to step over these low partitions, and many handle litter and manure to and from the pens over the partitions, but if desired a part of the partition in each pen may be made movable, to admit running a wheelbarrow into the pens. If these partitions are of boards there will be less draft through a long house.

The fences between the yards should be of wire. A fence two feet high will keep the ducks in. Duck growers usually make temporary fences, driving short stakes into the ground and attaching the wire fencing to these with staples, using only two or three at each stake, and not driving them in tight. The fence built in this way is easily taken down and moved, a matter of considerable importance, for ducks foul the ground badly, making it necessary to turn it over and plant on it often, and this can be much better done with the fences up and out of the way.

Number of Ducks in a Flock.

As drakes are not combative as cocks are, flocks large enough to require a number of drakes are kept. The usual plan is to have twenty-five or thirty ducks in a flock. For this number of ducks five or six males are needed, (one to every five females), during the early part of the winter. Toward the first of March the number of males in the pen may be reduced to one to every seven ducks, and in May some breeders still further reduce the males, leaving only about one to every eight or ten ducks. A drake will successfully serve more ducks when the flock has a water run than when only drinking water is provided. All water fowls copulate more freely in water than on the ground.

Ducks kept for breeding should be given good sized yards. They will do fairly well in close quarters, but have not the strength and vitality when so kept that they have if given room to take more exercise. A duck that forages about much is quite strong on its legs, while one that is confined to a small yard and eats only at the trough is very weak on the legs, and will give out after quite a short walk or run. In such condition duck may lay well, but the eggs will not hatch as well nor as strong ducklings as if the old stock had more strength.

A flock of twenty-five to thirty-five ducks may be kept in a house pen containing about one hundred and fifty square feet of floor space. A little more room will do no harm, especially if the ducks are very large. For the outside yard I would not give specific, or minimum or maximum areas. Give the breeding ducks as much yard room as you can, and if possible let

them have access to water. A single flock on a farm may be given the run of a small field. Where they must be confined make the smaller yards square rather than of parallelogram form, and make them as large as your land will permit. A quarter of an acre of grassy yard makes a nice yard for a flock of breeding ducks of the numbers we are discussing, but if you have the room you may be able to give a considerably larger yard at very little extra expense for fencing.

Beginning With Stock or Eggs.

One of our most successful duck growers and most judicious advisers of new poultrymen says that for those who begin in the fall he thinks it better to buy breeding stock, but those who begin toward spring may find it more satisfactory to start with eggs. From one consideration I would always advise the beginner to buy some breeding stock though not beginning until late in the spring. By handling only a few breeding ducks, and only for a part of the season, he gets some knowledge of them and experience which is of value to him when his young ducks come to their first breeding season. His chances of handling them properly and with satisfactory results are very much better if he has had some experience along that line than if all his knowledge of ducks is what he gained while growing them. It may not be advisable to buy breeding ducks enough at the prices which must be paid in the spring to hatch a large lot of ducklings, but I certainly think it will pay anyone not familiar with the nature and habits of ducks to buy at least a trio of them, though also buying eggs to hatch.

What Kind of Stock.

In buying stock ducks buy good ones. That is, ducks that are good for market purposes. They should be of good size, for to be profitable ducklings must make pretty nearly five pounds on the average at ten weeks, and such ducklings cannot be produced from small ducks. W. R. Curtiss & Co., who for years have bred Pekin ducks for all purposes very successfully gave the following statement of their methods of mating in FARM-POULTRY a few years ago:—

“We select females of good fair size,—we like to have them weigh at maturity eight pounds

Brooder House and Runs for Ducklings.

each—medium long in body, deep at keel, with flat backs and short necks; we also see that they have a sharp, quick eye, and carry themselves well when walking.

"If we wish to produce large birds we use rather small, active drakes, weighing, say six to seven pounds each. We do not use small drakes constantly year after year, for that would run the stock out. Our favorite mating is of medium sized birds of both sexes—the drakes to be as active as possible. This produces good fair sized stock, what we are after for market.

"Another mating we use quite frequently is, drakes weighing eight or nine pounds with extra large ducks weighing ten to eleven pounds each. This mating has produced for us extra large ducks of both sexes."

Feeding the Breeding Stock.

Ducks are fed practically all soft food. A number of growers have at different times tried giving hard grain as to hens, but generally the result has been to curtail the production of eggs. Herewith are given the rations for breeding stock recommended by some of the leading growers:

Ration I. "Equal parts of corn meal, wheat bran, and low grade flour, with about twelve or fifteen per cent of animal food. One-fourth of this food should be composed of vegetables cooked — say, small potatoes, turnips, etc., with all the green rye and refuse cabbage they will eat. Feed this mixture mornings and evenings, giving a little corn, wheat, and oats at noon. Feed all the birds will eat up clean and no more."—JAMES RANKIN.

Ration II. "Equal parts corn meal and shorts with ten per cent beef scraps added. If green food is not available, add one-fifth cooked vegetables to the mash. Give raw vegetables at noon two or three times a week."—WEBER BROS.

Ration III. "One-fourth corn meal, one-fourth bran, one-eighth broken crackers, one-eighth gluten meal, one-eighth low grade flour, one-eighth beef scraps. This mixture makes two-thirds of the mash, the other third being scalded green clover cut fine, and boiled potatoes mashed. The grain feed is mixed dry at first, and then the clover and potatoes added, and the whole mixed with hot water and fed warm. Feed all they will eat up clean with a relish. Allow no food to stand before them at feeding times."—CURTISS BROS.

Ration IV. "Two parts bran, one part Indian meal, two parts cut clover or other green food. Ten to twelve per cent of the whole to be best quality of beef scraps."—POLLARD.

Ration V. "Two parts clover heads, boiled, two parts corn meal, two parts middlings, two parts bran, one part ground bone."—MCFETRIDGE.

The food for ducks may be fed either cooked, scalded, or simply wet with warm or cold water, but it is advisable to use the same method continuously, and not indifferently and indiscriminately.

It is of greatest importance that both animal food and green food be liberally supplied. Ducks are hearty feeders, and, as when laying a duck lays almost daily, she must be well fed and with a good substantial ration. Water for drinking must be constantly accessible, and it should be near the feed troughs, for ducks wash their food down with water, and may choke if not provided with it. Grit and shell should be constantly accessible. Ducks can be started laying quite readily in early winter by feeding meat heavily in the mash, and by keeping them confined to the house on raw and stormy days. They will stay outdoors by preference, even in cold stormy weather, but may not begin laying if allowed to follow their inclination in this.

The floors of the pens should be bedded with coarse hay, straw, or leaves. Nest boxes are seldom used. The duck will scoop out a nest for herself in a corner or at the side of the pen, and duck growers agree that eggs are less likely to be broken when the ducks are left to themselves in nesting than if nest boxes are provided. Ducks lay very early in the morning, mostly before daylight, though occasionally a duck will lay as late as eight or nine o'clock in the morning. If they have liberty they are just as likely to drop the eggs about the yards as to leave

them in nests in the houses. If they have access to water they will oftener drop eggs in the water where they are lost. For this reason ducks that have access to water should be kept from it in the morning until the eggs for the day have been laid.

Hatching the Ducklings.

Where only a few scores to several hundred ducks are hatched hens or incubators may be used as most convenient. For larger numbers it will usually be found more satisfactory to use the incubators exclusively.

When the eggs are hatched under hens give nine to eleven eggs to a medium sized hen. The number a hen can cover properly depends on the size of the eggs, and also on the season. If eggs are very large it may be better not to give an ordinary sized hen as many as nine early in the season. After the weather is warm a hen may be given a nest full, and often hatches just as well when there are more eggs than she can fully cover, but in the winter and early spring it is better to limit the number to what it is clear a hen can keep warm all the time, for when there are too many eggs in the nest all are likely to be chilled in turn and the entire lot spoiled, when with a few less eggs in the nest a good hatch of strong ducklings would have been secured.

When duck eggs are hatched in incubators the operation of the machine is varied in some makes. In other machines a special pattern is made for duck eggs. The poultry keeper who has a machine adapted to both kinds of eggs can learn from his book of instructions or from the manufacturer or agent what special adjustments of it to make for duck eggs. In buying one can ascertain to what extent a machine under consideration is adapted to duck hatching.

The period of incubation for duck eggs is twenty-eight days. Sometimes the ducks hatch earlier, but it is preferable to have them go the full time. Unlike chickens, the little ducks pick the shells quite a long time before they attempt to break out, usually thirty-six to forty-eight hours. One inexperienced in duck hatching sometimes becomes alarmed about the ducks not coming out promptly after breaking the shells and undertakes to assist them. There is no occasion for this. As the ducks pick the shell so long before leaving it it is necessary to see that the membrane does not have a chance to dry and adhere to the duck or become so tough as to interfere with the hatching. In running an incubator the ventilation is reduced so much at the last that the air in the egg chamber is saturated with water and the membranes kept moist. In hatching with hens make sure that the hens are perfectly comfortable, and nests and hens free from lice. Then the hens will not be likely to leave the nest for long at a time. It is well also to keep the hens confined to the nest as closely as possible after the eggs are pipped, though as so long a time may elapse between the pipping of the first egg and the exclusion of the last duck the hen should have at least one opportunity to leave the nest in that time. The best way is to let or take the hen off just about the time the first duck is due to push out of the shell; then keep her on the nest until the hatch is over. It should be observed that the period of incubation is a full week longer than for chickens, and that this week, if the sitting hen is not in good condition, is harder on her than all the rest.

Brooding Ducklings.

When only a very few ducks are hatched at one time, say, not more than two or three hens can brood, hens may be satisfactory mothers, but as the number in a lot approaches the capacity of a single brooder, it will be found much the more satisfactory way to use a brooder, or as many brooders as are required. I think duck growers generally prefer to use the pipe system of brooding if they have enough ducklings to use such a system. The brooder house for ducks may be just the same as for chickens.

The ducklings are not taken from the nest or machine until they are twenty-four to thirty-six hours old. If they are to be brooded by hens the hens should be confined so that they cannot roam about and wear out the little ducklings. After the weather is warm the ducklings may be allowed considerable liberty, provided they are not disposed to wander too far, in which case they should be restrained. Sometimes little ducklings but a week old, if free to do so, will stray long distances. This must not be allowed if good growth is desired. It is a very simple matter to confine the ducklings to any required spot, for a board ten or twelve inches wide, set on edge and supported by pegs driven beside it will keep them in until they are some weeks

old. This is easily moved as often as desired. For a more permanent fence it is better to use wire netting. When the ducks are very small the finest mesh may be required to keep them in, but they grow within a few days to such a size that the two inch mesh will answer. Which to use must depend on the amount used, and on the convenience or inconvenience of changing the quarters of the ducklings, or changing fences.

Temperature of Brooder.

The brooder into which the ducklings first go should be at a temperature of about 90° before the ducklings are put into it. The heat of the ducklings will raise the temperature several degrees. This temperature, approaching 95°, is about what the ducklings should have for the

Pekin Ducklings 5 x Weeks Old. Boy Six Years Old.

first day or two, it being a reduction of about 8° from the temperature of the incubator. The temperature should be gradually reduced until at the end of a week it is 80° to 85°. Ducklings grown in the winter need artificial heat until ready for market. For those hatched in the latter part of winter, and in the spring, the period of brooding is shorter. When settled warm weather comes the ducklings need artificial heat only for two or three weeks. Ducklings that are five or six weeks old about April 1st can go into "cold" brooder houses at that time. These houses are tightly built, so that the ducks in them are well protected, but have either no heat at all or merely a row of pipes along the rear wall, perhaps a couple of feet from the floor to take the chill off the house should the weather at any time be unusually cold.

Feeding the Ducklings.

The very first thing the novice in duck culture should fix in his mind about feeding ducklings is that the duckling must have "grit" in its food from the very start. I am not prepared to say whether it would be possible to have thrifty ducklings without grit, but I have tried a good many ways of preparing their food, and found that they always needed some grit in the beginning, and that they did best when it was mixed with the food. Any fine grit or clean coarse sand will do, and not a great deal is required. When mixing a pailful of mash

for ducklings, I would throw in a heaping handful of fine grit or coarse sand. Mixing lesser amounts would use grit in proportion. Some duck growers use grit in food regularly for both young and old ducks; others only put it in the food for the young ducks for two or three days. I have never discovered any advantage in continuing to mix sand or grit with the mash after the first few days, unless symptoms of indigestion appeared, when the use of these aids to digestion for a few times seemed decidedly beneficial. Grit should be accessible to the ducklings at all times that they may take it if they need it.

As for chickens, there are many good food combinations for ducks; perhaps not so great a variety, for they are fed practically all soft food. Herewith are given the rations used and recommended by a number:

Ration VI. "Two parts wheat bran, one part meal, with a handful of fine gravel or sand thrown in, mixed with either hot or cold water, or with skim milk, to a crumbly consistency. I frequently break raw eggs into the grain in the proportion of two eggs to one quart of the dry grain. This must be thoroughly mixed that it may not be pasty or sticky. After the first three days omit the sand or gravel, and by the fifth day begin to feed a slight proportion of beef scrap, increasing gradually, until at two weeks of age they are getting five per cent beef scrap. Gradually increase the animal matter until at five weeks of age the ducks are getting fifteen per cent of it, which proportion may be continued until killing time."—POLLARD.

Ration VII. "Equal parts corn meal, bran, flour, ground graham bread, and rolled oats, five per cent beef scrap, a little oyster shells and grit, and a little finely cut green rye. Moisten with cold water. The ingredients are first mixed dry, then water thrown on and mixing continued until the food is of the proper consistency. Feed this five times daily until the ducklings are three weeks old.

"After three weeks feed two parts corn meal, one part bran, one part middlings, ten per cent of this amount beef scrap, a little oyster shell, and finely cut green stuff. This is fed until the ducks are six to seven weeks old, when they are put on a 'fattening ration' composed largely of corn meal, just flour enough being added to hold it together when wet; the proportion of beef scrap being still about ten per cent."—WEBER BROS.

Ration VIII. "*First week*—equal parts of corn meal, middlings, crackers, or stale bread, and green stuff; mix in a small handful of sand to each quart of food. Give occasionally bread soaked with milk for a change.

"*Second week*—four parts corn meal, two parts wheat bran, two parts middlings, one part beef scrap, sand; mix with about one-third the quantity of green stuff. At about six weeks put ducks in fattening pens and feed two-thirds meal, the remainder about equal parts of bran, middlings, and greens; add about twelve per cent of the whole beef scraps."—HALLOCK.

Ration IX. "*First four days*—four parts wheat bran, one part corn meal, one part low grade flour, five per cent fine grit. Feed four times a day what they will eat up clean.

"*From four days to three weeks*—three parts wheat bran, one part corn meal, one part low grade flour, three per cent fine grit, five per cent fine beef scrap, soaked. Finely cut green clover, rye, or cabbage. Feed four times a day.

"*From three to six weeks old*—equal parts corn meal, wheat bran, and low grade flour, ten per cent beef scrap, three per cent grit. Feed three times a day.

"*Eight to ten weeks old*—one-half corn meal, equal parts bran and low grade flour, ten per cent beef scrap, three per cent grit; oyster shells and less green food. Feed three times a day.

"The above ingredients should be made into a mash, and should be crumbly, not pasty. Proportions by measure, not by weight."—RANKIN.

Whichever of the above methods of feeding the reader takes up, he will find it better to

follow that method as closely as he can, including the accessories perhaps not insisted upon in other rations. The different proportions of different articles used by different experts, practically balance each other, as one who is skilled in feeding can see.

If only a few ducks are kept on a plant on which fowls also are grown it is not necessary to make a special mixture for the ducks. The mash made for the hens will answer by the addition of a little sand or grit, when required, to the portion needed for the ducks. When the ducklings are fed this way, extra green food should be provided.

Importance of Water.

Even more than the old ducklings, the little ducks require water to wash down their food. Their drinking vessel should be always supplied. They will drink even at night. For a small brood of ducks with a hen an open drinking pan or saucer may be used, but for larger lots drinking fountains into which the ducklings cannot get should be used, for with their pushing and crowding at feeding times a brooderful of ducklings having access to an open drinking vessel get themselves and each other very wet, and sometimes the wet ducklings are chilled or trodden down by the stronger ones. Milk may be used for mixing the food, but should not be given to drink, because the ducks will become smeared with the milk, which drying on them puts them in a most miserable condition.

Cleanliness.

It is important that all feeding and drinking vessels should be kept clean. The duckling's voracious habit of eating makes it shovel down filth with its food if there is filth present, and in a very short time the effects of sour and foul food and drink become apparent. The floors of the pens should be littered with hay or planer shavings, and as these become wet and soiled they should be removed and fresh litter put in. The yards, when small, should be swept or scraped, say once a week, and even if a yard is large enough to make cleaning of the entire space unnecessary as often as this, the parts of it most frequented by the ducks will need frequent cleanings.

Ducklings Must Be Kept Quiet.

Ducks are timid fowls, and the Pekin duck is probably the most timid of domestic ducks. Any annoyance or disturbance of the growing ducklings (or of the breeding stock) is therefore to be avoided. Visitors should be kept from the duck quarters as much as possible, and dogs or other animals that would frighten the ducks must be kept off the premises. Sometimes ducks become panic stricken at night and rush back and forth in the house or yard, wearing themselves out, losing a great deal of weight, and checking growth. To keep them quiet breeders who have trouble with them in this way hang large lanterns in the duck houses.

Marketing Ducks.

The well grown and well fed duckling should be ready for market at ten weeks of age. Early in the season some growers market ducklings at nine weeks to get the extreme high prices for the first ducks; but as soon as the ducks begin to go to market in fair supply it is better to hold them until at their best. For the bulk of the lot this should be at ten weeks. Some of the inferior ones will not be ready for a week or two more. All should be sold by twelve weeks, for after that the duckling begins to grow its adult plumage, loses its "baby fat," and loses weight, and will not be fit to kill until eighteen to twenty weeks old. At that age the duck is meatier and better eating, and is far more satisfactory for the home table, but will not bring as much in the market as the green duck, and will have cost nearly twice as much.

The large duck growers, from the time their first ducks are ready to dress until the close of the season, have pickers constantly at work. Their product goes almost wholly to wholesale dealers and commission houses. The grower who has only a few hundred ducks, and has a trade in dressed poultry, should have no trouble in disposing of that number of ducks at good prices to his trade.

Killing and Dressing.

The methods of killing, dressing, cooling, and packing ducks for market are the same as given for poultry in Lesson XX., First Series, but a duck is much harder to pick by any method than a chicken. It is a slower job and one that requires patience.

Growing Ducks for Stock.

The ducks that are to be reserved for stock purposes should be reserved from either the early spring hatches or from lots hatched not later than May. Good ducks often come from later hatches, but systematic selection from the best lots is the only way to keep up size and stamina. The best duckmen select what they need of the finest April and May ducklings, and separating them from the market lot at the age when fattening begins, continue them on such a ration as has been used for growing them, at the same time giving them more room with access to grass and water range. As they approach maturity the proportion of meat in the ration is reduced. Often it is completely eliminated for a time; because if continued it gets the ducks to laying earlier than is desirable. A "maintenance ration" only is given through the fall until the ducks are put in breeding houses at the beginning of winter, when rations for breeding stock, as given earlier in this lesson, are given them. It is not desirable that the ducks should lay much before December.

LESSON IV.

Goose Culture.

THIS is the branch of poultry culture which interests the least number of people. You may travel long distances in many directions, and see very few geese. Yet it is a line that might profitably be given some attention by practically all farmers and a great many others.

I do not mean by this that the growing of geese on a commercial scale could be carried on profitably very much more generally than it is. No doubt interest in goose culture on a commercial scale could develop considerably before an over supply was created, but those to whom

Emden Goose.

goose growing should appeal most at present are the many who might grow a few geese every year, either for home use or for a local market, almost without expense. Almost every farm has some land not used for any other purpose, and not productive, that might be devoted to goose growing. On almost every farm a flock of geese, large or small, according to accommodations, might be kept on pasture with other stock.

Geese thrive most readily and are least trouble to handle, and grown at least cost, when given good pasture, but they may be grown like ducks in close quarters if green food is liberally provided. This way of growing them is not recommended. I merely mention it as possible for those who would like to know something of geese, but have not good natural facilities for growing them.

Under favorable conditions geese are the easiest of all domestic fowls to handle. With good pasture provided with water they may be left to themselves half or more of each year. They do better, generally, if provided a little grain food to supplement what they get by foraging, but it is not regarded necessary, and perhaps the majority of those growing geese give the old stock nothing during the pasture season, and feed the goslings only a few weeks.

The Breeds of Geese.

Many of the geese found in this country are the common gray, gray and white, or white geese, not much larger than a large duck, and in a general way showing the same inferiority to the improved breeds of geese that common fowls of all kinds do to the well bred.

Of pure bred domestic geese there are the following breeds: Toulouse, Embden, African, and China, or Chinese. Of the last named breed there are two varieties: Brown and White. Canadian, or Wild Geese, are also kept in captivity, and bred to be sold as decoys to hunters. In some sections the breeding of Wild geese for this purpose is carried on in a small way by many persons, and considering investment and attention required is quite profitable. The young geese generally bring at the hunting season in the fall \$5 each.

Besides being used for the purpose just mentioned, Wild geese in captivity are crossed with domestic geese, producing a goose which is properly a hybrid, and sterile, but which is commonly called a Mongrel goose, and perhaps oftenest called the "Rhode Island Mongrel goose," most of them coming from that state. If the reader will make a mental note of the way in which the word "mongrel" is used in connection with geese, he may save some confusion on the subject. The mongrel, or common fowl of the barnyard, is an indiscriminate mixture of blood like the common goose, but the Mongrel goose is a half blood wild goose.

Of the breeds of domestic geese the Toulouse is a very large gray goose; the Embden a very large white goose; the African a very large brown goose, the "Standard" weights of all being the same for adult specimens, viz., 20 lbs. for males and 18 lbs. for females. For young specimens the weights are: Toulouse—gander, 18 lbs.; goose, 15 lbs. Embden—gander, 18 lbs.; goose, 16 lbs. African—gander, 16 lbs.; goose, 14 lbs. Why these variations in the weights of young geese should be made I do not know, nor do I think they can be given a reasonable explanation; but it makes little difference to any goose growers but the few who exhibit. Chinese geese are much smaller than the others, the weights being: Adult gander, 14 lbs.; adult goose, 12 lbs.; young gander, 10 lbs.; young goose, 8 lbs.

Of these varieties the Toulouse and Embden are quite common, flocks of them being found in almost all parts of the country. The others are more rarely seen, though Africans are quite popular in Rhode Island, and occasional flocks or specimens of the Chinese may be met in any part of the country.

Though similar in size these breeds of geese differ in qualities and characteristics. I can, I think, present these differences in no better way than by quoting the opinions of two of the best authorities on the subject:

Mr. Samuel Cushman. in an article written for FARM-POULTRY some years ago, said:—"Toulouse geese are very large, docile, and great layers for so large a breed; but they are slow to mate; ganders mate with fewest geese of all, and their very early eggs are rarely fertile. They grow a very large frame, but grow slow, and do not get plump or fatten readily until late in the fall. Their plumage is easily plucked, but as it is dark their skin does not have the attractive appearance of that of the white goslings. Therefore, this breed is not just suited to the production of early goslings.

"Embden geese are large, docile, and their goslings grow plump and large very quickly; have yellow bills and legs, and the most desirable white plumage. They also pick easily. They seem almost all that could be desired of any pure breed, but they have their faults. They lay later in the season than any other breed, and fewer eggs. The ganders are also backward in mating, and many infertile eggs are produced. The goslings that are secured are all that could be desired, but they are few in number and appear on the scene rather late.

"African geese are as large as the Embden and Toulouse; lay more eggs than the Embden, and nearly as many as the Toulouse, and lay them nearly as early as the Chinese varieties. They are prompt to mate, and the ganders will mate with more geese, and their early eggs will be more fertile than those of any other large breed. They are steady, docile, and great feeders.

Toulouse Geese.

Goslings grow faster up to the time they should be marketed, and are easily fattened. Many more large goslings will be secured early than from the other varieties. If you have ten females each of Africans, Embdens, and Toulouse, with the proper number of ganders on your place, and give them the same chance, you will have after the hatching season is over many more African goslings than either Toulouse or Embden. Probably three times as many Africans will be secured as Embdens, and twice as many as Toulouse. This has been our experience. Of course there are exceptions to all rules. African goslings are more salable dressed than anything except the Embden, and as they get in ahead, bring as much or more per pound. Their drawback is their dark bill and dark plumage."

Of the Chinese geese Mr. Cushman expresses this opinion:—"They are small, nervous, and noisy by nature, and are the least able to withstand cold or heat. They are timid and excitable,

and hard to fatten, also to pick, but they are the earliest and most profitable layers and producers of all. Their pure bred goslings are the least favored by fatteners and marketmen of all varieties."

Mr. Geo. H. Pollard, comparing the breeds of geese, says:—"There has been considerable question as to which is the best breed for general purposes. The three breeds which have the strongest following are the Toulouse, African, and Embden. Each of these has its special virtues. The Toulouse is the largest of the three, and produces a very strong and quick growing gosling. Owing to its great size, however, it is longer in reaching maturity, and when fully matured is too large to suit the best trade in the New England market. The female produces a fair number of eggs, and, on the whole, the breed is easily managed and is profitable.

"The African is a smaller bird, is darker in plumage, and enjoys the distinction of being the hardest to dress of any of the breeds. The female is the best layer of the three breeds mentioned. The eggs are of a fair size, and under proper treatment are generally well fertilized. The young are strong and hardy, and grow quickly to a size which is well suited to the market demand. The principal objection to the young of this variety comes from the fact that they are at most stages liberally covered with colored pinfeathers and down, which serve to mar the value of the carcass for high class family trade.

"The Embden unites the good qualities of the Toulouse and the African, while it is without their failings. The mature birds are a beautiful clear white, with flesh colored bills and legs. They are of medium size and weight. The females are good layers. The young are strong and quick growers, and being without dark pinfeathers and down, they dress clean and white at any age. The carcass is more tempting and sells more quickly to fastidious consumers. The quality of the flesh is about the same in all three. Probably no one could detect any difference in either tenderness or flavor. The Embden or Toulouse are more tractable and easy to manage than the African, which is the most pugnacious of the three breeds."

From these opinions, which, though not strictly agreeing are not radically different, the reader may judge something of what breed will be most satisfactory to him. Messrs. Cushman and Pollard are, of course, considering the three breeds as producers of goslings to be sold at periods of high prices or to an exacting trade. The reader who wishes to produce for himself, or for a local market, and does not intend to go into geese extensively, may find faults that were serious from their point of view of little importance from his. Mr. Cushman advocated very strongly the use of crossbred goslings for market. It should be said, however, that the experiments made with crosses took account of too small numbers, to give force to the general conclusions drawn from them, and that very few goose growers have done anything systematically in this line except those engaged in the production of the "mongrel" geese. In the goose growing sections of Rhode Island where geese are bred for market more extensively than anywhere else in this country, the geese used are generally grades produced by various mixtures of the blood of the three improved breeds we have under consideration with the old common goose. The goslings from this stock, while not equal to the best of the pure breeds or their direct crosses, grow rapidly to a good size and seem to suit the requirements of the trade.

Getting a Start With Geese.

If one wishes to grow more than a few goslings year after year the best plan is to begin with adult birds three years old or over. Geese do not come to full maturity until about three years of age, and rarely give at all satisfactory results until two years old. The young geese will lay and some of the eggs may hatch, but the goslings are apt to be weakly and not thrifty.

Good stock of any of the improved breeds usually costs \$3 to \$5 per bird. It is better to purchase some months in advance of the breeding season, as the geese will not breed well if moved just prior to the laying period. If stock has not been purchased early it is usually better either to let the matter go over for another season, or to buy eggs. In any case one must expect it to take several seasons to get a flock of geese established in new quarters, and breeding satisfactorily, for good breeders of mature age are not often offered for sale, and the young geese require two years, and sometimes more, before they produce well. Once established, however, a flock of breeding geese can be kept unchanged for quite a long period. The females are said to be profitable up to ten or twelve years of age, and males to a little more than half those ages, say, six or seven years.

From one to four females are mated with each male. Young geese are disposed to pair. As the ganders grow older they will usually serve more mates, but they do not copulate indiscriminately as fowls and ducks do. Each gander serves only his own mates, and an unmated goose in a flock in which all the ganders have other mates may be entirely neglected. For this reason goose growers often put an extra gander with the flock to pick up and mate with any neglected or discarded females. Usually when a gander and goose have mated once they are faithful to each other as long as allowed to remain together, and often refuse to take another mate for a long time after being separated. This trait makes it possible once the geese are mated to allow as many families as desirable to run in one flock, even though they be of different breeds.

Houses and Fences.

Geese require very little shelter, and the heavier breeds are restrained by almost any sort of low barrier. They do not seem to mind severe storms in the least, but will lie down on the snow, draw their feet up into their plumage, and seem supremely contented, no matter how

Flock of Breeding Geese in Pond.

cold or rough the weather is. I have some this winter that have gone into a small shed with a cockerel for which they seemed to have a special liking, but as soon as the cockerel was taken away quit going under cover and remained out in severe sleet storms. A low rough shed open to the south will provide all the shelter needed, and it need not be much larger than will give the flock standing room under it. My own experience with geese has been limited to small numbers, but though I have always provided shelter for them, and kept the floors littered the geese have made so little use of these comforts that continuing them seems more in the line of satisfying my conscience than providing for their needs. Sometimes they have to be confined at night for protection, but, as a rule, they can take care of themselves.

Care of Breeding Geese.

Geese breed best on pasture with streams or ponds accessible. They require little grain if the pasture is abundant. If pasture is short it may be supplemented by grain and vegetables. In winter they should be fed mostly on vegetable food, cut clover, alfalfa, cabbage, beets,

turnips, etc., with oats or barley and bran. Corn is generally too fattening, and most breeders are very sparing in feeding it. Herewith are given the rations of several well known breeders of geese:—

Ration I. "Through the laying and breeding season, in addition to grass, they should be fed twice a day with shorts and corn meal, equal parts, thoroughly moistened with cold water, but not too wet lest it produce diarrhea; add ten per cent of beef scraps, or its equivalent."—RUDD.

Ration II. "Take some boxes about eight inches deep, and put oats or barley in them. Place these in the pasture away from other fowls. There is no danger of overfeeding grain if the geese have pasture. Give corn only in coldest weather — when it is storming, or there is so much snow that they cannot go foraging."—NEWMAN.

Ration III. "Turn out on pasture from June until fall; feed no grain while grass is available, then feed lightly of oats and whole corn. After February 1st, give full ration: A mixture of corn meal, shorts, beef scraps, boiled potatoes, or turnips in the morning; whole grain in the afternoon."—WILBUR.

Geese usually begin laying late in the winter, or in the early spring. Not many lay while there is snow on the ground. When the goose is ready to lay she is apt to seek out a nest for herself, and having once selected a place is impatient of any interference with her laying habit. The goose, as a rule, looks for a somewhat secluded place, and as a pasture often furnishes few such places, keepers make a practice of providing nests that may attract the geese. An empty barrel placed on its side with a little earth in it to hold it steady and make a foundation for the nest, then a little straw or hay added, is the usual nesting place furnished. Often the geese will ignore these and make their own nest right in the open.

As geese lay but few eggs it is customary to take them away as laid during the first laying period, and give them to hens to hatch, or place them in an incubator, and not allow the geese to incubate until they have laid a second lot of eggs.

Hatching Goslings.

The hatching of goslings by natural methods, whether with hens or geese, differs little from the hatching of other fowls. The points of difference in hatching with hens are those which depend upon the size of the eggs and the length of the period of incubation. The eggs of the large breeds of geese are very large, and early in the season three will be found enough for a medium sized hen. Later when the atmosphere and ground are warmer more eggs may be given, but it is rarely wise to give more than five large goose eggs to a hen. The period of incubation being thirty days, approximately half as long again as the incubation period for hens' eggs, hens that are not in good condition and free from lice are likely to neglect or desert their eggs. Hence besides taking special care to use hens that are in good condition and to guard against lice, which multiply much faster on a hen late in a prolonged period of incubation than while she is active and robust, it is well to watch the hens very closely after the third week of incubation, and remove any that seem to be losing condition, giving their eggs to fresher hens.

When geese are used for hatching they may be allowed twelve to fifteen eggs. Usually they must be set where they have been laying. Many growers simply leave the eggs of the second litter in the nest.

Goose eggs can be tested from the fourth to the sixth day, and the infertiles removed. Testing should always be attended to with the early hatches and under hens. With eggs set under geese late in the season it is not so essential, for the eggs usually run very fertile then, and as the incubating goose does not like interference it is as well to let her alone.

Artificial Hatching of Goslings.—Artificial methods are very little used for hatching goose eggs. Only a few operators of incubators have had at all satisfactory results with them. One of these, Mr. Samuel Cushman, gave me a few years ago the following points on the artificial incubation of goose eggs:—

"Goose eggs need more drying out than hen or duck eggs, and also need more cooling. When an incubator containing goose eggs is run as for hens' eggs the air cells are too small, not enough of the fluids of the eggs are absorbed, the goslings are glued up, weakly, and cannot get out of

Goslings at Pasture.

their shells. Goslings under hens are also much slower getting out than those under geese. Sometimes they remain for a whole day after pipping the shell, with bill protruding through the opening, gaining strength before making a final effort. When in such a state, if the air in the egg chamber of the machine, or the air surrounding the nest of the hen is not moist, the membranes of the egg will adhere to the gosling so that it cannot get out. After the first week, whether under hens or in incubators, they need moisture. If in nests they should be sprinkled every two or three days or put in water from thirty seconds to a minute. With goose eggs in incubators, especially in ordinary hot air incubators, it is very important to soak the eggs during the latter part of the hatch. They may be soaked every two or three days after the fifteenth day, or daily during the last ten days.

"The temperature required for the incubation of goose eggs is lower than for hens' eggs, but the machine need not on that account be run at a lower temperature. Required conditions are met by running machine at usual temperature, and cooling eggs more, thus giving them a lower mean temperature. Toward the last the heat will naturally run up, and it is best to allow it to do so. Some of the best hatches were obtained when the thermometer registered 106 and 107°. To furnish the required moisture while the eggs are hatching pans of hot water are put for short periods beneath the trays. Under such conditions the largest per cent hatches were obtained. This process, however, must be conducted with caution, for it is easy to overdo it, and then the dried matter within the shell seems to dissolve and glue over the gosling. What is wanted at the period of exclusion is a high degree of heat not too long continued, and just moisture enough to prevent the membrane drying and sticking while the goslings are working their way out.

"The cooling in the incubators should begin at the tenth day. It need not at first be very carefully done, a slight cooling sufficing; but as the animal heat in the fertile eggs increases more care must be taken, and after the eighteenth day cooling and moistening should be very carefully attended to until the eggs pip. Moistening the eggs cools them rapidly by evaporation of the water on the shells, and it is possible that the dipping in water is more beneficial in cooling the eggs than in furnishing the required moisture, for the cooling effect is always pronounced, while the moisture effect of a single application of water is imperceptible. When cooled dry, the cooling toward the close of the hatch should continue until temperature has been reduced to 80 to 85°."

After the Goslings are Hatched.

Whatever method of hatching is used, the goslings should be kept warm and quiet after exclusion, and for the first few days. Mr. Cushman thought it better to remove goslings at once from the egg chamber and place in brooder. With hens it is well to remove the goslings as hatched to a flannel lined basket kept in a warm place, until the hatch is completed, when they may be given to the hens that are to brood them. It is best to remove the hen from the nest, and give her a box large enough to let her turn about and give the goslings a chance to get from under her and move about a bit, yet not get away and get chilled. With a goose mother the goslings may be let alone, and as they are generally much stronger when hatched by a goose, are not so likely to suffer from slight exposures.

Except for the precautions to be taken during the first few days, the care of growing goslings is as simple as anything can be. I give here first statements as to care and feeding from several of our best authorities, and following these a few comments from my own more limited experience, and from observations made in sections where the growing of geese is generally carried on.

Food and Care of Goslings.

Ration I. "The first two or three days keep them in a warm place and give a little soaked bread and water. In nice weather turn them out in small enclosures which can be moved every day. After a week let them go. The first four or five weeks give nothing but stale bread occasionally, but always leave them at liberty to get all the grass or clover they want. Do not soak the bread, as they do not like it so well. After five weeks give a mash of two-thirds bran and one-third corn meal. To fatten — after six weeks, feed one-half bran, one-half corn meal; do not feed it sloppy. Never allow goslings to go to the water until fully feathered, and then only let those go which are to be kept for breeders."—NEWMAN.

Ration II. "Goslings are better off if they get nothing but tender grass and water the first day they are out, or before they are forty-eight hours old. The next day they may be fed two or three times, but very lightly, with scalded cracked corn. This is probably as good food as can be given from then on, provided they have at all times an abundance of tender grass to eat, and the amount of cracked corn fed is such as will leave them always hungry for grass. An exclusive diet of grain or dough without plenty of grass, or too great a quantity, even with grass, will spoil them—cause them to lose the use of their legs, and die. If grain is fed sparingly while they are young, grass being three-fourths of their food, few will be lost. To make the best growth they should have succulent green food before them while they can see to eat. If shut in for a short time morning or evening, or on a stormy day, they should have a continual supply of freshly mown rye, oats, clover, or corn fodder. Otherwise they will fret and lose much weight. When the object is to raise show birds of great size and frame at maturity, it may be best to feed oat meal, gluten feed, and bran liberally, as well as corn and grass or clover; but there will be less uniformity under this feeding, and more will be lost."—CUSHMAN.

Ration III. "They need plenty of green food; and soft tender grass, rye, or other growing grains should be freely fed. A good green run is really one of the necessary aids to the proper growth of young goslings. While many of the old timers disbelieve in the feeding of grain to young birds, we strongly urge that they be fed regularly three or four times a day, as much as they will eat of a mixture similar to that which is fed to the young ducks. This, in addition to the green range will cause a growth that will astonish the natives, and yield a profit to the producer. The young, as well as the old, need free access to stores of grit and shell. While not so timid in disposition as ducks, they should be kept free from disturbance, and all possible pains taken to keep them contented and happy; contentment means growth, and growth means profit."—POLLARD.

My own experience in growing goslings favors Mr. Pollard's methods rather than the others. Feeding whole or cracked grain freely, even as part of the ration, I have found likely to put goslings off their legs, and I have invariably brought them right up again by going promptly back to a mash feed as soon as signs of this trouble appeared. If grain is sparsely scattered the goslings take a good deal without injury, and after they are well grown will eat a good deal of hard grain and grow very fat on it without showing any indications of weakness.

In visiting the Rhode Island growers of geese, one may find great diversity in methods of feeding as far as the use of foods supplementing the abundant pasturage given is concerned. I have seen the goslings on one farm fed a stiff dough largely of corn meal, those on the next a mixture of much the same consistency, but carrying less meal and more bran; while perhaps at the very next place visited the food would be more of the consistency usually given hogs to drink; yet under all these different methods of feeding the results appeared to be equally good, and from this I think it reasonable to conclude that with good pasture the kind and consistency of grain food makes little difference.

One point especially necessary to observe if the goslings are to be kept healthy is to either give pasture large enough to have clean grass in abundance, or move the geese often. A favorite method with those who grow them in large numbers is to divide a small field into three or four sections, and pasture one section at a time.

Marketing Geese.

For profit geese are sold at ten to twelve weeks old, at which ages they should weigh from 8 or 9 to 12 or 13 lbs. If pushed right along they should be ready to market at ten weeks, and at their best weight as green geese at that age. If intended for home consumption they may be kept longer, and as most people want them to eat in winter it may be as well in growing for home use to feed sparingly of grain foods until near the time of killing, when grain may be given freely to fatten.

Methods of killing, dressing, etc., for market are practically the same as for ducks.

LESSON V.

Turkey Growing.

THE turkey is the one common domestic fowl that seems to be utterly unadapted to confinement. The guinea fowl has much the same roving disposition and fretfulness under restrictions, but guinea fowls are by no means common. Geese, as we have seen, are much easier grown when given freedom and good pasturage, yet they may be grown without much difficulty in confinement. Instances of turkeys successfully grown in close quarters are extremely rare, and most of the successful growers of turkeys give them practically unlimited range.

The bulk of the turkey crop of this country comes from the large grain growing and general farms of the central west and southwest. There is a very limited area in Rhode Island where most of the farmers grow turkeys, and some grow a good many. In Vermont a good many turkeys are grown. The other New England states produce practically none, while through the Middle states the turkey product is light and scattering. In the grain growing sections of the west and southwest, turkeys, though not as generally kept as chickens, are very abundant, and probably more than nine-tenths of the entire turkey product marketed comes from these sections.

On these farms a flock of turkeys will forage far and wide, and if not too large, will pick the greater part of its living until the time comes to fatten in the fall. Under such circumstances there is generally a good profit in turkey growing unless losses are very heavy.

The matter of advising turkey culture for farmers or poultrymen located on farms where turkey growing is not common, is one that requires to be handled with caution, and calls for deliberate consideration on the part of those most interested. In some sections where turkeys were once generally grown their culture has been abandoned because of the prevalence of disease among them. In other places, where the natural conditions seem favorable to turkey growing the natural enemies of the turkey are too numerous. Again, where the farms are large enough in area they may be of such proportions that it is impossible to allow a flock of turkeys liberty without their being somewhat of an annoyance to neighbors.

Varieties of Turkeys.

Our domestic turkeys are all supposed to be descendants of the wild turkey still found in its wild state in many places on this continent. The wild turkeys are hunted as game; are often captured, and have been quite extensively crossed with the domestic races to restore the vigor of worn out stocks. In appearance the wild turkey resembles the Bronze turkey more closely than any other tame variety, and by some the Bronze turkey is regarded as simply a domesticated stock of the native wild turkey, modified and improved as is usual when wild stocks of any kind are given the more favorable conditions for development which are found under domestication with good care and liberal feeding.

Bronze Turkeys are the largest, hardiest, and by far the most popular of the varieties. An adult cock sometimes weighs over 50 lbs., though the Standard weights are much lower, i. e.,

adult cock 36 lbs.; yearling cock 33 lbs.; cockerel 25 lbs.; hen 20 lbs.; pullet 16 lbs. The Bronze turkey is more popular than all other varieties combined, in most sections where turkey culture is extensively carried on.

White Holland Turkeys are second to the Bronze variety in popularity in many sections. They are much smaller, the Standard weights being, cock 26 lbs.; cockerel 16 lbs.; hen 16 lbs.; pullet 10 lbs. Breeders of White Holland turkeys claim that they are much more docile and have less of the roving disposition of the Bronze, and are better adapted to close quarters or a narrow range.

Narragansett Turkeys are often mentioned as the favorite variety with Rhode Island growers, but in a two days trip through the best turkey growing section of that state with a friend a few years ago we found very few of them, both Bronze and White Holland seeming more numerous. We did, however, see a few very fine specimens of the Narragansett. They are second in size, the Standard weights being, cock 30 lbs.; cockerel 20 lbs.; hen 18 lbs.; pullet 12 lbs. In color they are gray, the plumage having a black ground with each feather tipped with a gray band edged with black.

The other three varieties of the turkey are Buff, Slate, and Black. All are quite rare in this country, and good colored specimens of the Buff and Slate varieties are very rare indeed. The weights for these three varieties are the same, cock 27 lbs.; cockerel 18 lbs.; hen 18 lbs.; pullet 12 lbs.

Accommodations for Turkeys.

The turkey is essentially an out door fowl. Like the goose, it will generally by preference remain out doors in all weathers, though that a part of this preference is due to habit, would seem apparent from the fact that in continued very severe weather when they cannot feed out doors, they seem to appreciate shelter and a comfortable spot to feed in. I kept a few turkeys in a room in my stable one season, letting them run about the barnyard and dooryard, but while the old birds seemed contented to keep within bounds, and were thrifty and bred well, they had to be driven into the shed nearly every night, and the young ones, after two weeks old, were anywhere and everywhere but at home.

Turkey growers generally provide roosting places for their turkeys out doors in a sheltered place where the roosts can be high enough from the ground to protect them from marauding animals. The sheltered side of a barn or other outbuilding is a favored place for the turkey roost. Occasionally a high open shed is used.

On most farms where turkeys are grown, the breeding stock is either not yarded at all, or yarded only during the breeding season, to prevent the hens straying away and hiding their nests. The hen turkey is very cunning in this matter, and I have known of their going a mile or more from home to lay, going and returning daily, and taking many precautions to throw anyone following off the track.

Some turkey growers yard their turkeys during the laying season. Some yard them until after the eggs have been laid each day, giving them liberty then, and of course seeing that

Bronze Turkeys.

they are back in the yard, and the gates closed, at nightfall. When turkeys are confined only during a part of the day, a yard 50 x 100 ft. will do for a flock of twenty hens or less. The fence, if of wire netting, need not be over 5 ft. high. A few turkeys might be kept permanently in an enclosure no larger than this, but when that is done higher fences are necessary, for immature fowls and hens that are not laying fly much more freely than the mature hens do during the laying period.

The Breeding Stock.

For breeding turkeys for market extra large birds are not desirable, especially in the Bronze, which sometimes attains such mammoth proportions. A medium sized turkey, plump in body, fine in bone, and active and vigorous, makes the best breeder. For breeding exhibition stock the largest birds are quite generally preferred, size being of great importance in the show room.

Turkeys mature slowly. The males do not reach their full growth until three years; the females not until two years of age. The male under two years old is not considered desirable as a breeder, and the male three years old should be at his best, and good for service for five or six years.

The usual proportion of males to females is one to ten or twelve, but sometimes a much larger number of females is given. A single impregnation fertilizes all the eggs in a litter, and often all laid during an entire season.

Turkey hens are not usually prolific layers. Some lay only a few eggs, perhaps not more than eight or ten before going broody; few will lay more than twice that number during a single period, and eighteen or twenty eggs per hen is about the average for the entire season, though an occasional hen may lay fifty or sixty.

The hens begin laying in March or April. If they are yarded, nests should be distributed about the yard, preferably in somewhat secluded places. Sometimes boxes or barrels are used; sometimes a good sized coop is made. One grower makes his coops three feet square on the ground, two and one-half feet high in front, and a foot and a half high in the back, with board roof and a good sized opening in front for the hen to go in and out. The hen turkey is sometimes very shy about nesting, and will avoid the nests provided for her. To accommodate such hens the breeder sometimes simply puts a bunch of hay or straw in half concealed places, leaving the hen to fix it up to suit herself. Even when the turkeys are given full liberty it is a good plan to place nests for them near the dwelling house, and prevent the hens wandering off until they have chosen one of these nests and laid in it. After having laid once in a nest the turkey, like other fowls, generally returns to it, though some will change if the eggs are taken from the nest. To avoid this, and still keep the turkey eggs from being chilled or broken, some put a few hens' eggs in the nests, and leave them there constantly, the turkey eggs being removed as laid.

One of the most successful turkey growers of my acquaintance, besides putting nests near the buildings to attract the turkeys, uses a coop as shown on next page to cover and protect the nest a turkey makes for herself in the open, and when the turkey, as often happens, makes her nest in an exposed place where the surface does not admit of protecting in this way, builds such a cover over it as is adapted to the location.

Such precautions as these contribute in no small measure to the success of the turkey grower's work, a point which we will have to take up again and again before the end of this lesson.

When the breeding turkeys have full liberty on such a range as a farm adapted to turkey culture usually affords, they will get the most of their living by foraging, and will require in addition only a little grain. Many growers feed corn exclusively, but a mixture of wheat, oats, and corn is generally preferred. Most of the authorities on turkey growing condemn the use of mashes. I cannot say from personal experience just how far their views are influenced by the effects of the use of poor mashes. In my own limited experience in turkey growing, I found both old stock and young thrive well on exactly the same mash grain ration I was feeding to hens and chickens.

Turkey's Nest Protected by Coop.

Whether a mash is used or not, yarded turkeys must be fed liberally, and with a good variety of food, grains, vegetable food, meat and bone; shell, grit, and water must be furnished in abundance.

Hatching the Turkeys.

In the rearing of turkeys natural methods are used almost exclusively, and as the hen turkey lays so few eggs it is customary to use chicken hens to hatch and brood the earliest turkeys. The general opinion is that the turkeys reared with hens never do so well as those hatched and reared by turkey mothers. One writer who had had a good deal of experience both ways, said of the relative advantages and disadvantages of chicken and turkey hens as mothers: — "I have found the advantages of turkey hens as mothers as follows: — They are more quiet with little ones; are better protectors from hawks and animals; will not wean their turkeys so soon as chicken hens; are kinder to little turkeys other than their own broods; are better foragers; will take their little ones to the range where they can pick insects, grass seeds, etc.; the little ones are not subject to so many lice as when running with a chicken hen. The main objection to turkey hens is, they are troublesome about coming to the accustomed roosting place with the brood and getting them sheltered for the night.

"Advantages of a chicken hen are that the little turkeys will be more tame as a rule than when mothered by a turkey, and the hen always takes her brood to the coop in the evening and puts them to roost, but as the hen is more restless, she keeps the little ones on the move the first few days, when they ought to be very quiet. This can be overcome by confining her to the coop. I endeavor to set eggs under some chicken hens and some turkey hens at the same time, so when the chicken hen weans her brood they will take up with the turkey hen and her brood and all go together."

When chicken hens are used to hatch turkey eggs the nests are made and the hens during incubation handled just the same as for chickens. The period of incubation for turkey eggs is twenty-eight days, is occasionally as long as thirty days, and the same precautions suggested in regard to the selection of hens to hatch goose eggs should be observed. Nine to eleven turkey eggs are enough for a hen. When turkey hens are used for hatching they may if docile be set wherever the keeper wishes, but if wild must be set on the nests where they have laid. A turkey hen can cover fifteen to twenty eggs.

Turkey eggs are almost always fertile, and the only test usually made is a few days (three or four) prior to hatching, when if the eggs are put in warm water, those with live chicks in them will "kick." These may then be returned to the nest, and those that give no motion discarded.

The practice when the eggs are hatching varies just as with those hatching chickens. Some advise letting the nests alone until all eggs are hatched; others say, take the little poults from the nest as hatched and put in a warm place, wrapping them in flannel. It is a point each keeper must determine for himself in accordance with the disposition of the hens or turkeys he is using, and also in accordance with his own experience. One person will examine nests without seeming to annoy hens in the least, while another will find his hens resent any interference. This is due to differences in people, probably cannot be changed, and each must act as his experience shows will give him best results.

The Care of Young Turkeys.

No food need be given the young turkeys the first day, but the mother should be fed. If the nest is so situated that a small pen can be made in front of it, it is a good plan to let the brood remain there quietly for some days. If the nest is not suitably located for this, the brood should be removed to a coop with small run attached. A coop with a board bottom is preferred, as the young turkeys are very susceptible to dampness, and a floored coop is dryer.

The pen for a brood of little turkeys should be made of boards twelve to sixteen inches wide, set on edge, and enclosing a space about eight feet wide one way by twelve to sixteen feet the other. The little turkeys are at first much less active and rugged than little chickens, and should be confined to this pen for about ten days. It is better that, if possible, this pen should be on grass land, for little turkeys, like goslings, want green food from the start. If they cannot have a green run green food should be provided. Grit and charcoal must also be provided, and lice must be kept down by dusting with an insecticide the same as with young chickens.

Most authorities insist on the necessity of altogether avoiding dampness, keeping the young

Turkey's Nest in Cleft of Rock, with Loose Boards.

poults up while the grass is wet; but some of the most successful growers I have known let their turkeys range freely after they are strong enough, and say they observe no ill effects from such wettings as the chicks get. Indeed, their opinion is that this way of life is much better than the coddling methods.

While the young turkeys are confined to coops the ground under them and the coop itself should be kept clean. With the ground shifting the coop is all that is necessary if there is opportunity to do that. The coop must be kept dry, as well as clean. In wet weather when the floor becomes damp it should be cleaned daily, and a liberal sprinkling of dry earth, or fine dry litter be applied.

By the time the young turkeys are two weeks old, if not before, the pen will no longer restrain them. Their roving instincts become plainly manifest, and in a very short time after they begin to go over the low sides of the pen they will go over fences four or five feet high with equal ease, and begin to make quite a circuit in foraging. Whether with hen or turkey mothers they require a good deal of watching at this age. In fact while on a good range the turkeys pick a considerable part of their living, and need be little expense for food until fattening time arrives. They require more or less watching throughout the season, and an essential factor in successful turkey culture is to have someone keep an eye on the flock almost constantly to see that they do not wander too far, are not overtaken by violent storms, or picked off one by one by their natural enemies.

Feeding Young Turkeys.

In the poultry literature of a decade ago, instructions to turkey growers make much of the matter of the correct feeding of young turkeys, and each writer was, as a rule, positive that his way was the right way, and the only right way to start young turkeys. This is a point that has come up before in these lessons in our discussions of the feeding of other kinds of fowls, and I presume the reader is therefore anticipating the statement that there are numerous good ways of feeding. A few of these are presented herewith, some dealing briefly with the early feeding only; others giving directions for feeding throughout the season:

Ration I. *For Young Turkeys.*—"After about thirty-six hours old, or after the hen leaves her nest, we feed for three or four meals, equal parts of hard boiled eggs and stale bread. After that mostly stale bread moistened with milk. For two or three weeks we give curdled milk to drink. After two weeks we mix a little red pepper with the bread twice a week."—CRANGLE.

Ration II. *For Young Turkeys.*—"Our first feed is bread and milk, with the milk so pressed out that the bread will crumble. This is fed for the first two weeks, after which the feed is gradually changed to milk curd and meal, one-half part each, and a little cracked corn is given at night."—CURTISS.

Ration III. *For Young Turkeys on Good Range.*—"The first feed I give is milk curd, with onion tops and tongue or pepper grass, cut very fine, seasoned with black pepper. I give this morning, noon, and night. It is a mistake to feed very often, or too much while they are young. If poults are fed three times a day from the time they are hatched until they are grown, they are fed often enough. Yet they must have something to pick all the time, hence I would advise that they be kept in a grass yard where the grass is kept low.

"As they grow older I add other things to the food. Table scraps are splendid for them. If I have infertile incubator eggs I boil them and mix with the other food, but never use fresh eggs, simply because I do not consider it necessary. I give milk instead of drinking water when it is plentiful. I keep grit constantly before them. Wheat is one of the finest feeds for young turkeys. Cracked corn is splendid when they are older. My rule has been to mix grains of wheat in the food from the first, so that when they are old enough to change from curd to grain it will not be so hard to change foods."—MRS. MACKAY.

Ration IV. *For Turkeys from Shell to Market.*—"I feed poults every two hours until about ten days old, giving stale light bread softened in sweet milk, (or water),

squeezed dry, mixed with hard boiled eggs, including shells finely broken. This food is alternated with bread and clabber cheese, oat flake and egg, or cheese seasoned with a little salt and pepper. After the little ones are about a week old I begin mixing a little whole or cracked wheat, indian corn, Kaffir corn, or millet with the cooked food, and thus they learn to eat grain. Always try to feed no more than they will eat up clean each time. When they are about a week old I begin to drop the white bread, and give them instead what I call a brown light bread made the same as white bread, using one-half white flour, (a cheap grade will do), and the other half about equal parts of shorts and bran, with a handful or two of corn meal. The meal makes it crumble easily. The bread should be allowed to dry for a day or two before feeding; if fed fresh it may choke the poults. I gradually drop the white bread and eggs, and feed instead the brown bread and cheese. When about six weeks old they have become accustomed to the grain food, which, since they were three weeks old, has been kept by them in troughs in coops so constructed that the little turkeys can get in and the older fowls are kept out. By the time the poults are nine or ten weeks old I have dropped the soft or cooked feed to once or twice per day. By September the older poults are dependent upon grain food and range. For fattening I had good results with a mixture of grains proportioned as follows: Two bushels whole corn, two bushels cracked corn, one bushel oats, one bushel Kaffir corn."—Mrs. HARGRAVE.

Ration V. In *All Corn Ration*. — "Successful Rhode Island growers, as a rule, feed their turkeys from start to finish on northern white flint corn, which they grow themselves. They take great pains to feed nothing but well seasoned old corn, because they have found that new corn causes bowel trouble. Turkeys not only like northern flint corn best, and fatten best on it, but it makes their flesh more tender, juicy, and delicious. That given the little ones is coarsely ground, and mixed with sweet or sour milk, or made into bread that is moistened with milk. This is gradually mixed with cracked corn, which, when they are about eight weeks old, is fed clear or mixed with sour milk. In the fall whole corn is given. After June 1st those at full liberty are usually fed but twice daily. They are hunted up and fed in the fields, that they may stay away from the farmyard and out buildings. Many give the turkeys no food from August 1st until cool weather. They get their own living until they come up from the fields in September or October. Upon the approach of cold weather they come to the house to be fed, and thereafter roam but little.

"To fatten them for Thanksgiving, they are fed in November all the whole corn they will eat three times per day. It is not necessary to coop them. The full feeding causes them to rest and sun themselves. Dough is not much used for fattening in Rhode Island. One grower who gives it every morning, and whole corn at night, mixes condition powder with the dough, and finds it causes them to eat more and gain faster. Some raisers give a little new corn mixed with the old at this time, but most consider it safer to feed clear old corn. It is not best to heavily feed turkeys that are to be held for a later market, or those to be kept over for breeding."—CUSHMAN.

Supplementing these rations let me say that in an extended trip among Rhode Island turkey growers, I found it the general opinion of the more successful that with other conditions favorable, the method of feeding was not of great importance, provided the young turkeys got enough to eat, and a variety. These successful turkey growers also agreed that *care* was of first importance, and one woman who was said to have been uniformly successful for many years, made the following interesting observation on the subject of care in relation to feeding; she said that the only difference she could see between her method of handling turkeys and that of various neighbors who were less successful, was that she made it a rule to hunt the turkeys up in the fields on wet or dull days when they did not forage freely, and when insects to be secured by foraging were far less numerous than on bright days, while most of her neighbors fed the turkeys on fine days when food was more abundant and more easily

obtained, and sat indoors and left the turkeys to shift for themselves when the weather was bad. When left to themselves with opportunity to range freely turkeys will usually leave their roosting place in the morning and make quite a wide circuit of the fields and meadows, terminating late in the day at the point from which they set out. I well remember how when a boy I used to go occasionally to the farm of a relative who reared every year a flock of 100 to 150 turkeys. There were several boys in the family, all then quite small, whose duty it was to take turns in guarding and herding the turkeys to prevent their scattering and stragglers being lost. It did not require constant attention, but the turkeys were rarely left alone for more than an hour at a time when out of sight of the dwelling. With this constant attention the losses were very small, and at the end of the season the addition to the family income resulting from the sale of the turkeys was quite a substantial amount.

The opportunity for someone whose time is not required for other work to give this intermittent but regular care to the turkeys is almost invariably a feature of successful turkey grow-

Turkey Roost in Shelter of Barn.

ing. Their roving habits make them especially open to attacks of their enemies, and unless they are watched quite closely, all that they represent may be lost in a very short time. For this reason it is generally more satisfactory in the end to grow a flock large enough to make the watching worth while, than to grow a smaller number and let them take their chances.

Turkeys are salable throughout the year, but the best demand and best prices are for "Thanksgiving turkeys." In some of the eastern markets there has grown up within a few years a demand for "turkey broilers," that is, young turkeys weighing three or four pounds each. These are wanted during the summer months, and the prices paid for them are good enough to make many growers prefer to market them then rather than take the risk of carrying them until fall. In eastern localities where turkeys have been long grown on the same ground, losses from disease are often heavy, and the most troublesome diseases develop after the turkeys are a third to a half grown. The grower who anticipates trouble may sell his young turkeys as fast as fit for broilers, but those who expect to carry them through with slight loss generally prefer to hold them for the winter market.

The turkey grower generally sells all that are ready at Thanksgiving. When the fall has been

favorable for fattening, this takes most of the early turkeys. Then for the Christmas market as many as possible of the later turkeys are slaughtered, and what are left are sold as they become fit.

The dressing of turkeys requires no special description. The methods employed are the same as for chickens, ducks, and geese — dry picking being advisable for all stock to be sold in an eastern market. It is in catching the turkeys to kill that precautions not so necessary with other fowls must be taken to prevent these nervous, shy, and heavy birds from bruising themselves and so damaging the appearance of the dressed carcass, and reducing the price. When the turkeys have been accustomed to roosting in a shed, catching them properly presents no difficulty. When they have roosted in trees or on poles in the open air, catching them requires special care. The method has been described as follows:—

“The usual plan is to get the birds into a barn or carriage shed, and shut them in. In order to do this, they are fed for a long time in front of, or just within the place where they are to be caught. Later, the feed is placed within the building, and they become so familiar with it that they are unsuspicious when within. When they are to be caught, the doors of the building are suddenly closed; or a covered yard of wire netting is built in front of the building and closed when all are in. Usually when they find they are confined they become frightened, and fly back and forth, or huddle up in corners. * * * To overcome this drawback, certain raisers have improved the usual makeshift catching place by building a long, low, dark pen back of the barn or shed. This pen extends alongside of the building, and is at right angles with the entrance to it, and at the extreme end is about two feet high. Up to the time of their being caught, the end is left open, and the birds frequently find their way through it. When they are to be caught, only what the pen will comfortably take are driven in. They do not discover that the end is closed until it is too late to turn back. The turkeys that are not to be caught, are first driven away; otherwise they may be alarmed, and become unmanageable. No turkey that is thus caught, and has learned the mysteries of the trap is ever allowed to escape, or its suspicions would be communicated to the others. When shut in this pen they are quiet, and when a man goes to catch them, there is no struggle; he simply reaches out and takes them by the legs. The pen is too dark and narrow for them to fly, and too low for them to crowd one upon another.”

LESSON VI.

Possibilities and Probabilities in Poultry Culture.

IN THIS lesson I am going to depart a little from the usual plan of the lessons. There are several reasons for doing this. First of all — the subject is too big for a lesson of the usual length. Next, I think it can be presented most effectively by treating it in three principal divisions. And, finally, I think that the points it makes in the concluding division will be much more generally appreciated if illustrative examples are used much more freely than has been found practicable in the lessons in general.

So we take the subject up in three sections. The first section will consist of a reprint of a part of a lecture given by me at various places some years ago, and published in full in the issue of this paper for August 15, 1902. The second section will be in narrative form, and will tell of the poultry experiences of a large number of persons—both those who have failed, and those who have succeeded in poultry keeping. The third section will give in systematic form a statement of conditions and circumstances making the possibilities, or affecting the probabilities of success in any line of poultry keeping.

I hope to be able in this way so to present the subject that anyone can determine for himself what is best for him to do, and what lines it will be most advantageous for him to follow.

Why the Failures in Poultry Keeping.

It is commonly asserted that over ninety per cent of all business ventures fail. On what authority this assertion is based I have never been able to learn, but I have very strong doubts of its accuracy. It is also commonly believed that the proportion of failures to successes is very much larger in the poultry business than in almost any other line.

If this is so, and if the general statement in regard to business failures is correct, the percentage of successes in poultry keeping would have to be very small indeed.

It is not now, and perhaps never will be, possible to get accurate data on this point, but we can still make comparisons which will have some value in indicating the relative number of failures among poultry keepers. Some months ago, just to satisfy my own curiosity, I took a copy of a poultry paper for March, 1891 — ten years ago — and went through the classified advertisements in it, checking the names of advertisers who, to my knowledge, were still engaged in the poultry business, and including with these the names of a few who had died while active in the business. Of 240 persons advertising stock in that paper of ten years ago, I found that 50 — more than twenty per cent — were still engaged in the business. As I omitted the names of a number I think (but do not positively know) are still in the business, and as it is probable that a number of the others of whom I know nothing at all are still in the business, perhaps a thorough investigation would show nearly as many more still interested in poultry keeping. So that that method of getting an indication of the proportion of failures would indicate that they were not more than sixty to sixty-five per cent.

But with the best showing that could possibly be made in this way, it would still remain true that a majority of those who undertake poultry keeping — whether for profit or pleasure — fail to realize on their expectations; and as we can only judge what is to be by what has been — making due allowance for general progress — we have to consider it as improbable that the proportion of failures to successes will be much reduced in the immediate future.

Then putting the matter in its most favorable aspect we have to say that more than half of those who engage in poultry keeping will make a failure of it. In other words, that when one undertakes poultry keeping the chances are against his success.

If every prospective poultry keeper could be made to appreciate this before he begins, the proportion of failures might be so much reduced that successes would preponderate; but, unfortunately, nearly every beginner thinks himself, or herself, the talented and favored or exceptionally industrious person who is sure to succeed, and therefore neglects to take the necessary precautions to avoid failures, even when advised of them.

With very rare exceptions, those engaging in poultry keeping on any considerable scale begin without any adequate practical knowledge of the conditions, requirements, and methods of the business. Sometimes they have had a limited experience with a few fowls; but quite as often they have had no actual experience, and a very limited and superficial information. If they happen to have abundant capital to carry on the business until they have learned in the costly school of their own experience what they ought to have known before investing a

View of Grandview Poultry Yards, Aurora, N. Y.

dollar, they may make a success of it — may finally make the business pay its expenses, and give them a living besides; but the greater part of the original investment, and also of the expenses for several years, may have to be charged off to cost of acquiring experience — that is, cost of learning the business.

But the most serious cases are those of people with limited means who go into poultry keeping expecting it to yield an income sufficient to meet all expenses and give them their living almost from the start. These people engage in the business with two ideas which I think are either separately or jointly responsible for their undertaking it — both of which ideas are radically wrong.

The first of these ideas is:—that poultry keeping is very easy, that there is really nothing to learn which any person of average intelligence cannot acquire at once and almost without effort as soon as ever he gives his attention to the subject, and that the fowls require so little care that their owner has light work and a great deal of leisure.

The second idea is that the profits of the business are very large, and the margin of profit in each of the branches of the business so good that even if there are losses due to inexperience these cannot possibly be heavy enough to make the business run behind.

Novices are not wholly to blame for these errors unless they persist in them after the facts have been clearly presented. The people most to blame are the interested parties who circulate such ideas. But, as far as my observation goes, the greater number of persons who once

Feeding, Watering and Egg Collecting Cart Used on a Rhode Island Farm.

become deeply interested in poultry, and decide to venture into it will take bad advice in preference to good every time. I suppose this is because the bad advice is more in line with their hopes and wishes, and because those who give them good advice will admit that though the chances are very much against the success of a business established on the basis they propose, there is still a chance that intelligent application and hard work will pull them through.

The daily care of poultry is neither as easy as some think it, nor as hard as some others make it. It is easy when you know how, and, unless you happen to be one of those who utterly lack natural aptitude for handling live stock, you find it neither a long nor a difficult task to *know how*. But whoever without previous experience undertakes the care of a large stock of poultry, soon finds himself in the predicament of every man who undertakes to do or to learn too many different things at once.

There is a very great difference between doing work well and doing it profitably. Permanent success in any line of work depends, as a rule, upon doing it both well and profitably. The workman must combine thoroughness with a considerable degree of speed,—he must have skill and facility. Skill and facility come only as the result of thorough practice so long continued

Chickens in Corn Fields, on Farm of Knapp & Son, Fabius, N. Y.

that a piece or kind of work becomes largely mechanical, head and hand working together without conscious effort to keep their operations in harmony.

The novice in poultry keeping who undertakes to establish and manage a plant all by himself, has a great variety of unfamiliar things to think about. As the Irishman expressed it in his parody on Poe's well known poem, "The Raven," he has to spend a great deal of time and gray matter in "thinkin' thoughts he never thought of thiukin' of before." He also has to learn to do a number of things quite new to him, and as a result he does a great deal of hard work both mental and physical, and has very little to show for it.

Frequently he has never even seen a well equipped poultry plant, and has no knowledge at all of good methods of doing the work on his plant. Often he makes very hard work of very simple things just because he has no one to tell him or show him what to do.

But, after all, the work of caring for the poultry and the worry which this work causes an inexperienced man or woman constitute the least part of the inexperienced proprietor's real troubles. Even before this work begins he is called upon to decide matters of deepest importance to the success of his business while, as yet, his opinions on the subjects involved are not worth a cent to himself or to anyone else. The result of this is that such beginners are constantly doing things which to persons having any real working knowledge of the business, and likewise to all persons in the habit of exercising plain practical common sense appear incredibly stupid and altogether inexcusable.

I had some correspondence not long ago with a man who was having a great deal of trouble with roup and rheumatism in his flock. He used the most approved remedies for both without securing any permanent improvement in the general condition of his flock. After repeated inquiries as to conditions I learned that his houses were located on low damp ground, where both soil and atmosphere were objectionable from a poultryman's points of view. His houses were only dry in periods of drouth, and often there was stagnant water all around them. He had not even the excuse of having had the place already on his hands before he went into poultry to offer, nor could he plead that he did not know that the location was unfavorable.

He had bought this land for a poultry farm because he had made up his mind to try poultry keeping, and this was the only farm he had been able to find within the limited time he allowed himself to find a farm that came within his means, and he had thought that even with the disadvantages of this location he could — by giving his fowls special care — make enough in a few years to buy a more suitable farm.

I could give numerous similar instances where people have deliberately gone contrary to the known teachings of experience, because that experience not being personal to themselves, they could not realize the danger and folly of rejecting its lessons. Had they learned the business first under a competent instructor they would not have been likely to go badly wrong, for the habit of doing a thing right often keeps one out of trouble, even if he does not understand the reasons for the method he uses — and has never seen a practical demonstration of the consequences of doing that particular thing in some wrong way. Someone has said, "Success does not consist in never making mistakes, but in never making the same mistake twice." I don't think that assertion will bear a very close analysis; very few generalizations of the kind will; but it certainly has a great deal of truth in it.

As I look back over the years when I was learning poultry keeping—experience made largely of mistakes—I recall that at the close of each season I used to note, in reviewing that season's work, that my marked progress had been principally along the one or two lines in which I had found most discouragement and loss in the previous season, and to which I had therefore given most thought and attention; and in the next season work on those lines was comparatively easy, had perhaps advanced to the mechanical stage, and more time could be given to some other troublesome matter.

This was progress, and there was a certain satisfaction in working things out for oneself, but it was a slow and laborious progress, and the cost was enormously greater than if I had learned the business in the right way.

There is another way in which poultry keeping is hard for most people—and very hard for some—which few think of until they learn it by experience.

The business is very confining, and so in time becomes monotonous.

Then it becomes a question of whether the poultry keeper can take up some form of recreation that can be adapted to such leisure as he can secure, and furnish relaxation which will break the monotony of his work without interfering with it. If he cannot do this—and if he is of such a disposition that he cannot stand the monotony of the life, he is very apt to begin to cut his duty here and there to get time for favorite pleasures, and when he does this the finish of his venture is only a question of time.

The poultry keeper—like all who have the care of live stock—has to give the real needs of his stock precedence over all ordinary claims upon his time and attention. The care of the stock will frequently require long days of labor extended far into the night, loss of sleep, and denial of many pleasures.

“Business first” must be his invariable rule, for there is no other line of work in which the penalties of slight infringements of that rule are more sure or more quickly felt. Whoever finds it too hard to follow that rule will fail in poultry keeping.

A common cause of failure—which is in part the cause of by far the greater number of failures in poultry keeping—is a lack of sufficient capital. Any business undertaken with insufficient capital is heavily handicapped at the start. In poultry keeping it is almost the rule for men to begin with an amount of available capital which is insignificant in proportion to the amount actually required by their plans.

Those supposed authorities on poultry keeping who have so industriously preached that the poultry business requires smaller capital and will yield larger returns on the investment than any other, have a great many failures to answer for, and so have those who have advised prospective poultrymen to go ahead on a capital which they could not help knowing was insufficient.

While I blame such persons for misleading people, I have not as much sympathy as some have for those who allow themselves to be misled, and have not much patience with them when they try to put all the responsibility for their failures on those who advised them badly, because too many such cases come to my notice where people have also been given good advice—but have followed the bad because it was more in accordance with their desires.

I sometimes think that most of the people who ask advice about going into the poultry business are simply looking for encouragement to go ahead with plans—which are often very peculiar plans,—and keep asking until they get the kind of advice or encouragement they want. In such cases as this, both adviser and advised are equally responsible for the failure, but the division of responsibility does not diminish the share of either.

Far too many of those who build poultry plants have not capital enough to properly equip and stock them—to say nothing of running them until the profits begin to appear. And so financial worry is added to all the other worries. The poultryman goes into debt—practically mortgages his receipts for months in advance—carries on his business in a hand to mouth way, neither buying nor selling to best advantage; interest eats up a large part of his profits, and finally he is forced to the wall.

Lack of business ability is responsible for many failures.

It is very difficult—if not quite impossible—for one who is not a fairly good business man to make much of a success of poultry keeping, and in some branches of the business a man is seriously handicapped if he is not a good correspondent and salesman.

My observation has been that the poultrymen who lack business ability—who are deficient in the trading faculty, seldom realize that the fault is with themselves. Many of them are disposed to quarrel with the conditions of the business and to imagine all kinds of crookedness and meanness the most substantial aids to the advancement of their more successful competitors.

I suppose that in New England it is not necessary to dwell long on the lack of business ability, for Yankees are supposed to be born traders, and if a genuine Yankee fails in poultry keeping we have to lay it to one of the other causes.

The three things named—inexperience, lack of capital, and lack of business ability, I consider the principal causes of failures in poultry keeping; but, besides these there are numerous minor causes which frequently prevent success, or turn most promising prospects into failure.

Perhaps in a strictly systematic treatment of the subject some of the minor matters should be classified under the others and considered as subordinate to them; but I do not think that to do so would give them any more force, and it seems to me much the better way to consider them independently.

A number of errors similar to that of selecting a bad location, which has been mentioned, are common. Sometimes these errors are the results of inexperience, sometimes they are due to the prejudices or follies of poultrymen of experience enough to have acquired good judgment in the matters involved. Of this kind are errors in poultry house construction—not the minor errors, but the big mistakes—the mistakes that are so absurd that they are serious. There are a great many poultrymen—and not all of them inexperienced novices—who, when they get an idea which they think would work well in a poultry house, are not satisfied to test it on a small scale first, but must apply it, at whatever cost, to one large building at least—if not to the whole plant.

Breeding House at Jordan Farm, Hingham, Mass.

There are hundreds of poultry houses in this country where the incorporation of a few "original ideas" is costing a great deal in extra work and wasted time; hundreds where wrong construction makes it unnecessarily hard to keep fowls healthy and productive. There is absolutely no excuse for this, for the construction of a good poultry house is about as simple in theory as the construction of a good dry goods box, and it is hardly more difficult in practice.

Too many people seem to think that changing a good plan is improving it, especially if they think the idea of the change original with themselves; and such people are not apt to accept the testimony of others as to results of putting their ideas into practice. As a rule the miscarriage of their plan will convince them that it is wrong.

In justice to the general good sense of poultrymen, however, it ought to be said that the majority of them are quick to see errors of this kind when use brings them out, and would be quick to correct them if they could take time to do so, or could stand the expense.

A great many poultrymen lose time and money by clinging to poor methods of doing work. Indeed, almost all poultrymen lose in this way. That is one of the disadvantages of being mostly self taught in anything. One works out a poor method, and after that becomes a habit finds it hard to change. I have known large poultry farms developed from very small beginnings where methods which were all very well for a few dozen hens and chickens, but wholly inadequate to doing the work economically for a few hundreds, were continued when the number of fowls and chicks aggregated several thousands.

If this fault occurs only at one or two points it may not make the larger business a failure—though it will surely cut the profits; but if it is general it is sure to make a failure, and it is because they do not develop methods suitable to their increased stock that so many poultrymen who are successful on a small scale fail to do well on a large scale.

After a poultry plant is once built and stocked the most important item of expense is the

Copons in Colony Houses at Jordan Farm, Hingham, Mass.

labor. The cost of feed may be greater, but the cost of labor is more important because more difficult to regulate.

A well known poultryman once said — referring to someone else's habit of getting up early and having a great part of the routine morning work on his plant out of the way before breakfast—that there was no need of getting up so early if one would lie awake long enough at night to plan easy ways of doing his work.

I don't think he meant this to be taken literally. I imagine his idea was to convey as forcibly as possible the idea that to learn to work well—particularly where there are many different tasks to be fitted into a day's work—one must do a great deal of thinking and planning for the work.

A half an hour is not very much time; but see what a saving of time a poultryman would effect who would so rearrange his work, or so improve some method that he would save a half an hour a day. Most poultrymen work 365 days in the year. A half hour saved each day would mean in the aggregate three weeks of six days of ten hours each—an item worth looking after. This time, properly used, would enable many a poultryman to do a great many

things left undone for lack of time — there are plenty of such things on the average poultry plant — or take a little needed recreation.

There are a great many old poultrymen who have their work so well systematized that it would be hard to plan such a saving in time as this. The old hand's shortcomings in such matters are generally limited to occasional tasks. His regular work as a rule he has, as the saying is, down fine. But nearly all beginners, and most of those who, after a few years hard work, are still creeping along on the ragged edge of failure, could save much more than a half an hour each day.

The old method of learning a trade, when a boy worked as an apprentice for a number of years, and then as a journeyman traveled about, working a short time in each of a number of places, is the ideal way of learning poultry keeping. I sometimes think that we will never know just what can be done with poultry until we have among poultrymen a considerable number of bright intelligent men who have grown up in the business, and thus learned it more thoroughly than most of those who pick it up later in life ever can know it. When that time comes we may look to see successful poultry plants on a very large scale — and until then I do not think we shall.

I have already referred incidentally to the aptitude for the work of caring for live stock as a factor in successful poultry keeping. If we attempt to analyze this faculty we find that it consists mostly of good judgment as to the condition and needs of each animal; and if we try to learn the history, or trace the development of this faculty in individuals, we find that it is a natural talent developed by experience and training. Where the talent is conspicuous, the person possessing it will be quite successful from the first with almost any kind of live stock, and in time will become notably successful. Where it is of less degree, experience and training — in inverse ratio to the amount of talent — are required to make one proficient in the management of live stock. Where this faculty or talent is wholly wanting, I do not think it possible for the person so deficient to ever attain any respectable measure of success. His occasional successes will, as a rule, be purely accidental. The proportion of persons thus deficient is probably small — or appears so because few of them attempt to go into stock breeding. Yet, first and last, a great many such persons do engage in poultry keeping, and if they are of persevering disposition, peg away at it for a long time before they come to a realization of their unfitness for the work.

A very common idea, which seems to me wholly wrong, is that love of animals is an important factor in ability to manage them well.

A great many prospective poultry keepers mention that as the first and most important of their qualifications for making a success with poultry.

As far as I have been able to analyze the conditions of success in handling live stock, a love, or strong liking for animals, and good judgment in caring for them are two entirely independent attributes. They are frequently found existing together, and sometimes one helps the other; but an excess of affection for animals is apt to bias one's judgment as to their needs. The cultivation of the calculating spirit in considering animals is quite essential in one who keeps them for profit, and this spirit is likely to develop a very cold blooded matter-of-fact brand of the article called love.

A strain of fickleness in a person's character is likely to develop in various ways when he engages in poultry keeping, and nearly always in ways detrimental to the success of his business in poultry.

Perhaps the most noteworthy illustration of this is found in the case of persons who are continually changing breeds of fowls, never keeping any one long enough to know what it is or what they can do with it. It takes several years of careful handling and close observation to show one just what his stock is, and if he is breeding for fancy points generally several years more are required to get the stock on such footing that he is at all sure of results from it.

This being the case, it is as clearly impossible for one who changes breeds every year or two to make any perceptible progress as it was for the frog in the well which, in the catch problem in the old mental arithmetics, was said to crawl up three feet every day, and slip back four feet every night.

Just at present a desire to be progressive and scientific is hurting a great many novices in poultry keeping.

Poultry and agricultural papers have published numerous articles about the science of poultry feeding, written by persons who knew very little of either science or feeding, and the general impression these have given people who have not learned feeding by practice is that the ration can be, and should be, compounded according to a mathematical formula, and exactly balanced to suit the needs of the fowl—or the requirements of the keeper—the two being assumed to be synonymous.

Now the scientific investigation of articles of poultry food, and of results of methods of poultry feeding is a necessary work which will, in time, no doubt arrive at some important results; but the folly of persons who have not the judgment and skill to take a tested ration, recommended by experienced feeders after years of use, and keep a stock of fowls healthy and productive on that ration, trying to compound rations by formula, and feed them by weight is something truly appalling; and the number of those who are frittering away their time and money while trying to make figures and weights do work for which nature, if she intended them for poultry keepers gave them brains and eyes, is very much greater than is commonly supposed.

Unless restrained within very narrow limits, the disposition to experiment and investigate may prevent one from making poultry keeping financially successful.

Experiments are expensive, and comparatively few of them yield any immediately useful practical results. If carefully and thoroughly followed out, experiments invariably take more of one's time and thought than he intended they should, and it all comes out of time and energy which, if used for work of which the results were practically assured in advance, would help instead of hindering success.

To some, experimental work is in the line of recreation, and in this way it is all very well if not allowed to interfere with regular work more than a recreation should; but, on the whole, and as a general rule, it is much better not to engage in it until one's poultry business is on an assured basis. Even then it must be indulged in but moderately by those keeping poultry for profit. Let them leave it to those who keep poultry for pleasure, and to the experiment stations.

Many who try to make the breeding of fancy or exhibition poultry profitable, fail because they are not, and never can be, fanciers.

To be a successful fancier one must be something of an artist, with a keen appreciation of the points that go to make the ideal fowl in his variety. The artistic faculty is generally a birth-right. As the saying goes: "Fanciers are born, not made." Their talent improves with use, but, if small, cannot be developed by training to the same extent that a moderate aptitude for the care of stock may be.

It has seemed to me very noticeable among poultrymen of my acquaintance that the best fanciers have seemed to show from their first acquaintance with a breed or variety a correct appreciation of what a fowl of that breed or variety should be, even though it might be some years before they learned how to produce the desired types from their matings; and it has seemed just as noticeable that others, after years of studied and persistent effort, were as far away from producing what was commonly desired in fowls of the breed they handled as they were at the beginning. In some this was evidently due to inability to appreciate all the details of beauty in the best representatives of the breed. In others it was as clearly due to the absence of a disposition to harmonize their personal tastes with accepted ideals or standards.

The successful fancier must not only have good artistic perceptions, a good eye for form and color, but his practical success depends upon his being conventional, upon being one of those whose ideas naturally harmonize with ideas prevailing about them.

So—it is possible for anyone to make practical test of whether his artistic perceptions are of the degree and quality necessary to make him successful as a breeder of fancy poultry. To make such test he has only to compare his judgment of his birds with that of others, especially of good breeders and competent judges. He will find these agreeing in the main, though often differing in particulars.

LESSON VI.

SECTION II.

Some Typical Ventures in Poultry Keeping.

HERE is one of the most remarkable successes in poultry keeping. Less than twenty years ago a laboring man of foreign birth, living in New England, bought a worn out farm, paying a small amount of cash, and giving a mortgage for the balance. In all his life this man had never earned over a dollar and a half a day. He was industrious and frugal. His wife was the worthy helpmeet of such a man, doing her share to make his slender earnings go as far as possible. His children were trained in the industrious and thrifty habits of their parents, and at the same time given good common school educations.

At the time this farm was bought the sons of the family were young men, working generally, as I have been told, by the day for farmers and others in their vicinity. After the farm was bought the father and his several sons continued day's works for others, carrying on the operations on their own farm at such odd times as their services were not in demand elsewhere, and in this way turning all their spare time to good account.

In their efforts to make the farm profitable they tried various special lines, among them poultry keeping. They established quite a flock of practical thoroughbred fowls, and found them increasingly profitable, and were gradually increasing their equipment and stock, when in some way their attention was turned to duck growing. Just how this came about is not, so far as I have learned, a matter of record but in view of the fact that this was just at the beginning of the great boom in market duck culture there is nothing at all strange about it. And then there was located not many miles from them, the farm of one of the pioneer duck growers in this country, a man who was doing a large and growing business in market ducks. Had the interest in duck culture been less widespread than it was they could hardly have failed to hear of this man and to be interested in what he was doing. They visited him and decided to begin duck growing in a small way. Within a few years their business had so increased that the entire family were giving all their time to it. The farm had been paid for, a plant representing very much more than the value of the land had been erected. (Though a large plant, it was by no means an elaborate one). Their joint incomes were steadily increasing; they had ample capital to meet the growing demands of their growing business, and secure correspondingly larger returns on the amount invested; the farm acreage was gradually made more productive; new houses were erected. In less than ten years from the start on that farm their business ranked among the first poultry businesses in this country, both in volume and profitability.

About the same time that operations began on this farm some members of an enormously wealthy family—men, too, who had made their money, and are still making it in their regular business,—established a poultry farm only a few hours distant from that I have just briefly described. They had unlimited land and unlimited capital. They hired a manager at a good salary and built an expensive plant. They went into it for profit, not for fun; but when I saw the plant about ten years after its opening, I was told by one who knew its financial condition intimately, that the plant represented a net loss to its owners of over \$20,000. They were men who could stand even heavier loss without financial or personal inconvenience, but they were not willing to run the plant at a loss. That was not what they operated it for. They

House for "Winter Chickens" on a "South Shore" Farm, H. D. Smith, Norwell, Mass.

hired another manager, who was able to make a better financial showing,—yet not, as I judge from the fact that he remained but a few years,—good enough to be encouraging either to him or to the proprietors. The plant represents too much dead capital, and its manager, however competent, would always find himself handicapped in various ways. I am not able to say in just what condition the plant now is, but there is little likelihood of its ever being made profitable enough to wipe out the heavy deficits of its earlier years and leave its owners square.

A good many years ago there were two brothers, young men and unmarried, who jointly bought a little farm away back in the hills in central New York. They had but little money to pay down. Together they worked the farm in summer. In winter one ran the farm and the other taught the district school, assisting with the chores mornings and evenings. They went on this way for several years, making a bare living and just keeping up the interest on the mortgage on the farm.

As they worked together they used to discuss various methods of making the farm more profitable. Their attention was finally drawn to the possibilities of profit in poultry, and after talking it over they concluded—to go into the poultry business?—Oh, no;—to keep strict account for the little flock of fowls they had on the farm, and see for themselves what they could make from a small number.

The flock consisted of less than a score of ordinary fowls. The profit on this flock was so satisfactory that they increased the flock,—about doubled it. That was still a small flock, not at all up in numbers to the ideas of the average beginner of the number with which it is worth while to make a start. The third year they increased in about the same proportion, the flock being still below the hundred mark. After that the same rate of increase made large additions to the flock every year. They began to get into thoroughbred stock; went to local shows and won prizes; went to New York and won more prizes, and began to sell eggs for hatching and exhibition and breeding stock at high prices. Money began to be easier with them. They left the small farm and bought a larger and better one more conveniently located. The profits on poultry gave them the means to enlarge other farm lines.

Their "fancy" poultry business was but an accessory of their work in practical lines. As soon as they began to have eggs to sell in quantities, one of them went to New York and looked up special customers who would pay extra prices for a good article. Finding the demand too great to be filled by their own supply, they began to collect eggs from their neighbors, and gradually extended the circle of collections until, when I visited the farm last, they were handling about \$25,000 of eggs a year. The farm is one of the finest in that section. One of the brothers retired from the firm a few years ago, and the one who remained and his son continue the farm along the same lines. They are also interested in many outside enterprises. The head of the firm said to me a few years ago: "Our poultry gave us our start. We have made more money since from other things than we ever did from poultry; but poultry has always paid us well."

A few years ago a stranger stepped up to me at a New England poultry show, and said: "You were pointed out to me as the editor of FARM-POULTRY. I've just won a lot of prizes here, and I want to advertise in your next paper. I want a big space, and I want your best terms. I've spent a lot of good money for birds to show, and now I want to do business. I believe the way to get business is to sling printers' ink. I've got plenty of money, and I'm going to sling it." By "it" he referred, of course, to the ink first, but indirectly, I suppose, to his money. He had bought a fine farm. He put up expensive buildings. He took in a poultry fancier of more experience as partner. He remained in the business less than two years.

A man engaged in a manufacturing business bought a small farm inside the city limits for a home. There was room for a garden, cow, and of course some poultry. He had never taken any special interest in poultry, but fowls were a necessary part of the equipment of such a place, so he bought a few—just to keep the family in eggs.

Having the fowls he felt that he must know something about fowls—so he began to read a poultry paper. It happened to be FARM-POULTRY. Reading it he became interested in several features in poultry culture. He built a broiler plant, and made something of a reputation in broiler raising. At the same time he began to breed one of the most popular varieties of fowls. He exhibited, and won prizes. He advertised in a small way at first, gradually increasing as his stock and trade warranted the expense, until in a few years he had one of the largest poultry businesses in the country, and the broiler adjunct was dropped because it was found more profitable to devote all attention to the production and sale of high class stock.

About the same time an elderly gentleman of considerable means, bought a farm with the idea of fitting up a poultry plant for his only son who was an invalid and needed outdoor occupation. He spared no expense in equipping it. He employed an "expert" to lay out the

Poultry House in Corner of a Farm Door Yard.

plant and paid roundly for "expert" advice at every turn. He soon found that in order to get anything at all out of the plant he must give it his personal attention, and the farm was kept going for several years on this basis. Meantime the son died, and the father, to whom the plant was now of no use, was glad to sell it for a small part of its cost.

Perhaps thirty years ago the son of a New England farmer, arriving at an age when enterprising young men begin to plan very seriously their life work, concluded to try what he could do with poultry. He began on his father's farm, and with a cash loan to give him a start. He worked for his father for his board, and to repay the loan, while getting his stock established. Beginning as a practical poultryman, he became interested in exhibition stock, was very successful in breeding it, was an excellent salesman, and in a few years built up a business ranking among the largest in the country. As his trade in fine poultry grew he dropped the market side, and gave all attention to the lines that were giving him greatest profit. He has prospered in business. A few years ago he said to a group of friends to whom he had just

White Leghorn Chicks on Farm of H. J. Blanchard, Groton, N. Y.

shown a business block he had recently completed in a town near his home, "This is my provision for my family in case I am taken away. This building will give them a comfortable income." Years ago I heard him say that while he had found poultry keeping profitable, he believed that any man who could make money at poultry could make more money at something else.

Eight or ten years ago a traveling man bought a farm in New Jersey, and put a good sized poultry plant on it. Immediately marvelous tales of its success began to be circulated. His detailed statements of results showed how easy it was to make money with poultry if only you had the personal equipment which everyone who thinks of starting supposes he has. In a very short time the remarkable success of the plant on the established scale indicated such great profits from larger operations that he easily interested capital in his schemes, and the farm was made one of the show farms of America. People came from far and near to see it. The poultry press generally gave it extended write-ups. Then all at once the promoter disappeared, and those who had furnished the capital put the concern into bankruptcy.

Not many miles from Boston there is a small farm which the present owner purchased about a dozen or less years ago. He had money enough to pay for the farm, make the old house habitable, buy a small flock of hens, and have a few dollars left for an emergency. For a few years he continued working at his occupation. He saved what he could. The few hens earned something; when he had money enough ahead to buy material for a house he bought it. Then at such odd times as he could he put up the house, at the same time planning to have increased his stock so that when the house was ready he had extra pullets to fill it. He planted fruit trees, and seeded down such parts of the farm as were suitable to grass. He kept a cow or two. Everything was made to contribute something to the total income. It did not take as long to get money ahead for the second house as for the first. When the money was ready the material was bought, and the house built at his convenience. By this time his farm was taking more of his time, the outside work was gradually reduced as home demands became more imperative, and soon his farm was taking all of his time, and he was making a living from it.

A Town Lot Poultry Plant at Wellesley Hills, Mass.

He has now house capacity for 800 to 900 hens, keeps several cows, and makes a comfortable living and a little more. You need not drive far from his place in any direction to see the wrecks of poultry ventures embarked much more auspiciously than his. He is in no sense of the word a fancier. He is even indifferent to thoroughbred stock, using mostly good grades, but his poultry pays.

In that section of the old Bay State celebrated among poultrymen as headquarters for fine market poultry, two brothers began some fifteen or sixteen years ago to try to grow winter chickens. One, who was employed in a factory, had a little money saved up. He bought some incubators, contracted for some eggs, and the other brother went to work to see what he could do with them. Hatches were discouraging. Hundreds of eggs went through the machines without giving any substantial supply of chicks. The greater part of a hundred dollars had been expended in eggs, and the man who was running the machines wanted to quit. He thought it was no use. But the capitalist of the pair insisted on sticking to it as

long as he had money or credit to buy eggs, and soon luck changed. They got enough out of the first season's work to encourage them to go ahead. Slowly but surely they did go ahead until they had a plant to which both gave their full time during most of the year, (their special line giving them a month or two off in the summer if they chose to take it), and were making more clear money for each every year than the average professional or business man makes.

Two young men, brothers-in-law, employed in a factory, together built up a poultry business to the stage where one of them, whose health was not good, and to whom constant indoor work was injurious, could give all the time that he was able to work to it, the other helping him out in emergencies. The plant was at the home of the invalid proprietor. They would have continued to develop it until large enough to make a living for both, but there was not land enough, nor was it possible to buy adjoining land. At length an opportunity came to buy a piece of woodland a short distance away. It could be bought for \$150. I do not remember the acreage, but it was not large, only enough for a small farm. It was purchased by the second man. He cleared it, and made enough on the sale of the wood to pay for the place, so that he started with the land clear, and what small capital he had of his own could be put into a dwelling, poultry buildings, and equipment. The house erected was small and plain, only sufficient for the actual needs of the family, costing probably not to exceed \$500. The outbuildings also were built as economically as possible.

The two men, though not now in partnership, worked on a coöperative plan. The original plant had been run as an egg farm. It had a capacity of about nine hundred hens. By the arrangement made, the owner of this plant furnished the other at market price all the eggs he wanted for incubation, carrying the account until fall, when he took his pay in pullets, at market prices for poultry at the time they were delivered. As the man who grew the chickens hatched both winter and summer chickens, and grew many more than required to furnish the other what pullets he needed, the value of the eggs he took would each year run close to the value of the pullets he delivered. The plan worked very satisfactorily until with the continued ill health of the invalid poultryman, a change of climate became necessary for him. Both farms were sold, and both families moved to a milder climate.

On a Maine farm devoted to general farming I found a flock of between 400 and 500 hens kept in houses built to accommodate 50 to 100 fowls each, these houses being distributed within a radius of the dwelling which made it not too hard a task for the farmer's wife and mother to attend to them during the summer when the men were engaged in the fields, the men taking care of the fowls at other seasons, and also in rough weather. There were too many hens close to the house to admit of keeping the place as we like to see the surroundings of a dwelling; but the farmer said his hens were the best paying stock on the place, and as his method of handling them was adapted to his situation and circumstances, and they were thrifty and productive, he did not feel disposed to make any sacrifice of profit to appearances at present. This flock had been built up very slowly. He had been seven or eight years in getting to the number he had when I saw him. He said the usual increase had been about fifty hens a year, as he had found that he could add that number each year and make the necessary provision for them without taking more of his income for the purpose than he conveniently could.

On many farms in Rhode Island hens are kept by the "colony system." I presume that on most of these farms the beginnings of the system date back for over a generation, and on many much further back than that. I spent parts of two days at different times, going about as he cared for his poultry with a young man whose father and grandfather before him had for years kept poultry on this same farm, by the same methods and with the same kinds of stock. Without going into a full account of these methods here, I will say that with such a small poultry house as might be used anywhere — on farm or town lot — as a unit, anyone who has room to spread his fowls out, locating houses far enough apart so that the flocks will mingle little, can apply this system. The limits of it come with the limits of his land. All that he has to do is put a small new house in a suitable place whenever he is ready to do so. He may use two or three houses, or he may use a hundred; the system is the same, and the conditions the same for all.

A school boy became interested in poultry, bred and studied a popular variety, and before he was out of his teens was competing successfully with veteran fanciers. He was educated for a profession, but his health being poor after having embarked in his profession, he found the confinement too much, and engaged temporarily as manager of a poultry plant. The position proving congenial and profitable, he continued in it. Whether he is as well off financially as he might have been had he continued in the line of work first chosen, I cannot say, but he earns a very fair salary now in a position which still leaves him a little time for judging shows, contributing to the poultry press, and mating fowls for others.

A lady who had for years taught school, found after her marriage that housework was far from congenial. After many consultations with the gentleman most interested, she arranged to hire her household work done and give her own attention, except for the cares devolving upon the wife and mother, to poultry, of which she was very fond. Her poultry business grew and flourished until the problem became how to keep it from intruding upon other obligations, and at last was given up solely because it was found impossible to make a satisfactory adjustment of business, family, and social cares.

Another school teacher whose health had been impaired by years of hard work to such an extent that she had to give up teaching, began to interest herself in poultry. She made her home with a brother whose business was in one of the large cities, and residence on a farm near a suburban town. Beginning with a few dozen fowls, she increased in a few years to several hundred, the receipts each year netting her a substantial amount, until a change of residence for her brother's family was necessary to give the children the educational advantages desired, since when she has had to content herself with a few pens of fowls on a city lot.

I know a young man whom I first met as an exhibitor at numerous New England shows some seven or eight years ago. I don't know whether this young man would make a financial success of poultry keeping—make it pay—either for himself or anyone else. It has happened that he has more than once been selected by men with ample funds to take charge of poultry ventures of the kind that have never yet paid, and few men who have made poultry pay can command a better salary or show net earnings in a year larger than his salary. The situation in regard to such places as he has filled is peculiar. There will probably always be a demand for men to run poultry farms on big plans for men who will be convinced that their plans are not practicable only when it is made clear that they have not accomplished what they expected to, and they see no prospect of doing better. In my mind this problem of the man of ability, well paid for his efforts to make a success, in a sense parallels many cases we find in manufacturing and commercial enterprises—men who never really succeed in what they undertake, but who are always ready for new effort, and always find fresh opportunities opening up to them.

These opportunities must be reckoned among the possible results of one's interest in poultry as it develops.

There are also other ways in which opportunities may come to successful, or even to capable but not brilliantly successful poultrymen.

Some years ago a marketman, buying and selling poultry, became interested in the production of poultry. He began growing poultry and ducks on a very small farm, not much larger than a good sized village lot. His successes here led him to purchase a farm, and begin to build up a business on a large scale. He had his ups and downs, his business grew, but he had a heavy load to carry. Sometimes he felt like giving up—again, things looked brighter and encouraged him to keep on. The farm paid, but did not pay enough—he was not making as much at poultry keeping as he could make at something else. Then his services were wanted by a manufacturing concern for a position calling for a knowledge of the poultry business and a wide acquaintance with poultrymen. In this new line he rose rapidly. His ability and character attracted attention and brought him an offer of a position of great responsibility with commensurate emoluments.

A young man just out of college was ordered by his physician to get into some outdoor occupation for a few years. He had been interested in poultry as a boy, and concluded to go into the poultry business long enough to make a fortune and retire. In due course of time he discovered that the possibilities of wealth in poultry culture were much overrated, and that educational qualifications representing expenditures which would make a neat little capital were not at all essential in the routine work of the poultry yard. He decided that he would make more by taking up a line of work more in keeping with his educational training, and began to arrange his affairs accordingly. Circumstances diverted him from the original plan and gave him a connection with a poultry paper, starting him in a line of work which he found very congenial and reasonably remunerative.

A farmer's boy interested himself in poultry, earned a considerable part of the money to defray his expenses at college by keeping poultry, and, having graduated from college, continued poultry keeping as a means of earning the wherewithal to pay for a professional education. Shortly after he had returned to the farm he was offered the position of manager of a large poultry plant. After a few years spent here he got into poultry journalism, and is now editor of one of the papers ranked among the best. Even before his college days his contributions on poultry topics were read with interest and profit by many who might have skipped them had they known how few years the writer numbered. As another juvenile expert once remarked to a veteran whom he had bested in a discussion who tried to overawe him with years and "experience," "Some people get a great deal more experience in a few years than others do in a lifetime."

Two physicians in the same city became interested in fancy poultry. Each had a good practice. Both took up poultry for recreation. One has continued to keep a few fine fowls, getting much satisfaction and a little profit from them, but never allowing them to interfere in any way with his professional duties. I doubt whether as much as one per cent of his patients know that he has any interest in poultry. The other developed "hen fever" in a virulent form. He crowded his premises with fowls of different varieties, making all sorts of queer coops and houses for them. He neglected his practice. Patients who came to the office at his residence frequently had to wait while he attended to the poultry. Some complained that he came to them from the poultry yard with odors, feathers, or other evidence of his having been in that locality still about his person. This may have been an exaggeration. It is certain, though, that he gave many patients the impression of being more interested in his fowls than in their ailments. This was a fatal error. The ailing man or woman is of all persons most resentful of any lack of concern for their welfare—especially in one to whom they come for healing. His practice began to fall off. As his income dwindled, instead of taking steps to reestablish himself in his profession, he began to think of his poultry as a possible source of income. The last I knew of him he was still struggling to make poultry pay, and of his once fine practice little was left.

A master mechanic in a New England city has been identified with a certain breed of fowls for, I think, nearly forty years. He breeds a hundred or two every year, and makes two or three hundred dollars on them, without letting his poultry interests interfere with his regular business. He visits a few of the best shows every season for a day or for several days, as business cares permit. He meets a number of men interested in his fancy, competes with them in the shows, and enjoys their company. His sales of eggs and stock keeps him in correspondence with people all over the country. His poultry is a profitable and pleasant diversion.

A city newspaper man interested in poultry started a poultry farm in a small way, and, quite naturally, as he learned more and more of poultry culture began to disseminate his knowledge through such channels as were available. In one of these channels he found an opportunity for a special engagement out of which grew one of the leading poultry journals of the period. His connection with this and subsequently with other poultry journals, and work as a poultry lecturer have been combined with poultry keeping with results as to income which are apparently good enough to keep him from returning to regular newspaper work.

A printer, a young man whose health was far from robust, had to leave the office in the city and return to the farm. There the care of poultry was assigned him as "light work," most suitable for one in his condition. He became interested enough to leave the farm and go to work for one of the leading poultrymen. Continuing with him for several years he became proficient both as a poultryman and a fancier, and embarked in the business for himself. He soon made a reputation as a breeder. It occurred to him that an article he was making for use in his own yards would sell well to poultrymen generally. He began to advertise it, and soon his trade in it called for the erection of a factory. In a few years more he had a large and profitable business in the manufacture and sale of an article of a kind used in every poultry yard.

A mechanic, who was probably born a fancier, has but a small back yard in which to keep fowls. He can keep but a very few, and can raise chickens only with such difficulty that he prefers not to try to grow them at all. His method of handling poultry is rather unique. When he sees an opportunity to buy a small lot of nice fowls cheap, from someone who is going out of them, he buys. These fowls he keeps until a customer comes along who will pay a good price for them. Then he sells, and his yard is empty until another opportunity to buy low occurs. He has told me that he frequently has three or four different kinds of fowls in a year, though no two kinds at the same time, and that he makes much more in this way than he could by breeding or keeping one lot of fowls permanently in his narrow premises.

I could go on indefinitely, multiplying illustrations of what people have done and are doing with poultry. The most common type—the farm poultry keeper—has hardly been mentioned. The illustrations given nearly all refer to specialists of various kinds and grades—to people who go into poultry keeping. On the farms generally, poultry is kept as a matter of course, but as we consider the possible results from poultry in the succeeding section there will be occasion to say more of farm conditions and possibilities.

LESSON VI.

SECTION III.

Branches of Poultry Culture and Classes of Poultry Keepers Considered in Their Relation to Prospective Poultry Keepers' Expectations of Success.

THAT is a longer title than I am in the habit of making, but nothing shorter seemed to answer the purpose. I want to tell the reader — and particularly the reader interested in the possibilities of poultry culture for pleasure and profit, or for that combination of pleasure and profit which the great majority are seeking, what poultry culture offers him, the conditions which it imposes, and the limits of different branches and limitations of various individuals.

Poultrymen have to deal with four principal classes of domestic fowls, chickens, turkeys, ducks, and geese. The first class mentioned are of many times more commercial importance than the other three combined.

What Poultry Culture Offers the Farmer.

The great bulk of our poultry products comes from farms where they are produced under conditions which make the receipts for them practically all profit. This being the case it is not often that an exclusive poultry business can be conducted profitably in any section where the farms produce more eggs and poultry than will supply the local markets.

And in these sections where exclusive poultry farms are rarely successful, it is not generally advisable for farmers to go into market poultry culture on a scale that requires them to give any considerable part of their time to poultry, or that makes poultry culture more than a minor feature of their farm work. But between the conditions in which poultry is usually kept on a farm and the limits I have indicated, there is a difference which leaves room for considerable enlargement of farm flocks and improvement of farm methods, and a considerable increase of receipts, and consequently of profits, from poultry without its encroaching on either time or land which might more profitably be devoted to other uses. On most farms the best policy to pursue in developing the poultry interests of the farm is simply to make the most of farm advantages by farm methods. The best way to go about this is indicated in the stories of the several farmers who developed as poultrymen. It is a mistake for a farmer, or any one else whose interest in poultry is just beginning, to undertake to plan for a poultry business on an extensive scale. The wise way is to extend and increase operations year by year, little by little, as results and experience indicate the most profitable lines to follow.

Ordinary poultry keeping on the farm includes, almost universally, the maintenance of a flock of laying hens, varying in numbers from a few dozen to several hundred, and the rearing each season of as many chickens as can be conveniently taken care of. On most farms no special attention is given to the production of eggs and poultry for the seasons of scarcity and periods of high prices.

The profits from the poultry on such a farm may, in nearly every instance, be much increased by keeping better stock, by more careful selection of breeding stock, by disposing of poultry either before or after the seasons when most farmers are in the habit of disposing of their

surplus, and in a general way by taking precautions to avoid the losses which often greatly reduce the stocks of fowls and flocks of chickens. Along these lines of saving and judicious handling there are good opportunities for greater profits with little additional expense—sometimes with no increase of cost whatever.

Beyond this, the farmer may go into any of the special branches of poultry culture as far as circumstances, inclination, and experience take him. He as well as another may be a fancier, breeder, and exhibitor of fine fowls. His opportunities for producing them are second to none, and as they are sold principally through mall orders, location cuts very little figure in that line of the business. He may grow broilers, or raise winter chickens for roasters, if his location favors, and other demands on his time permit. He may also combine, as only those located on farms can, the growing of the several kinds of domestic fowls, and keep in addition to his chickens, flocks of turkeys, ducks, and geese.

The farmer who becomes interested in poultry will see possibilities of profit in all these lines. If he develops in any direction slowly he avoids making serious and expensive mistakes. People often write me for instruction as to the best way to begin, to avoid mistakes, saying:—"I have only a small capital, and I must start right. I cannot afford to make any mistakes."

It is not possible to altogether avoid mistakes, but there is one sure way of avoiding bad mistakes, and expensive mistakes, and that way is well stated in the old maxim, "hasten slowly." If one observes that rule he finds his knowledge of poultry and his capacity and skill in managing it growing as his stock increases, and though his mistakes may temporarily hinder him at times they are not likely to cause his failure.

What Poultry Culture Offers Those in Other Occupations.

It may safely be put down as a general rule that a person who has a business or occupation in which he is making a living ought not to change abruptly to a line of which he knows nothing, and in which his prospects are uncertain. Yet I suppose that at least three-fifths of those who come or write to me to ask how they can get started in poultry keeping belong to this class. They are for the most part persons who are dissatisfied with their present occupation, and chafing under its unpleasant features. Their interest in poultry commonly springs from impressions of it derived from hearsay or from occasional extravagant references to it in newspapers. Almost invariably they regard it as a business singularly free from drawbacks and holding possibilities of big incomes made by the hens, while the keeper takes it easy. They also believe that a poultry business large enough to give them a living income can be built up in a few months on a capital that would be too small to be of any use in most lines of business. This belief is so diligently fostered by the poultry press, by poultry writers in agricultural papers, and by those interested in the sale of equipments and supplies for poultrymen that it becomes a very hard matter to convince a man once imbued with it that it is wrong.

Unless one is so situated that he or some member of his family equally interested in poultry can give the flock all necessary attention, and can both increase the flock, and constantly increase the time given it as the growth of the flock calls for more and more of the keeper's time, it is quite useless to make a start with a small flock with the expectation of gradually developing. To do so is like planting a tree in a space which will be ample for only a few years. When the tree outgrows the space it is an incumbrance. And that is very apt to be the case with a poultry business started under conditions which limit its development long before it has reached the point where the proprietor is justified in making it of first importance.

Poultry culture has no encouraging offers to make the man already established in something else, doing reasonably well in it, and not under necessity of making some change. In almost every case where people quit other employment to engage in and learn poultry keeping they soon find that they have made a mistake. It might not be so, if they were willing to learn the poultry business before going into it, but nearly all of them are unwilling to take a thorough training. Almost as often as I suggest this course to an inquirer or correspondent the reply is:—"I don't want to do that. I learned my present business that way years ago. I am too old to do it that way. I can't afford to take the time. Can't I just begin and learn poultry keeping by keeping poultry? Doesn't my training in the other line count for anything in this?"

The reply is:—One can learn poultry keeping by engaging in it on his own account, and pay-

ing for all his experience as he goes, but it is the most expensive way to learn, and also the most discouraging, and where one persists and makes a success scores give up either from discouragement or lack of funds. Even with plenty of capital it usually takes three or four years to get a poultry plant started this way in running order and netting anything above expenses. A man who knows the business may begin with only a few hundred dollars, a good reputation, and good credit, and by hard work and the most rigid economy, both on the plant and in the household, may get along and ahead, but it is not an easy road to affluence.

What Poultry Keeping Offers Those For Whom a Change of Occupation is Desirable.

To a great many people engaged in occupations injurious to their health, or utterly distasteful to them, or in which compensation is small, and chances of advancement smaller, poultry culture seems to offer a way of bettering themselves. Yet I have found comparatively few, even of these, who were willing to work themselves into the business in ways that gave reasonable assurance of their being able to continue in it permanently. The bane of the poultry business seems to be the desire of everyone starting in it to "boss," to be his own boss if possible, if not to secure a position as manager and "boss" for someone else.

There are many poultrymen in the business, making livings of all grades, from a bare subsistence to comfortable independence and a bank balance that shows a gratifying increase nearly every year, who got into it from one of the classes we are now considering; but so far as I have known them they have worked into poultry culture gradually. Either they went to work for poultrymen and learned the business thoroughly, or they found it possible to build up their stock of poultry in the days and hours which had they had only their other occupation would have been idle. In a great many instances, too, the help of one or more of the other members of the family has been an important factor. Perhaps the most common case is where a wife equally interested with her husband looks after the poultry when he is unable to do so. Occasionally — perhaps I should say often — the wife is the better poultry keeper, and better manager of the two, though rather averse to being known to the world as the head of the concern. In most instances where women successfully carry on a poultry business in their own name the male members of the family give such assistance as they can, though occasionally a woman is left entirely dependent upon her own efforts and such help as she may hire.

In general it may be said that to make a satisfactory exchange from some other line into poultry keeping requires exceptional conditions. Many who would like to do so cannot, and some who would be better for the change could it be effected find it impossible. It should be said also with reference to poultry culture as a business for those not in robust health that their adaptability to it will depend more on whether they can stand steady work and exposure than upon ability to do hard work. A poultry keeper must be about in all weathers. He may arrange his plant to make his labor as light as possible, and to have everything adapted to the comfort of fowls and chicks; but still occasions will arise when in heat, or cold, wind, rain, or snow he must get about and look after his stock, and if he cannot stand such exposure, and cannot occasionally work long hours he had better not go deeply into poultry keeping. In some diseases long hours and exposure are not injurious, provided there is not too much overtime, and one takes proper care of himself after exposure, and in such cases poultry keeping may be unexcelled as a health restorer. The great thing is to keep the business within the limits which will not make it too great a burden.

What Poultry Keeping Offers Those With Money to Invest or Land to Occupy.

Under this heading we consider poultry culture as an investment for men who do not intend to give their poultry plants their personal supervision, or who plan to hire an expert to run the business until under his instructions they become qualified to manage it for themselves.

A great many people every year contemplate poultry culture seriously from this point of view. Men with money to invest, having heard reports of large profits from poultry, imagine that by investing money in a poultry farm they can have their money pay them ten or twelve

per cent, or even more. Men with unproductive land which they are not able or qualified to handle profitably often think that by forming some sort of partnership arrangement with a poultry farmer they can get an income from the land.

All these schemes presuppose a profit on poultry large enough to yield the owner of the land, or the plant, better returns than he would be likely to get on any other investment of his money, or use of his land. As far as I am able to learn, no arrangement of this kind has ever been satisfactory — no investment in a poultry plant managed by another for a man who knew nothing of the business, has ever been profitable, and no poultry plant established on a large scale, as an investment, has ever been run at a profit. There may be instances which constitute exceptions to these statements, but I do not know of them. I do know of large plants started on a large scale, which those interested in them claim are paying, but I know of no such farm in which the statements that have been given out as proof establish the claims made. I do not know of a single large poultry plant in profitable operation except such as have been built up gradually from small beginnings by men who were trained poultrymen, most of them acquiring their training on their own plants, and conducting them for some years at first on a very small scale.

The great obstacle to the development of plants of this character is the difficulty of securing competent managers. As indicated in one of the sketches of successful poultrymen in the preceding section of this chapter, men who have the executive and commercial ability required for the successful management of large poultry plants can usually get larger returns at something else. Men who are equal only to the management of a "one man plant" almost always prefer to work for themselves, or to take charge of plants on which they are not expected to do the impossible.

It may be that the time will come when poultry plants will be satisfactory as an investment, and when men with unoccupied land can hire it advantageously to poultrymen. It may be that in the many failures of attempts to do these things we are gradually working out methods, training men, and approaching conditions which will make these things possible, but as I see the facts today I could not offer any great encouragement to those who looked to poultry culture as an investment for their funds, or a use of their land, unless they were competent themselves to manage the venture.

What Poultry Keeping Offers in Salaried Positions and Wages.

The best paid salaried poultrymen are fanciers of much more than common ability as breeders and exhibitors. They are few in number, and, as I can place them now in my mind, are all employed by well to do fanciers who cannot personally manage their plants and attend to their exhibits. By that I mean *cannot for any reason*, including more important demands as well as inability. Not a few men of means in the fancy are men whose judgment and skill, while not perhaps equal to that of those who devote all their attention to poultry, are still of first rate quality. In fact it seems to be impossible for the first rate men in salaried positions to be satisfied in the employ of men who are not keen fanciers. In these positions men command salaries from about \$1,000 a year to \$1,500 year, with possibly one or two going above the latter figure. In most cases men in these positions can earn something extra as judges or in other ways in line with their opportunities.

There is a considerable demand for managers of market poultry plants, generally at a much lower range of salaries. The equivalent of \$100 per month is about as high as these salaries go. In a few instances higher salaries have been paid, but such engagements have rarely continued beyond the limit of the original contract. The average amount paid a man able to handle a poultry plant of one or two man capacity is about \$75 per month. Good men in subordinate positions get \$40 to \$50 per month.

The poultryman's opportunities, however, are not limited to employment on poultry farms. There is an ever increasing demand for men having a practical knowledge of poultry culture, for places in all lines of business dealing with poultrymen, and a good many men who have not been able to make money with poultry in the ways they had originally planned, are finding their acquirements useful in these collateral lines. Not only so, but to many who have made a good deal of a success in poultry culture, these lines offer more profitable openings.

Hence, while the wages paid the poultryman at the start are not especially attractive, there are in poultry culture such opportunities for advancement to responsible and lucrative positions as open in every line to those who are competent, reliable, and industrious.

What Poultry Keeping Offers in Recreation.

American poultry fanciers and breeders, as a class, try to combine pleasure and profit in poultry culture, but we will consider here the pleasurable aspects of poultry keeping only, passing the connection with profit with the remark that those who went into the poultry fancy for pleasure have again and again found it at some time their chief or sole reliance as a means of livelihood, and been able to make a very good living at it.

The simplest pleasure poultry keeping affords is found in the production of eggs and poultry for the family table. The desire to have poultry grown on the premises, and known to be well fed and fresh when used for the table, and to have strictly fresh eggs as wanted, seems to be responsible for most beginnings in poultry keeping in town and cities. The pleasure this affords usually bears a direct relation to the results obtained. Very often it leads directly to the higher forms of pleasurable poultry culture. Of these we may consider here the few principal ones.

There is first of all the pleasure derived from the possession of fine fowls. From this there comes naturally the desire to produce fine fowls, and a keener pleasure in the sense of skill which comes with successful accomplishment in this direction. Many are satisfied to stop here. To others possession and skill suggest competition, and their keenest pleasure is derived from successes in the exhibition room, which give them reputation varying from local to world wide according to the sphere in which they compete and the frequency of their successes.

To achieve these successes someone has to exercise rare artistic and creative skill and judgment, and I think it may be said that our poultry fanciers today quite outclass breeders in all other lines of live stock in knowledge of the principles of breeding and in skill in their application. The man who goes into the fancy today finds himself pitted against combinations of art, skill, and judgment which tax his faculties to their utmost. He finds himself also brought into contact with men in all relations in life who meet on the common ground of their interest in poultry, and he finds that the peculiar combination of qualities which make the fancier are not the exclusive possession of any class of men or character of intellect.

I think that fanciers generally will agree that the frankly democratic equality of the poultry show is refreshing. Even those who in their social and business relations are disposed to be exclusive rarely display any of that spirit in the show room. On the contrary most of them seem to be able to meet every other fancier on terms of equality, and it is a rare thing to see any traces of either snobbishness or obsequiousness in the intercourse of poultrymen.

In Conclusion.

In conclusion, let me remark what no doubt more than one reader has reflected for himself, that poultry keeping offers a very wide range of possibilities. And let me add, and impress it upon the reader, that while the possibilities of what he may get are in the business, the probabilities of what he will get are in himself, and to some extent in his circumstances. The making of a competent and skillful poultryman is a slow process. When a very young man fills those specifications it will almost invariably be found that his poultry culture began in childhood and represents years of interest and application. When a man's interest in poultry does not antedate his mature years his knowledge of poultry is almost always deficient in some essentials—often strikingly so, yet by persistent application he may work out success in spite of his limitations. For men somewhat advanced in years the outcome of a venture into poultry keeping is so uncertain that I have never been able to see how I could conscientiously advise such to go into it. The prospects of their making a success of it are, on the whole, too remote to warrant the investment and the effort. Men who have passed the age when they can obtain new positions in the lines in which they have been engaged are constantly investigating poultry culture, and looking for encouragement to take it up. For men who have had an interest in poultry which by gradual extension may develop into an understanding of it having commercial value it may be worth while to try what they can do, but I am not able to recall a single instance of a man advanced in years taking up poultry culture and making a success of it.

LESSON VII.

Locating and Laying Out Poultry Plants.

THE owner of a piece of land upon which he wishes to engage in poultry keeping has to adapt the business to his location, markets, and his own ability. He makes his business fit his conditions as he understands them. If his ability and experience are small he may make many mistakes, and he is likely to make some mistakes, no matter how able or expert.

The mistakes people make in locating and laying out their plants vary both in kind and in degree. There are mistakes that make success impossible. Of this kind is the common error of buying land that is of a nature unsuitable for poultry keeping, or so located that extra expenses, due to location, eat into the profits to such an extent that the net returns are reduced below the lowest figure at which it is possible to maintain operations. In the earlier days of interest in poultry culture as a means of livelihood, the idea was land unsuitable for any other purpose was just what was wanted for fowls. Those who bought on that principle have had cause to regret it. From as far back as our poultry literature goes it has also been customary for most authorities on poultry culture to advocate sandy and porous soils that were drained well; and a site with a southerly or southeasterly exposure was considered preferable. Nowadays poultrymen are not quite as particular about those points, though they do not wish to get too far away from them — particularly when arranging winter quarters for laying stock.

As is so often the case, when these points of location were insisted upon as cardinal points there was a general tendency to try to secure them, even at the expense of other desirable features. As a result of this, a great many poultrymen have located in places where they had to contend with a multitude of other adverse conditions as well as with the faults of locations which would always be dry.

For best results most easily secured a medium soil is to be preferred. Perhaps the ideal location is one which gives a high and well drained site for the poultry buildings, but with adjacent low land that remains moist through the driest and hottest summers, to which the runs may be extended. A sandy soil that cannot be kept in sod becomes intensely hot on hot summer days, and fowls and chicks confined to such a location cannot thrive. This has been one reason for poor summer laying and for difficulty in growing late chickens on many poultry plants.

Another point given more consideration of late years is the adaptability of the land for cultivation. Good grass or tillage land is usually good land for poultry. Not infrequently poultry will pay better on it than any other crop that could be grown. There is the further advantage in the use of such land for poultry that the poultry running on the land enrich it, and when the land by use for poultry becomes contaminated the poultry can be shifted to another part of the farm, and this will grow extra fine crops while being renovated. As far as I have discussed the matter with them—and I have talked of it with a great many poultrymen—I have found no man located on a farm with little tillage land who would choose such a place

Plot of Original Grove Hill Poultry Yards.

Scale, 1-80 inch to the foot; 1-16 inch equals 5 feet.

A, continuous house with walk; K, cook and feed room, office above; R, open shed for storage; C, surplus stock house; P, approach to house A; B, cockerel and surplus stock house; M and T, large yards; Z, small yard for chicks; Y, bins for manure and refuse; small oblong figures in T, Z, and in the field to left of street, indicate roosting coops.

again, and none keeping poultry on good farming and garden land who would take land for a poultry farm which could not also be developed for grass, grain, and vegetable crops. I do not advise a beginner in poultry culture who knows little or nothing of farming or gardening to purchase land in a high state of cultivation. I do urge him to purchase land capable of being brought to a high state of cultivation.

The selection of a place to establish a poultry farm is usually a tedious process. There are so many points to consider that not a few soon begin to despair of ever getting what will suit them, buy places they do not really want, and begin to adapt their business to the farm. Only a very small proportion of the properties offered as poultry farms or farms suitable for poultry farming are desirable. Those offered cheap almost invariably have some very pronounced "outs" about them. They are hard to get to, or in undesirable neighborhoods. In general they fall very far short of the advertised descriptions in every way. But there are here and there properties most satisfactory for poultry farming which may be bought at reasonable to low prices. The finding of one of them may take months, or it may take several years. As a rule it is best not to buy until one finds a place that he is sure will be quite satisfactory. This may mean a postponement of the undertaking, but as most of those going into poultry keeping expect to stay in it, it is better to put off the beginning until a satisfactory place is found than to equip a plant on a farm with which the owner is never satisfied.

A farm to be well adapted to market poultry keeping should be not more than a few miles from a station that has a good express service to a good poultry market. If there is also a good local market, so much the better; but don't rely too much on a local market that has no convenient outlet to a large market, for such a market may at any time become glutted with poultry products and continue so simply by a slight permanent increase in local production.

A farm for poultry should also be of such proportions that the fowls may range widely without encroaching on the premises of neighbors, or, at least without trespassing where their presence would be objectionable. It is desirable that it should have abundance of shade, preferably orchard trees which may be expected to add something to the income, but groves and thickets serve the purpose as far as the fowls are concerned provided there is not too much wood or brush in the vicinity affording harbor for wild animals which prey on poultry. The advantage of shade already on the farm is that it provides at once good summer conditions for both fowls and chickens, while on land bare of trees and bushes makeshift shades must be provided until trees or other natural shade can be grown, and the shade supplied in that way rarely makes conditions at all approaching the best. What is usually found on such farms is a

Grove Hill Poultry Yards Farm Plan.

Scale, 1-80 inch to the foot; 1-16 inch equals 5 feet.

A, 200 ft. stock house; P, shed at east end of same; B, scratching shed house; C, D, and E, cockerel houses.

A Model Fancier's Plant. Grove Hill Poultry Yard, Waltham, Mass.

little patch of shade here and there in which the fowls crowd for shade instead of dispersing as they should.

The land for a poultry farm should be bought, not rented or leased. In making this assertion I am aware that there may be cases where renting or leasing is better. At the same time I do not think I have ever known of an instance where it proved best not to buy — that is not after what was intended or desired to be a permanent business was undertaken.

Some Model Plants — Grove Hill Poultry Yards.

Before making any statement of methods, rules or systems for laying out poultry plants I will present plots and descriptions of several plants which will serve as models.

The first is the plot of Grove Hill Poultry Yards at Waltham, Mass., which so far as buildings and equipment go is two complete plants.

The original plant is at the foot of the hill from which it takes its name, and occupies a part of the estate upon which are the residences of Mr. Bright and of his mother. There are some seven acres in this estate, half, or perhaps a little more of it, being occupied wholly or in part by the poultry.

The estate fronts upon Main street, which is the thoroughfare between Watertown and Waltham, Grove street beginning at Main street and starting at right angles to it, but later, taking a winding course, intersects the land, dividing it into two nearly equal parts. It is on the easterly of these divisions that the two residences and all the poultry buildings, also a small dwelling for a man, are located.

The residence of the elder Mrs. Bright is at the corner of Main and Grove streets, and at the foot of Grove Hill; that of Mr. W. E. Bright is high up on Grove Hill, which at the back makes quite an abrupt descent. Half way down this descent are the dog kennels. At the foot of the hill back there is a triangular space of gently sloping land. Here it is that the poultry yards are located.

The principal building, A in the diagram, is close to the foot of the hill; in fact, in places the hill has been dug out a little for it. It is 185 ft. long, 12 ft. wide, except the central part, and contains a central two story building (K) 14 x 15 ft., used downstairs as a cook and feed room, and upstairs as an office; and two wings, one 98 ft. long, containing 12 pens, and one 72 feet long, containing 9 pens. This building faces southeast. It is lathed and plastered, and has a cement walk in the rear of the pens in each wing. A half tone from a photograph of this building appears on page 78.

On a line with the front of this building, at the end of the east wing, is a small house (C) which was probably once the poultry house, but it is now used for surplus stock, sitting hens, chicks, or whatever is convenient; this house is 55 ft. long, with a central pen having a hexagonal front, and two 20 ft. wings. The wings are 8 ft. 6 in. wide, and each contains four pens. The hexagonal front pen is, at the widest part, 3 ft. wider than the wings. Between A and C is an open shed, R.

Each pen in A has an outside run of the same width as the inside pen, 8 ft., and 35 ft. in length. Then for every three of these pens there is a grassy yard, 24 x 40 ft., set with fruit trees, to which the pens have access in turn. There are no separate outside runs for the pens in C, these opening in common into the yard between C, the east line of the yards of A, the east boundary fence, and the north end and fence of the cockerel house B.

This cockerel house B is a story and a half house 60 ft. long by 10 ft. wide. It runs almost exactly north and south, and has full windows in each lower pen on both east and west sides. The first floor is divided into five sections, the north one, into which the door opens, being used as a store room. Upstairs are the cockerel pens. At the east side of the house are yards corresponding to the inside pens. The fowls in the south pen also often have the run of the large triangular yard, T. In this yard T are several roosting coops for chicks. Generally a number of broods of Leghorn chicks are started in small coops in this yard, transferred later to the roosting coops, and finally the cockerels put in the end pen of C, the pullets going to other quarters.

There is a small yard south (properly southeast) of the dwelling house which is used for chicks. Then at the west end of A, between this house and its yard and Grove street,

C. F. Thompson & Co.'s Poultry Plant

Scale, 1-80 inch to the foot;

A, B, C, stock houses, long houses with walks, brooder house in east end of C; is a large yard, used, as a rule, for a breeding pen. On the other side of Grove street is a pasture used for a few broods of chicks in the early part of the season, and later for pulets, these being housed through the summer in slatted front roosting coops placed in a row under the trees near the street with intervals of about 100 ft. between the coops.

Mr. Bright's Farm Plant.

On the home plant Mr. Bright had to make the buildings and yards fit the space available, but on the thirty-five acre farm, less than half a mile away, he had ample room for whatever sort of building equipment he might want. The beginning of the poultry plant on this farm was the 200 ft. house A, with cook and feed house attached.

This house faces squarely south. It is 15 ft. wide, and contains 19 pens $10\frac{1}{2}$ ft. wide by 11 ft. deep. The passage in the rear of the pens is 4 ft. wide. The cook and feed house is just back of the west end of this house, and consists of one room 20 ft. square, in which are the cooker, bone cutler, pump, etc., an L, 12 x 20 ft., containing the feed bins, and a lean-to 8 ft. wide, in which is the boiler. At the east end of the 200 ft. house is a shed for manure.

The arrangement of yards here is similar to that on the plant first described, except that the large yards are longer, and there are more of them. The yards next the house, corresponding to the pens inside are $10\frac{1}{2}$ ft. wide by 30 ft. long. The general plan is a large yard for every two of these, just the width of two yards, and 120 ft. long. The last long yard is irregular. As the number of small yards is uneven, it is made the width of three small yards. There are grape vines in the small yards running up over the division fences and affording fine shade. The large yards are set with fruit trees.

About 200 ft. back of the house A is a scratching shed house B, 126 ft. in length. This house was made from part of an old barn and some other out buildings, and is of such irregular construction that I did not attempt an accurate diagram — not thinking that a matter of special importance in this connection. There are about twice as many pens as yards, some having scratching sheds, and some small pens having none. These small pens are used mostly as accessory to the large pens, or for sitters or extra males. The yards in front are 72 ft. deep, and of varying widths, the narrowest being 26 ft.; the widest 35 ft.

at Lynnfield Center, Mass.

1-16 inch equals .5 feet.

a, d, e, detached coops for hens and chicks, or for surplus stock; b, c, and f, small houses.

West of the house, with a roadway 14 ft. wide between them, is the building C, the main part of which is a cockerel house 11 ft. wide by 40 ft. long. At the east end of this is a shed 16 x 20 ft. for hitching place for teams. This cockerel house contains eight pens 5 x 7 ft., with walk a little over 3 ft. wide in the rear. The outside measurement of the width of the building is 11 ft. The other measurements were made inside, hence the discrepancy of some inches. There are no outside pens connecting with this house.

Directly west of the feed room and 100 ft. distant from it is a second cockerel house D, 12 x 36 ft., containing 6 pens 6 x 12 ft. Outside are yards 36 ft. long and of the same width as the inside pens.

In front of this house, and 98 ft. from the line of the front of the 200 ft. house is a third cockerel house built last fall. This house is 15 ft. wide, not quite 100 ft. long, and contains over fifty pens.

The land actually occupied by the poultry plant described, including spaces between the separate buildings and yards comprises a little over three acres. Much of the remainder of the farm is given to the young stock, the growing stock in roosting coops being well spread over it. The mowing land gives a heavy crop of grass before it is needed for the chicks. A couple of acres are planted to cabbage for the fowls every year. Some grain is grown for hay and litter, and there is some ground in garden crops, but the growing chicks have all the range they can use.

Then several hundred yards in front of the house A there is a grassy shrubby piece of low ground where several sheds are erected. In these after the breeding season the hens from the breeding pens take their vacation.

A Two Thousand Hen Plant.

The plant of C. F. Thompson & Co., at Lynnfield Center, Mass., is another case where the land, some dozen acres, allowed a liberal margin around the houses and yards, and so required no close figuring on space.

Still it is quite on the extensive plan, and while I have called it a 2,000 hen plant, and the winter capacity is over 2,000 hens, Messrs. Thompson & Co. do not attempt to grow even half their young stock here, but have over half of it grown for them elsewhere.

Viewing the diagram of this plant first as a whole, we see first a row of small houses, a, a. Then the small house b, with the pump house next it. Then back of this another small house, c. Then the three long houses, A, B, and C, and the cook and feed houses. Back of these again are more small detached houses, and far back of these a single house, i. Back of the cook house is a house which could be used for a man if required, but is now occupied by a tenant. The distance from the road in front of the residence to the rear line of the farm is nearly a quarter of a mile.

The poultry houses face the southeast. A narrow road runs from the public road in front along the northeast line of the plant as platted.

The long houses, A, B, C, are of the same width, 12 ft. A and B are each 240 ft. long. C is 200 ft. long. There is a 3 ft. walk in each house. In A there are 12 pens; in B, 13. In C the first 68 ft. from the northeast end is the brooder house. The remainder of the house is divided into seven pens.

The yards for A are 12 yards, each 42 ft. long, corresponding with the interior pens, and six larger yards with the width of two small yards. In front of B the small yards are 38 ft. deep, and between them and the house A is a large undivided yard to which the fowls from B have access alternately. There is quite a dip in the ground at this point, and for convenience in work this little valley is bridged by an elevated walk extending from the end of A to B, which saves a great deal of up and down hill work in feeding and watering.

The large cook and store house is $24\frac{1}{2} \times 42$ ft., the smaller feed house 15×30 ft., with a root cellar under it; the small houses, b and c, are old buildings that were on the farm when purchased by Mr. Thompson. For yard room the fowls in b have the long yard running cross-ways of the plant back of the small houses a, a, while those in c are given the run of the large yard which should, in accordance with the plan, be used for the first pens in house A.

The small houses a, a, are each 5×8 ft., divided in the middle, and are used especially for hens and chicks, for the young broods first, later for the growing stock. In winter they furnish good places for surplus males. Except for the first two where the yards had to be short on account of the projection of the dwelling house and barn, these yards are 58 ft. in depth.

The small houses in the rear of the plant are each 5 ft. wide by $18\frac{1}{2}$ ft. long, divided in the middle, giving pens suitable for detached brooders, for roosting quarters for growing stock, or for small pens of mature fowls. As will be noticed, the house at the extreme end of each row is out of the system, and these houses are in fact extra, not regularly used. That in the first row has a small yard in front of it; the other has none. Their principal use is for vacation quarters for the breeding stock.

It will be noticed that the yards for the pens in the southwest half of each house in the row d, d, are smaller than the others. To compensate for this, the chicks from these pens are alternately given free run in the vacant space back of them.

Something like a hundred yards back of this row of houses is a house 14×30 ft., which has been used for different purposes, but will next year be used for breeding pens of Leghorns. Scattered about this undivided space are coops similar to those commonly used as roosting coops for growing stock. In these the breeding hens kept over are every year given their vacation through the hot months.

A Roomy Plant for a Small Space.

By a "small space" here I mean small as compared with those we have been considering. This plant was on a three acre lot in the residence portion of a town. As described it occupied about half an acre, such a

A Plant to Fit a Small Space.
Scale, 1-80 inch to the foot; 1-16 inch equals 5 feet.
A, old house; B, new house; c, bantam house.

space as it is possible to give poultry on many large village lots. I occupied these premises as lessee for several years before buying my home, and the buildings used were put up with the intention of removing them at the expiration of the lease, and were moved then, though circumstances necessitating my absence from home at the time made leaving the work to a man not familiar with the construction of the large building unavoidable and the job was badly handled.

A part of the house A was on the place when we moved there. At a cost of about five dollars a shed was added to this little house which more than doubled its capacity. This house was used in the season for one breeding pen. The yard joining it is 40 ft. wide by 150 feet deep. For shade it has a large grape vine, a small apple tree, and several pear trees.

The yard space available in front of the new house B, was not quite 100 ft. in width, and 155 ft. in depth. There were three rows of apple trees in this space, and in order to divide the shade as evenly as possible, as well as to make yard room for the fowls in the 6 x 12 pen, the principal division fence was put on the line of the middle row of trees, this being about 10 ft. nearer the west than the east wall. Then the yard for the small pen was taken in the corner of the east and larger division.

Back of A, and a little to one side is the bantam house, C, the fowls from which had the liberty of the lawn. By dotted lines in the west pen of B is indicated a partition put in temporarily at times for the accommodation of a small special mating, the yard being as indicated by the dotted lines outside.

The plots and descriptions of these plants as I have given them, indicating the positions and dimensions of houses and yards, afford but an incomplete idea of the plants themselves. In each the spaces available outside of the yards must be regarded as essential features, giving the opportunity to raise young stock under better conditions than are possible with close yarding, and also to put out the old stock at times to give it a change and rest.

I might describe a number of other plants, but cannot at present give plots of them, and in a general way the descriptions of the best of those where continuous long houses are used would be but a repetition of some of these, with variations according to the size of the plant, the "lay" of the land, and the proprietor's appreciation of the needs of his stock and the advantages and possibilities of the situation.

Where the colony plan, or any modification of it, is used, the houses are usually so much scattered that to plot the poultry houses and ranges on a scale that would give any correct appreciation of the arrangement, is not practicable for use in this connection. Besides, the colony plan more than any other, requires to be adapted to the features of the farm and to other operations carried on upon it, and the variations in it made from time to time with reference to those things may give very different arrangements in each of a series of years. In a nutshell this system consists in distributing about the farm, as is at any time most convenient, a number of small poultry houses of a capacity of several dozen hens each.

In the laying out of a permanent system of houses and yards the most important point to consider is the convenience of the keeper and economy of time and labor in caring for the fowls. In making this statement I assume that the comfort of the fowls and their needs indoors and out have had due consideration in the decisions as to the style of house to be used and the kind of yards. Of course in practice we cannot make such a separation of points to be considered, taking up one at a time and deciding it. We have rather to settle each point tentatively, then taking it up in connection with the next decide whether it can be carried out as we had planned or must be modified or entirely changed to get best results. One style of house might be preferred if each house was to contain only a few pens, while if a house of many compartments was to be built another plan might be better. The house plan preferred might require a system of yards which in some situations would be the best, because they would utilize all the land available for yards, but in other situations would not be satisfactory because they left out of use land which with another style of house and arrangement of yards could be used to the great benefit of the stock, and with some saving as well.

Occasionally it happens that the possibilities of a piece of ground are plainly seen at a glance, and almost anyone at all familiar with the laying out of poultry plants would know at a glance just the best way to arrange a poultry plant there. Oftener the best arrangement for the poultry plant comes to one only after a good deal of thoughtful study of the situation.

To anyone, however inexperienced, looking at a well arranged poultry plant it seems a very simple thing to lay out such a plant, but sometimes the simplest and most natural looking arrangements have been reached only after a good deal of puzzling over the situation and several remodelings. This is a feature by no means peculiar to cases such as we are now discussing.

Indeed partiality to a certain style of house or arrangement of yards has been a stumbling block in the laying out of many a plant, when if, as it was found that the preferred style of house and yard did not suit the case, the poultryman had set about making yards to fit the land and his convenience and houses to suit, the solution of the problem would not have been long delayed.

A long continuous house requires for its location a piece of ground that is level one way, otherwise the house must be built with one end higher than the other, or with short sections on different levels, either of which arrangements is unsatisfactory, the former making the temperature in the house very uneven, and the latter making passage through the house very inconvenient.

Again it very often happens that a piece of land most suitable for a long poultry house is so situated that by locating one or more long houses on it the yards are very much restricted. I have seen more than a few plants where all the advantages of giving the fowls good range had been sacrificed in this way.

Oftener the desire to have the poultry plant convenient to the dwelling and to other outbuildings is responsible for placing it where it is restricted on every side. Convenience in this respect is a point well worth considering, but it ought not to be secured at a loss of other advantages. It is certainly very much better to have a little longer walk between the dwelling and the poultry buildings than to expend in other ways more time and labor than is saved by having the poultry plant convenient to the house. If the poultry layout can be close to the dwelling, and convenient and suitable in every other way also, so much the better. The small plot of which a plot has been given combined in an unusual degree convenience to the dwelling and convenience in every part of the work.

For the most satisfactory layout of a poultry plant that is not made to exactly fit a prescribed space, the poultryman must take time. Even the "expert" is likely to make mistakes if he goes on a place to lay out a certain type of plant, and does so according to the situation as it appears to him at the time. Indeed, plants that are laid out by experts in this way, and, in fact, almost all poultry plants laid out on a large scale at the beginning are quite sure to prove unsatisfactory unless all features of the business can be carried on according to the original plan — which very rarely happens. The usual thing is for the business to develop along lines somewhat different from what the proprietor designed, and in this case the equipment must be changed to suit, or used at some disadvantage.

If the poultryman, as I have more than once advised in the course of these lessons, is content to let his plant grow slowly, build only as he needs, and build inexpensive buildings, he gives himself ample time to consider different plans in their adaptability to his needs and opportunities, and also to test different types of buildings and different methods on a small scale before introducing them on a large scale. This subject is one to which expert knowledge is more difficult to apply than to most of the subjects on which poultrymen ask for advice. To know a location thoroughly you must have summered and wintered with it several times over, and seen the effects of different weather conditions. So I have always been reluctant to give suggestions about the laying out of poultry plants for anything more than suggestions which would help the parties interested to solve the problem for themselves. I have laid out for myself one large poultry plant and two small ones. In no case was I able, though I was reasonably deliberate about it, and in the two later instances had a good deal of knowledge of other plants to draw upon, to make a plan that was so good I could not, after using it a little while, improve on it. This, I think, has been the common experience of those who have given

the subject much attention. One of the most convenient plants I ever saw finally took shape on a spot that would generally have been condemned as quite unsuited for the laying out of a model plant. The man who planned it was much above the average in intelligence and inventiveness, but the plan as ultimately worked out did not come to him all at once.

So I feel that in a lesson on this subject the most that I can do for a poultryman of some experience is to tell him what some others have done, and perhaps remind him of a few points he has overlooked. And for the beginner the most that I can do is to give him a general idea of how several good plants have been laid out, suggest for his consideration a number of points, and urge him to go slow, to take his time, not to plan too far beyond his necessities, and in his building to consider how far each part of the plant constructed can be adapted to changes. If the first buildings are of light and simple construction they may either be moved about or torn down and the materials worked over into other buildings with very little loss. If they are expensive buildings of very substantial construction they must either be used as they are or remodeled at an expense which not infrequently is as great as the cost of new cheap houses.

A most important thing for the person who expects to lay out a poultry plant is to visit as many plants as possible and study them, not so much with the idea of making a model plant, combining the best features of them all, but to find out how in the light of the owner's experience each plant answers the expectations with which it was planned. This gives one a better idea of the things that affect operations differently under different circumstances. It also gives one a better insight into the adaptability of different styles of houses and systems of poultry culture to different locations, and of the possibilities of tracts of land containing features not generally regarded as desirable for a poultry farm.

If one has the opportunity to visit a large poultry farm again and again at different seasons, he can get a very much better comprehension of the good and bad points of its plan. If he is learning the business and can make himself something of a journeyman working for a season on each of several good plants, he should be able, if he is constantly studying the subject for himself, to get something of the best out of each method and plan, and thus bring to his own plan when the time comes to make it a practical combination of good methods and features which it is rarely possible for those who plan without having had practical experience to make.

LESSON VIII.

Kinds, Breeds, and Varieties of Fowls.

BY "FOWLS" in this lesson we mean birds of the species "*gallus domesticus*," which for want of any other specific English term, are often called "chickens," though "chicken" applies properly only to their young. Perhaps in time, common usage will limit the use of the word "fowl" as we limit it here. There seems to be a tendency that way. Most poultrymen so use the word, but the explanation of this use of the term is sometimes necessary for readers not familiar with that usage.

We may classify fowls as:—Common or mongrel, cross bred, grade, pure bred, or thoroughbred, and "Standard" bred.

Mongrel fowls are fowls of no special breeding, generally a mixture containing the blood of many varieties of pure bred fowls, though in some sections there are still to be found flocks in which the blood of the old common stock is still strong. A flock of mongrels generally presents numerous very distinct types of fowls.

Cross bred fowls are the result of a union of two pure breeds. The term is usually limited to the produce of a first cross.

Grade fowls are produced by a systematic series of crosses, beginning with a thoroughbred male and females of mongrel stock, and mating each year a male of the same pure breed with females from the mating of the previous year. By this process, in the course of a few years, the stock becomes practically thoroughbred. Sometimes pure bred females are used in the first instance.

The terms *pure bred* and *thoroughbred* are synonymous, and the term *Standard bred* is also generally synonymous with the others.

As a matter of fact there are few, if any, stocks of fowls that are absolutely pure in blood; that is, entirely free from any mixture or trace of the blood of fowls not of their kind; but most of our pure or thoroughbred races are sufficiently well bred to make the production of specimens plainly showing obsolete ancestral characters extremely rare. A *Standard bred* fowl is a fowl bred to conform to the requirements of the "American Standard of Perfection," as promulgated by the American Poultry Association.

To be admitted to the "Standard," a breed or variety must be able to reproduce its type in a large proportion of its progeny. There are also other qualifications to be considered, as whether the breed presents new and distinct features; but as the judgment of the association is sometimes erratic, it happens occasionally that some fowls that are entitled to recognition are excluded, and also that unworthy varieties and breeds are admitted. Hence we find some pure breeds not "standard bred," because they are not "in the Standard;" and some breeds in the Standard that breed very indifferently. We also find breeds in the Standard in which poultrymen are little interested, while we may frequently find very great interest taken in breeds outside of the Standard.

In this lesson we limit special consideration of fowls to thoroughbred or pure bred fowls. Common or mongrel stock rarely satisfies for long the person trying to get pleasure or profit from poultry. The lack of uniformity in it, and the uncertainty of results in breeding from it, usually makes persons especially interested in poultry turn to pure bred stock to get these points, even if they have not been convinced that well bred stock are more profitable — better egg producers, and better for market poultry.

That well bred, thoroughbred stock is better for egg production, has been demonstrated in practice over and over. This statement will hold good in spite of the fact that some successful poultrymen do not use well bred stock — are not good breeders, while there is a very general belief that crosses are hardier, and many will affirm that crosses make better layers. Without entering into any argument in the premises, it may be said that there are two general facts that prove the general superiority of thoroughbreds:

First.—The great development of the poultry industry in this country followed closely the comparatively general introduction of thoroughbred fowls.

Second.—An overwhelming majority of poultry keepers whose successes attract attention keep pure bred fowls.

It would be absurd to maintain that success in poultry culture could be achieved only with thoroughbred fowls. Success depends on other things quite as much as on the kind of fowls kept. But it will be found a general rule that — whatever the cause — inability to get as good results from pure bred fowls as from mixtures is a serious handicap to a poultry keeper.

A brief reference to the history of the breeds of fowls will show how thoroughbred fowls supplanted others among progressive poultrymen, and also how some classes or types of thoroughbreds have generally replaced others. This historical showing should have a most important bearing on the attitude of the poultryman toward the various breeds and types, for in few things does the law of the survival of the fittest work more relentlessly than in the determination of the status of a variety of fowls.

It was between 1840 and 1850 that the American public began improvement of domestic fowls of the class to arouse enthusiasm and possibilities of have since unfolded. There were scattered out the country flocks some developed crude before their time, and in by people coming where superior types of but the public generally them, and they pressed on the poultry

Early in the "forties" fowls imported from attention. Traditions as much that passes as our lots of these fowls Orient by sea captains. the detailed stories of particular lots of these

Buff Plymouth Rocks.

and 1850 that the to be interested in the fowls. Prior to that country were not of a fad, or to suggest development which We may assume that here and there thoroughbred fowls — by the fanciers born some, perhaps, brought from foreign countries fowls were to be found; generally was not attracted made no distinct influence of the time. "ties" some gigantic Asia began to attract which are as accurate history, say that varieties were brought from the Some who do not credit the importations of fowls, claim that they

were developed in this country and aboard the vessels repute-brought them. Such an explanation, however, merely imports for it is not supposed that class and type to the public from our or developed tractating attention.

These Asiatic fowls were of the type of our Indians and Brahmins, but without the finish of feather, and sharp differences in varieties since taken were large great size as with the common fowls.

They were immediately taken up both by "fanciers" and by poultry keepers. The fanciers immediately began to multiply breeds by giving different names to different types and colors. Quite a number of poultrymen began at once to try to improve the common stock in their hands by crossing the large males on it. It is said that one effect of this was that within a few years the poultry brought into the Boston markets was noticeably improved in size. Another result was a general quickening of interest in better poultry. People began to try to learn something of established breeds of fowls; numerous importations were made from England especially, though there may have been some from continental countries. Within a few years most of the breeds having any vogue in England were pretty well represented here, and forty years ago Hamburgs, Polish, and Spanish were distributed quite generally throughout the northern states—not in such numbers as are found of popular fowls today, but still numerous enough to become familiar objects. Asiatics seem to have been distributed more slowly. All these worked into the common stocks of the country until, when I was a boy beginning to be much interested in poultry, a large proportion of the farm flocks contained many specimens showing unmistakable evidence of well bred parentage of some of these races.

Such breeding, however, was indiscriminate, and led to nothing definite. None of the new types produced were able to gain more than local prominence. Nor did the thoroughbred fowls of those days take with the public, especially the farmers, as did those which were to be brought out later.

It is less than thirty years since the first of our present "American class" of fowls was introduced to the public as the "Plymouth Rock," to be known later, as other varieties of the same breed type appeared, as the Barred Plymouth Rock. Into the disputes with regard to the origin of this fowl we need not enter here. Suffice it to say that in it were combined for the

Silver Laced Wyandottes.

ed in this smuggled vessels repute-brought them. Such an explanation, however, merely imports for it is not supposed that class and type to the public from our or developed tractating attention.

These Asiatic fowls were of the type of our Indians and Brahmins, but without the finish of feather, and sharp differences in varieties since taken were large great size as with the common fowls.

first time with promise of race permanence the most generally desirable qualities of the Asiatic and the smaller races of fowls. Soon afterward the Silver Wyandotte appeared. This was a combination of the Hamburg and Brahma, and a most attractive intermediate between those types.

A few years before the introduction of these "general purpose breeds," the Leghorns had been introduced, and they quickly distanced the older "every day layers" in that field, while with the new Plymouth Rocks and Wyandottes they awakened a general interest in poultry culture which has enormously increased the volume of our poultry products, and is still steadily growing.

The remarkable success of the new class of fowls led to an immediate multiplication of varieties of the same type—if indeed some of these were not already making when the pioneers of each breed appeared. In a few years more we had White Plymouth Rocks, Golden Wyandottes, and White Wyandottes. Then came Buff Plymouth Rocks and Buff Wyandottes, and after them Partridge Wyandottes, Silver Penciled Wyandottes, Columbian Wyandottes, and Partridge and Silver Penciled Plymouth Rocks. Of the duration of popularity of each of these, and of their relative occasion to speak a

Meantime the development of fowl have not ties of the two breeds of the state of Rhode serves a degree of isolation of easy communication, Asiatic fowls half a century the beginning of the breed, the only one important place for itself Rhode Island Red. These type and characteristics and Wyandottes. As fanciers became interested in pure bred fowls, for introduced, one farmer breed, another of another general was the mixture. I. Reds a few years ago mixed ancestry were conspicuous. But through all these mixtures a common type was followed, and when fanciers took up the breed it required only a few seasons of careful breeding to make them as "thoroughbred" as most breeds have been within the same time after their introduction.

S. C. Rhode Island Red Cock.

tive popularity there will little further on.

ments of this favorite been limited to the varieties mentioned. In a section of Island which still pretension rare in these days the introduction of tury or more ago marked making of a "local" which has made an impression in this country, the are fowls of the general of the Plymouth Rocks commonly bred before in them they were not foreign blood was often using a male of one breed, and so on. So that in most flocks of R. evidences of a very

In England the success in America of the medium sized general purpose type of fowl led to the development of a breed of fowls much the same in type, a little more "beefy," as English types of poultry usually are when compared with American, but still very like. This breed was called the Orpington. The object of the originator, as repeatedly stated by himself, was to make a breed of the general type of the Plymouth Rock and Wyandotte, but better suited to English tastes and markets. The American productions had the yellow legs and skin popular in American markets—the English markets wanted a white skinned fowl with flesh colored legs.

In considering the relative merits of the many breeds and varieties in this class of general purpose fowls, the reader should always bear in mind that they are essentially very like; that the differences between them are mostly superficial; that in many cases differences observed between the lots of two different breeds or varieties of this class when compared are peculiar to the case under consideration, and not general differences running all through the variety or breed. Hence as we shall see, any one of these varieties may be substituted for another in any

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S. C. Brown Leghorns.

superficial matter becomes for him an essential matter, meaning easier sales and better profits, with no difference in cost of production. If he is growing fowls only for his own table, and has no prejudice in the matter of color of skin, it will make no difference whether his stock is yellow skinned or white skinned. Or, again, take the color of plumage: A white or buff fowl is easier to dress in the pinfeather stage than others. If one is selling much poultry this slight difference in time and cost of dressing may amount to a large item in the course of a season, so large an item indeed, that he will prefer to keep only white or buff fowls; but if one is dressing only for his own use, or dressing for sale in small amounts, this advantage of color may not be of importance enough to call for consideration.

With these two illustrations we will pass the subject of superficial differences. I think that what has been said about them will enable the reader to see the point without further explanation, in each case of this kind to which allusions will become necessary as we discuss the relative merits of the varieties of fowls.

Returning to our main subject: In the Plymouth Rocks, Wyandottes, Rhode Island Reds, and Orpingtons, (of which there are some eight or ten varieties), we have a common type of medium sized, active, hardy, vigorous fowl, a good egg producer, and a good table fowl; we have now varieties representing quite all the colors, and combinations of colors, that have ever been popular in any breed of fowls. In other words, we have now fowls of this class to suit every taste in color.

Now on their economic merits and their general adaptability, this class and type of fowl, in the comparatively short time since its introduction, has far outstripped all others combined. Not only so, but in each breed in this class, (with the exception of the Rhode Island Red, of which there are but two varieties, differing only in comb), one or two varieties have gained a long lead on all the others. This means that it is these varieties that are best adapted to the needs of the greatest number of poultry keepers.

Then in the choice of a breed the beginner who is wise will not look through the entire list, and endeavor to select for himself on the descriptions he may find. He will rather consider first the most popular varieties, assuming at the outset that it is best to take one of these unless for some special reason another kind of fowl is to be preferred.

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I suppose that for nine-tenths of those who keep poultry, a general purpose fowl is the best fowl — will be found most satisfactory. What proportion of this nine-tenths are best suited with the most popular varieties of this class, is not so easy to estimate, but I should say certainly three-fifths, and possibly as much as four-fifths. These estimates will indicate to any reader interested in the matter, something of his "expectation" of suiting himself better by going outside of the popular varieties of the general purpose type of fowl.

But while the advantage in general popularity is overwhelmingly with one class of fowls, and with a few varieties in this class, there is still a large field for the others, and if the tendency is for growers of poultry for economic purposes to concentrate on a few varieties, the tendency among fanciers is quite opposite, and the number of people open to interest in other varieties is always great enough to make possible a liberal demand for any fowl that has merit and beauty.

Coming now to a detailed consideration of the varieties mentioned, we have *Plymouth Rocks*—Barred, White, "Standard," and well and Partridge and Silver recent introductions, not determined).

Plymouth Rock in this varieties in popularity. ago it was probably coming both special poultry some attention was given profitable, and fanciers' Barred Rocks in the all other thoroughbred great predominance in all to their being first in superficial faults: They difficult to breed to a and they had many black dressed in the pin feather these drawbacks, they eminence, because the Rocks were lacking in Wyandottes, which, in some sections, surpassed the Barred Rocks in popularity, were, on the average, smaller fowls, and many breeders had injured their stock by forcing early egg production.

White Plymouth Rocks are now fully equal to the Barred in every economic quality, and have the superficial advantage of color, which is gradually bringing them to a popularity more nearly equal. As between White and Barred Rocks, choice hinges on taste, and on whether easier preparation for market is an advantage. It is when many chicks are to be dressed in the pin feather stage. When stock is not dressed until mature — as is the case on most farms — the white color is no advantage.

Buff Plymouth Rocks are quite popular, but not so much so, nor with such promise of permanent general popularity as the Barred and White. Their most serious fault, from the average breeder's point of view, is that common to all buff and red fowls — the wide departure from approved shade of color even when bred with great care and good judgment to maintain color. To the fancier this may not be a fault. Those who admire buff fowls, and find pleasure in producing them, will readily sacrifice the culls, but a poultryman not especially interested in the fancy will not long be suited with buff or red fowls if he wants uniform appearance in his flocks, for he cannot afford to sacrifice off colored hens. If he is indifferent to lack of uniform

Indian Game Hen.

and Buff, (which are established varieties), Penciled, (which are whose status is as yet

Of these, the Barred country has long led all Until a very few years rect to say that — count-farms, farms on which to making poultry plants, there were more country at large than of fowls combined. Their numbers was due first of the field. They had two were, and still are, very high excellence in color; pin feathers when stage. But in spite of long held their pre-early White Plymouth vigor, and the White

Houdans.

appearance he will not count this fault against them.

Partridge and Silver Penciled Plymouth Rocks are very handsome fowls, but at present require great skill in breeding. Like all laced and penciled fowls, they will always be difficult for most breeders to handle, and if their popularity, as compared with the other varieties of the breed, follows the same course as that of similar colored varieties in the old breeds, they are not likely to come into a general and lasting popularity, but will be bred mostly by those who want general purpose fowls with single

combs, and have a decided preference for one of these colors.

In *Wyandottes* we have, naming them in the order in which they were admitted to the "Standard," the Silver Laced, Golden Laced, White, Black, Buff, Partridge or Golden Penciled, Silver Penciled, and Columbian.

The typical *Wyandotte*, as compared with the typical *Plymouth Rock*, is a shorter bodied, compact, blocky fowl, and a little smaller fowl. But many breeders of *Wyandottes* breed them as large as *Standard Plymouth Rocks*, and larger than the general run of *Plymouth Rocks*, while it is probably true that *Wyandottes* as they run are smaller than *Plymouth Rocks* as they run. The difference in size is one which any breeder of either variety who chooses to do so may easily overcome breeding *Wyandottes* to *Plymouth Rock* weights, and vice versa, so that for general use we may say that there is no material difference in size between *Rocks* and *Wyandottes*. The real differences in this respect are, that the most symmetrical fowl in each breed is likely to be the fowl about standard weight and size for the breed. *Wyandottes* of *Plymouth Rock* weights are apt to be a little coarse and "cochinny;" *Plymouth Rocks* at *Wyandotte* weights a little undersized. From this it follows that if a poultryman wants fowls which we may term small medium in size, he can get them in *Wyandottes* without departing as far from a good type as he would if he tried to breed *Rocks* to the same weights. Conversely, if he wants large medium fowls he can get them in extra large *Plymouth Rocks*, which will be a little coarse, but not so far away from the breed type as if he tried to get as large fowls in *Wyandottes*. In egg production there is practically no difference in average number of eggs laid. The *Wyandotte* eggs average a little smaller, as would be expected, but the difference in this respect is not important.

As between the different varieties of the *Wyandotte*, the White is by far the most popular, ranking as one of the few most popular fowls. The Buff, though far behind the White, comes next in popularity, and so far these are the only varieties of the breed to gain and hold any great popularity, though all the laced and penciled varieties have had their booms, and have maintained a following large enough to keep them well in the public eye. The Black *Wyandotte* has never attracted much attention. The Columbian *Wyandotte* is by many regarded, as a "coming" variety. Being a white fowl with black points like the *Light Brahma*, it will dress like a white fowl.

Of all these varieties the White furnishes the greater proportion of specimens of good size and with true *Wyandotte* shape. This is because more people are interested in it, and more of those interested in it are especially interested in market poultry culture.

Of *Rhode Island Reds* there are, as has been said, two varieties differing only in the shape of the comb, one having a single, the other a rose comb. Taking the average *Reds* as we find them, the single combed variety might — on its looks — be termed a *Red Plymouth Rock*, and

Silver Spangled Hamburgs.

the rose-combed variety a Red Wyandotte. Fanciers of Reds try to make the Rhode Island Red of a shape intermediate between Plymouth Rocks and Wyandottes, but as the reader who examines many specimens of the three breeds will find, the breed shape is still very rare in the Reds. As a matter of historical fact, the first Buff Plymouth and Buff Wyandottes exhibited were Rhode Island Reds, and a good part of the stock of both these Buff varieties is of Rhode Island Red origin.

In Rhode Island Reds, then, we have two more varieties of the medium-sized general purpose

fowl, not essentially different from Plymouth Rocks and Wyandottes in practical qualities.

It is from the varieties of the three breeds just described that most poultrymen will make choice of the fowl that suits them, and whatever else they may begin with or try, most poultrymen will eventually settle on a variety of this class. All these breeds have, with the exception of an occasional stock, the brooding faculties active. All lay tinted eggs varying from rich creamy color to very dark "brown." All are easily handled, and give fair to good results when fed and cared for with ordinary good judgment and regularity.

The Buff Orpington is the only variety of that breed at all generally introduced into this country. Without denying it as great economic merit as any variety of the American class, and admitting that as seen on exhibition Orpingtons have generally shown better table form than the American varieties at the same shows, one is quite safe in predicting that their general effect on the varieties with which they come into competition will be to improve rather than to displace them. The other varieties of Orpingtons, Black, White, and Spangled, have attracted little attention here outside the circle of enthusiastic Orpington exhibitors. Considered as a commercially popular fowl, the question of the popularity of Orpingtons in this country turns on the question of the continuance of American prejudice in favor of yellow-skinned table poultry. If one can convince himself that this is passing he may see a large popularity coming for the Orpingtons. Otherwise he is likely to believe that the American varieties will continue to give general satisfaction.

Next to the American class in popularity comes the Mediterranean class, comprising Leghorns, Minorcas, Spanish, Andalusians, and Anconas. These all lay white eggs, and are non-sitters.

Leghorns. In these there are seven varieties, of which only two have a broad popularity — the S. C. Brown and the S. C. White. Of the two the White seems to be most popular throughout the territory which contributes New York city's supply of fancy white eggs. Throughout the rest of the country the Browns are generally more numerous. The Single Comb Buff Leghorn made very rapid advances in popularity for a while, but then went backward. The rose-combed varieties of the colors mentioned have never approached the single combs in popularity, though the Whites and Browns are quite well distributed. Black Leghorns are not often seen, and the Silver Duckwings are still more rare.

The Leghorns' chief claim to attention is their laying propensity. They lay better under indifferent care, except in early winter, than any fowls not of their class, and except when frost is severe enough to affect their large combs they are reasonably hardy. Average Leghorns are too small to be of much value as market poultry. Many breeders breed to a size to mate

their Leghorn chicks, and young hens compare favorably with ordinary stock of the American breeds, but the average Leghorn is a very poor table fowl.

The Black Minorcas are the next breed in this class in popularity, though far behind the popular varieties of Leghorns in this respect. Ordinary Minorcas are found distributed throughout the country do not differ greatly from Leghorns. Indeed it is not an unheard of thing for breeders to supply customers with Black Leghorns and Black Minorcas from the same pens. Typical Black Minorcas, as bred in the sections where they are most popular are medium large fowls, sometimes as large as Plymouth Rocks; are good layers of very large white eggs, and are fine table fowls for home use, though their white skin and dark legs are not in favor in most markets.

Andalusians and Anconas do not differ much in anything but color, from Leghorns. The Andalusian is a trifle more on the Minorca type; the Ancona on the Leghorn type. The Andalusian is a slaty blue in color, and very difficult to breed to standard color requirements. The Ancona is a mixed (speckled) black and white fowl. Both have their admirers, and the Andalusian in particular is given a good deal of attention by fanciers. They may be rated as fowls for the fancier and amateur rather than for those looking for the most suitable fowl for commercial purposes.

The Black Spanish are practically extinct, except in the hands of a few fanciers.

Of much the same general type as the Leghorns are the Hamburgs and Polish. Varieties of both breeds were popular before the introduction of the Leghorns, but being generally less hardy, more difficult to keep and rear, and lacking the yellow legs and skin which our markets prefer, they were rapidly crowded into the background on the advent of the Leghorns. They are still bred by many fanciers, and seen in considerable numbers at some shows. Most Hamburgs are so small as to be of little practical value. A few breeders maintain good size, and a type that is well suited both for egg production and for the family table. The Polish fowls, though small, are generally plump and meaty. They are good layers under favorable conditions, but their large crests make them very susceptible to colds and rump when exposed to wet weather.

In the Asiatic class we have another group of fowls generally crowded out by the "general purpose" fowls. The Asiatics, of which there are three breeds — Brahmas, Cochins, and Langshans — are large fowls — too large for general market demands, and among those keeping fowls for commercial purposes are bred mostly for special markets. With the exception of the Light Brahma, it may be said that the Asiatics are of no economic importance today, and it occupies a very limited field. Light Brahmas in a few localities are produced in very large numbers for large roasting fowls. They are the largest of fowls, and as it takes them so long to attain full size, they remain soft meat much longer than fowls of the smaller breeds. With judicious management they are good layers, but comparatively few poultrymen succeed in getting satisfactory egg yields from any Asiatic fowls. The Langshan, the smallest of the group, is the best layer under ordinary management, but its color, (black, the White Langshan has never become well known), is against it for market poultry. An objection, in most sections, to all Asiatic fowls, is the foot feathering. Wherever the soil is heavy and there is much wet weather, or where these fowls are not provided with houses where the floors are dry and littered with material that will quickly absorb the water in the foot feathers after they have been out on wet ground, this foot feathering is really a fault. Asiatics are the most docile of fowls and the hardiest, but unless one gives them plenty of room and uses judgment in handling them he will not get as good results from them as from fowls of the American class for any purpose. In the hands of those who understand them they are good layers — comparing favorably with any other breed, but the average poultry keeper gets very few eggs from them, and soon changes to a breed easier to handle.

In our "Standard of Perfection" Dorkings, Red Caps, and Orpingtons are grouped together in the "English" class, though the three breeds are of distinctly different types. The Dorking is an English production of great antiquity. The Red Cap is perhaps best described as a fowl of the Hamburg class bred to large size, while the Orpington, as has been seen, is an English translation of the type which prevails in the American class.

Red Caps are rarely seen in this country. Dorkings are found in considerable numbers at

some of the leading shows, and in Canada are quite extensively kept as farm fowls. They are commonly reputed indifferent layers and rather delicate. I kept a small flock secured from a Canadian breeder for several years, and in this limited experience with one stock found them hardy and good layers. As table poultry the Dorking has long ranked as of finest quality, and fully deserves its reputation.

Houdans are the only French breed well known in this country. They are as good layers as Leghorns, and first class in table quality, but not as rugged as is desirable for fowls for general use. Like the Polish, they have heavy crests which to many are objectionable. The color of their skin (white) and their dark legs are also against them as market fowls.

In Game fowls we have three distinct types — the Pit Game, the Exhibition Game, and the Indian Game. The Pit Game fowl is practically the Game fowl as it has been bred for centuries in England, with perhaps a little more differentiation in colors. The Exhibition Game is a long legged, long necked, exaggerated Pit Game, which has no place outside the exhibition room and the yards of the fancier. Pit Games are really valuable economic fowls as far as productiveness and quality go, though not to be classed for general purposes with the breeds of the American class. Perhaps their greatest fault from economic standpoints is their "gameness," — their pugnacity, and quarrelsomeness. These are qualities destructive to comfortable and profitable work with poultry, and the Game as a farm or practical fowl, soon disappears from sections where the economic value of a fowl becomes the first consideration with poultry keepers.

The Indian Game is a larger and meatier type of fowl than either of the others, and, as bred in England and America, is less pugnacious. I think it should be regarded as a useful type temporarily somewhat neglected because of the disappointments which followed its introduction to the American public, with widely exaggerated reports of its laying and table qualities.

Of course it is out of the question to discuss in a single lesson exhaustively the qualities and adaptabilities of all these breeds and their several varieties. As I said near the beginning of the lesson, the poultry keeper should limit consideration of varieties to the few popular general purpose breeds unless there are special reasons for not doing so. The most general illustrations of exceptions to this rule may be found where one is going into some special branch of poultry culture, as the production of white eggs for the New York city trade, or the production of large roasting chickens for the Boston market. Even in these exceptions, the principle of the rule I have given applies, and the poultryman should follow custom, and take the breed, or one of the breeds most popular among those in the line in which he is engaging.

LESSON IX.

Stocking the Poultry Plant.

IN THE last lesson the different varieties of poultry were described, and their adaptability to different conditions and purposes discussed. In this lesson we take up a number of questions in which beginners, wherever located, or whatever their objects, are about equally interested.

How Many Breeds or Varieties Should a Poultryman Keep?

Those who have been long in the business are generally agreed that one variety is better than more—is enough. Even those who keep several or many varieties are quite unanimously of the opinion that it is better to start with a single variety, and to limit oneself to that one variety. It does not necessarily follow from their taking this position with reference to what it is best for one beginning now to do, that it is also better for one who has several or numerous varieties of fowls to drop all but one.

Granted that it might have been better not to keep more than one variety, it still is true that when the thing that was not best has been done, conditions are sometimes created which make it better policy to keep on as one has begun than to change to the more approved situation.

A breeder of several varieties who has established a trade in each, cannot drop any of them without letting go trade which it cost him something to secure, and he cannot afford to let such trade go unless he is reasonably sure that increased sales from the variety he retains will compensate for the loss of trade which follows the dropping of the others. The beginner's situation is different. He can take the one variety of his choice, and concentrate all his efforts on securing a fine stock of that variety, and building up a trade in it. If he is successful in the first, and has ordinary good business ability, he can hardly fail to succeed ultimately in the second. In the earlier days of poultry culture it may sometimes have been good policy to start with several breeds; as to that, opinions differ. But of late years trade tends more and more to go to "specialists"—that is, to breeders making a specialty of a single variety, and in the stronger competition for exhibition honors, and for business that exists today, the man of several breeds is more apt to be crowded aside by competitors, and neglected by purchasers. He finds it harder to win a satisfactory share of the prizes where in each variety he keeps he has to contend with men of equal or greater skill in breeding who are applying to that one variety as much skill as he has to divide among two, three, or a half a dozen, and to add to his difficulties, buyers generally prefer to buy of the man who keeps but one breed. The reasons some have for doing this are fallacious, but it is the condition of which the breeder must take account. He can adjust his business to conditions much more readily than he can change conditions to fit his ideas of how business should be done.

Beginners often think it advisable to keep two varieties of different classes and types to meet different demands or serve different purposes. The most common cases are to keep large fowls for table purposes and small fowls for laying; and to keep fowls of the Asiatic or American breeds for winter layers, and Leghorns for summer layers. Usually they find that results do

not justify the arrangement. The special adaptabilities of the different breeds to different purposes are more theoretical or fancied than real. Thus Leghorns, though easier to get eggs from than heavier breeds, and generally steadier layers in summer because they are non-sitters, frequently surprise the man who would keep them for summer layers, by laying as well in winter as his supposed winter layers, while the difference between the two kinds for the year may be insignificant. The fact is that in general the different breeds lay about alike when given good care—such as those trying to make poultry pay commonly give their fowls, and in time the poultryman realizes that the few practical advantages of keeping two types of fowls are about offset by the disadvantage of having to maintain two stocks, and the frequent inconvenience in adapting the accommodations to the different habits of the fowls.

What Quality of Stock?

The next question of interest to the beginner is the quality of stock to buy. Beginners usually purchase low priced stock—that is, low priced from the fancier's standpoint. From the beginner's point of view, two or three dollars for a female, and three to five dollars for a male is extravagance. He may pay such prices, but prefers not to let his acquaintances not much interested in poultry know the amounts. Occasionally a beginner will pay much higher prices. If financially able to do so, beginners often buy the highest priced birds. Their idea is that by so doing they buy a place and a standing among the foremost breeders.

There certainly is an advantage in buying high quality stock, and it may be from every consideration the best policy for one who is financially able to do so, and who knows how to maintain its quality. It is on the latter point that most beginners fail. No money can buy skill in breeding except money which may be paid to a breeder for birds he has produced, or as salary. His goods and his services may be bought if he is willing to part with them for a consideration, but this kind of knowledge and skill is not to be had separate from individuals who have it.

As we saw in the lessons on breeding, it requires quite as careful selection to maintain excellence in fowls as it did to secure it. In unskillful hands the best of stocks are apt to deteriorate rapidly. A single season of unskillful management of the breeding stock may put the stock of the man who bought the highest priced birds he could get on a level with that of one who bought much cheaper stock. Unless one is in a position to get expert services in mating his stock it is as well for him not to pay extremely high prices. I would not say that he should limit himself to the lower figures I have mentioned. He might go several times as high, and if he proves an apt student of mating problems and successful in growing chicks, have results that justify the larger expenditure for stock, but as a rule the poultryman who buys extra good stock at the start does not establish his stock on that foundation. The rule is that in his inexperience and his unskillfulness his first stock goes back, and when he realizes this and sees where and why he failed he buys anew for foundation stock, and on this stock bought when he has a measure of experience to show him how to use it, he builds up his permanent line. Hence in buying ordinary good stock at about the range of prices mentioned, the beginner with poultry is simply applying the common principle in use wherever people work with materials which may be damaged or lost in manipulation, of using rather cheap material to experiment with.

Beginning With Stock or Eggs.

The determination of this question is settled in part by the season when the beginning is made—people are going into poultry keeping at all seasons. Unless the start is making during the late winter or spring, that is, during the hatching season, beginning with eggs would not be considered (except in the hatching of winter chickens, in which line, as stated, most growers buy their eggs for hatching). For those beginning at times when the start might be made with either stock or eggs, it is often a puzzle to decide which way to begin. Results by either method of starting are so variable that one has to be cautious about making positive recommendations, but I believe that the greater number of satisfactory beginnings are made from stock. Perhaps as good a way as any is to try both ways,—divide the amount available for the purpose, buy a few fowls, and invest the rest in eggs. Though there is no sureness about results, unless luck goes entirely against the beginner, he is likely to get some good chickens from fowls mated as they were sent him by the breeder from whom he bought them. But in buying eggs there is always the possibility of getting a good hatch and a lot of exceptionally

good chicks at a cost away below what birds of the same quality could be bought for at maturity. This chance is attractive enough to make most of us risk the total failure which comes to the buyer of eggs about as often as a satisfactory hatch of chicks that turn out well.

Buying young chickens is much like buying eggs except that the uncertainty of hatching is eliminated as far as the existence of the number of chicks desired is concerned. The chicks are shipped before it begins to appear whether they would generally live and thrive, and the results at the end of the season are likely to average only a little better than with eggs. That little, however, is an inducement to many to buy new hatched chicks rather than eggs.

It is not possible to eliminate risks in starting, or—for that matter, at any stage of the proceedings. Whichever way one elects to begin, or if he prefers to try them all, there is risk of failure to succeed in any of the attempts.

Nowhere is persistence more necessary than in efforts to get a start with stock of poultry of the kind one desires. In what follows I shall try by suggestions and advice to help each beginner to avoid mistakes, but I cannot assure him of any way of certainly avoiding them. I made the common mistake myself, of beginning with a number of varieties, and made no more than the average number of mistakes in buying, yet it took me two to three seasons to get a good start—just a start with a few birds in most varieties, and some it took longer than that.

In many cases the question as to beginning with eggs or stock is better answered by considering it with the question,

Where to Buy.

The greater number of novices in poultry culture seem to think they can buy better stock, whether in birds or eggs by sending to some breeder at a distance for it. They see the faults—some of them—in the stock of nearby breeders whose yards they visit. The stock they do not see they judge by the breeder's advertisement and descriptive literature which rarely admit that the stock has any serious faults, and his correspondence, which only occasionally refers to the weak points in the stock, and then minimizes faults more than a disinterested person would. Common sense might teach even the novice in poultry transactions to discount liberally the salesman's enthusiastic recommendations of his goods, but apparently only experience in buying teaches this lesson effectively, and the average beginner in buying poultry will pass by his neighbors and cheerfully pay a little higher price, plus a heavy express charge, for stock no better than he could get close by.

I would not have any reader conclude that there is never an advantage in buying from a distance, for there often is a great advantage in it, but when buying stock of ordinary grades, if you have an opportunity to buy from a nearby breeder whose stock you can inspect, within the range of prices mentioned earlier in this lesson, the chances are that you will be better satisfied in the end than if you send the same amount of money for the same number of birds to a breeder at a distance. After one begins to be able to judge of the quality of his stock, to know where it is weak, and to know something about the characteristics of different stocks of the same variety, it will be his best policy to buy what he needs where he can get what suits him best, but a considerable part of the present buying away from home is of no benefit to anyone but the transportation companies. If every poultry keeper who had not a good reason for sending away for breeding stock and eggs for hatching would buy at home, sellers generally would sell as much as they do now, and the business would be on a much better basis.

There is another and a strong reason for the novice buying his first stock in his own locality if possible. Fowls, like all kinds of live stock, and like human beings too, are with few exceptions affected by change of climate. Nearly all fowls are unfavorably affected for a time—for a few weeks or months. After that some are likely to be better for the change, some worse, others not notably affected either way. On the whole the period of acclimatization is an unsettled period, and the beginner will almost invariably do better to work with acclimated stock.

But not all beginners can buy stock at home. There are still many localities in which thoroughbred stock is rare. Within a few years I have had a letter from a poultryman in a section where a show, at which he was an exhibitor, had been held annually for several years, asking for a description of White Wyandottes, one of our most popular varieties, and stating that

they were unknown in that vicinity. So, while our popular varieties are quite well distributed there are still many places where they are not to be had. The beginner located in such a place must go or send abroad for stock. If it is at all possible for him to go himself to yards where stock of the variety he wants is to be procured, it will pay him to do so. He can then see how the stock he buys compares with other specimens of the same stock, and have a better idea of its actual quality. Seeing the stock as it grows, he will also better appreciate the variations in it, and be better able to judge of the general quality of the stock he produces from it.

If it is impossible for him to inspect and select his stock, and he must buy by mail, he will still find it to his advantage to buy as near home as possible. By doing this he saves express, and, further, when the express charges do not constitute too large a proportion of the cost of the fowls delivered, he can return the fowls if not satisfactory.

Sometimes in making shipments a breeder will agree to pay return express on a lot of birds not found satisfactory, but in general the buyer pays express both ways. There is room for an argument as to what is fair in such cases. I think the best way for a buyer to look at it is this:—If he bought the fowls himself at the breeder's yards, whatever the distance from his home, he would not expect the breeder to pay his traveling expenses, or any part of them. He buys "on approval," because of the inconvenience or expense of going to see the fowls. He should then consider return express charges on unsatisfactory birds as an expense arising from his inability to inspect the stock before buying, and not an expense on account of the breeder's failure to send him stock that would suit, and therefore an expense for which not he but the breeder is responsible. If the buyer will look at the matter in that way he will enjoy more peace of mind than if he resents the payment of return express as an imposition for which the party who sent him the fowls is responsible.

In deciding from whom to order stock by mail, a beginner is necessarily very much in the dark. Many write to me for advice, information, and sometimes recommendations in this matter, saying that their resources are limited, and they cannot afford to make any mistakes. I can appreciate their position, and also approve the caution they display. At the same time I know of no way of avoiding "mistakes" in buying stock. I have been buying fowls, sometimes a good many and sometimes only one or two in a season, for sixteen years now, and I am somewhat acquainted with the quality of stock kept by a very large number of breeders, yet I cannot avoid "mistakes" of this kind. I don't think anyone can. The best I can do is to reduce the cost of mistakes in buying to the minimum by never buying more fowls than I actually need. That point we will take up again.

In deciding from whom to buy, give the preference (for reasons previously stated), to breeders nearest you. Write to as many of these as you wish, stating your wants, and asking for prices, and terms. Most breeders state their terms in a general way in their circulars, but not all are as explicit as is desirable. If you are going to buy stock on approval, (and it is the only way to buy if you cannot buy on inspection), you should have it distinctly understood before you send your order on what conditions the shipment is made. Some breeders make the statement that stock may be returned at their expense "if not as represented" in their circulars or correspondence. This is not enough. It is too easy to misinterpret both the buyer's statement of his wants and the breeder's statement of what he will send to fill the want. Make your order conditional on the stock being *satisfactory to you*. Have the seller's written agreement to that effect before you send him the money. If he will not agree to that don't buy of him. A man who will not make such an agreement may be perfectly square. Looking at the matter from his point of view he may think it not good policy to make sales that way. I think, however, that most breeders will without hesitation agree to such terms for shipments within reasonable distances.

How Much to Buy.

To make mistakes or misfortunes in buying of as little consequence as possible buy only for actual needs. I mean now your own actual needs. I think one of the greatest mistakes a beginner can make is to buy more stock at the start than he needs for himself, expecting that by selling eggs for hatching he is going to get back the additional money put into the stock, and more. The novice is wisest who lets the egg trade alone until he has his stock well estab-

lished. One cannot be certain of the number of fowls or eggs that will supply him as many chicks for the season as he wants, but he can take the number that should do so if results are about average. Generally speaking, a breeding pen — that is, a male and four females — is enough to begin with. In more cases a trio will be better. Then if the fowls do not breed satisfactorily the outlay has not been heavy. There is, of course, a loss of time, but that cannot be avoided. Indeed, it is no uncommon thing for breeders of considerable experience to lose practically a whole season through the failure of their stock to breed satisfactorily.

Returning Unsatisfactory Stock.

The novice generally is not capable of judging the quality and value of the stock sent him accurately, nor is it possible to give him instructions that will enable him to arrive at an exact estimate; but there are some points that may be given that will help him to know some faults for which he should reject stock, and some reasons why he should sometimes hesitate to reject it on his own unfavorable impression of it.

Unless bought in the fall, birds that are decidedly immature and undeveloped should not be accepted. Breeders sometimes, in their eagerness to fill orders, send chickens whose quality is as yet uncertain, telling the buyer that they will grow into fine birds by the breeding season. If the buyer was advised before ordering that this class of stock would be sent him, he has no cause to complain, but such birds too often fail to develop into what the breeder said they would, because they are not, when received, what they should be at their age.

Sick, injured, or dead birds the buyer should refuse to accept from the express companies. This leaves the settlement of responsibility for damage where it belongs — between the shipper and the transportation company.

The mere fact that on inspection a pen of fowls fails to realize the anticipations one had been indulging of what he was to get, ought not to lead him to reject them as unsatisfactory. If the birds are apparently in good condition, take them out of the coop, put them in a pen by themselves, and observe them for a little while — at intervals for a few hours, or, at most, a day. Give them and the seller a chance. A reasonable time is allowed — and should be taken for inspection. Often birds just from a journey look quite different after a short rest. But don't keep the birds more than a day. If you are then still not satisfied with them, return them promptly. For whatever troubles may develop while the stock is in your hands, you are properly responsible. A buyer cannot, in fairness, keep stock for one or two or more weeks, and then ask the seller to make losses good.

Do not let a small fault, as you see it, decide you to return birds bought at ordinary prices. There are few specimens produced free from faults, and they are not for sale except at very high prices.

If one fowl in a lot seems to you decidedly superior to the rest, don't use that fowl as the standard of the value you should get at the price, and be dissatisfied with the others. It may be that in that one specimen the breeder has given you special value. It is not at all an uncommon thing for breeders anxious to extend their reputation to give customers some rather better birds than the prices warrant.

Don't allow any ideas you may have of distinctive marks indicating the absolute purity of stock of the variety you are buying, to lead you to reject or find fault with it. Many novices have a notion that pure bred fowls have certain distinctive features which invariably appear in well bred stock. This is not the case, and in rejecting a fowl for lack of such mark, one may reject a fowl that is especially valuable for other or general excellence.

Don't be too much influenced in your opinion of the stock you buy by the comments or judgment of others who see them. Consider all such on the basis of the speaker's actual knowledge of and experience with the kind of stock in question. On the whole, it is safe to give the seller and the stock the benefit of any small doubts you may have on points other than sickness, damage, or immaturity. Persons selling stock cannot afford to send out stock that will not suit, and in most cases where this is done the party doing it is at fault because of his lack of experience in selling, rather than because of any deliberate purpose to deceive or defraud.

Testing the Stock.

It is always safest to breed one's first pure bred stock as mated up by the breeder from whom it is purchased. The beginner should remember, however, that failure to get results that suit him may be due to his inexperience—to mismanagement of the stock. Even if his experience with inferior stock has been such that he is sure of his ability to grow good chicks, failure to get such from his new thoroughbred stock the first season should not lead him to discard it. In such cases I would advise buying a few more birds from another breeder, and breeding them separately, but continuing to breed the first stock bought, for it not infrequently happens that stock that did poorly the first season in a new place, does uncommonly well the next, and it is therefore poor policy to turn it off without a further trial.

LESSON X.

The Most Important Part of the Poultryman's Equipment.

BEFORE leaving the class of topics we have been discussing in the last few lessons, I want to consider more particularly some of the points that have had incidental mention in them. We have discussed a number of matters of prime importance to the beginner in poultry culture:—the possibilities of the business, the different branches of it, locations, markets, the kinds of stock, and various like questions, and I have tried to indicate how a venture in poultry keeping may be as free as possible from mistakes that use up the beginner's capital and often exhaust his enthusiasm.

But not only through these lessons, but constantly in correspondence with readers of the paper, I find that many express in varying degrees the feeling of the correspondent whose letters with my comments on them appear in this issue of the paper. They think it would be much easier for them to get along if I would explain and decide for them in everything, down to the last and least detail, and where I stop they imagine that there are other reasons for stopping than those that are given, and that my freedom of speech is restrained by consideration for other interests.

When in connection with this series of lessons, I organized a special class in poultry keeping, with the purpose of keeping more closely in touch with a number of poultry keepers, and following their work in its details, and advising them more definitely than is possible in the majority of cases, I found in connection with this class an obstacle I had not at all anticipated. By far the greater number of the class evidently failed to understand that the "Special Section" was in effect only an effort to give individual instruction, as far as it could be given under such conditions, to a limited number of readers of the paper. The questions they asked, and the comments they made soon made it clear that the general idea was that the special section students were to be given such an answer as they wished to any question they saw fit to ask.

At the time I was quite at a loss how to account for this, for I had tried in the announcements and in all correspondence relating to this plan, to make it entirely clear that I was not going to do these very things. I have since thought that this general misapprehension of the purpose of that plan was owing to the general feeling among novices that the greatest hindrance to quick and sure progress in poultry culture was in the impossibility of getting absolutely authoritative and reliable directions as to what to do in every instance where the poultryman is called upon to make a decision.

In a sense this is true:—but what to the novice seems to be the trouble is not the real trouble. His view of the situation is superficial. His difficulty is not that he can find no one to direct him, but that he does not know himself. He is undertaking to do things for which he has had no preparation, or inadequate preparation. The first and strongest reason for urging beginners in poultry culture to begin small and go very slowly, is that only in this way is it possible

for those who learn by themselves (that is, who through the agency of books, papers, their own experience, and an occasional interchange of opinions with another poultry keeper, are self-taught) to be in any sense well prepared to make choice and decisions when necessary.

Where a man learns poultry keeping as he would a trade, occupation, or business in which a thorough training covering a period of years is regarded as essential to proficiency, he has, during all that period, frequent—perhaps daily—opportunities to see how others under various conditions make such choices as he would have to make if in business for himself. He can also see subsequently how events mark a course as wise or unwise, and through it all he hears from those interested in the matter discussion of all phases of the situation.

Now there are, as we all know, some men whom no amount of training, experience, and instruction will fit for positions of independent responsibility. They need always someone to oversee and direct their work, to plan for them and decide for them. And there are some men who, wherever you put them, learn very quickly, as compared with the average of their fellows. But I have never yet seen a man who in any position acquitted himself well who had not the particular kind of knowledge and skill needed for effective work in that position. He may not have acquired this knowledge and skill for the purpose of using it in this particular way, but it was knowledge and skill that could be applied, and when you hear of a man accomplishing wonderful things in a line new to him, you may be very sure either that his previous training adapted him to this work, or that the reports of what he is doing are exaggerated. In poultry culture the stories of phenomenal successes by novices are—I think without exception—greatly exaggerated, or refer to accidental successes never repeated. As I have said in one of the recent lessons, the plants that I *know* are successful have all been developed very slowly from small beginnings.

The attitude of the beginner who thinks he would get along all right if only someone would tell him just exactly what to do in each situation as it arises, after having outlined for him the general scheme upon which his poultry keeping is to be conducted, is practically that as he looks at it the poultry business is one that, with all conditions right or best, runs itself. Most beginners will unhesitatingly affirm that this is not their attitude at all, but in practice will still continue to show that that is exactly their position.

Mr. J. begins poultry keeping with White Plymouth Rocks, because in some way he has formed the opinion that they are the best fowls for his purpose. If his hens do not lay, and his neighbors' Buff Rocks lay well, he concludes that the fault is in the stock. It never occurs to him that it is in his inexperience. When he began poultry keeping he fed by the method that seemed best to him. Perhaps it was recommended by someone who used it very successfully. Not getting results by it, he casts about for another method. He takes that of the poultry keeper who, so far as he can learn, is most successful—just at that time. He succeeds no better by it, and tries another, with no better success. Perhaps he tries a dozen different ways of feeding before he begins to get a satisfactory egg yield. Then he thinks results are due to the particular feeding formula used. The fact usually is that out of his varied efforts in feeding he has developed judgment and skill in feeding, and the results he is getting are not due to special virtue in the feed in use, but to the cumulative knowledge and skill that have been acquired little by little.

There is another fact closely related to this which many do not appreciate. It requires a good deal of familiarity with a subject to enable one to grasp understandingly anything beyond the simplest and briefest statement of matters in it. Even in a series of simple and easily understood statements many will make no lasting impression on the mind of one not familiar with the matters treated. Some readers who thought the elementary lessons of last year very complete when they read them first, write me that in reading them over again in book form they find much more in them—much that escaped their attention in the first reading, though they read carefully. The printed matter is precisely the same. There is neither more nor less of it. The difference is in the reader. He knows more of the subject—perhaps more from other reading, but certainly much more by experience. This is his own knowledge—what he knows at first hand.

The first year that I was in the poultry business I bought breeding stock of several varieties, partly from and partly through an acquaintance in the business. I did not get the results I

thought I should have had, and blamed it on the stock, and discarded it all and bought new stock elsewhere, meantime harboring the thought that my acquaintance's aid had been more of a hindrance than a help to me. By the time I was getting good results in breeding I had discovered that, in general, the trouble that first year was not in the stock so much as in my inexperience. Later I learned that the stock soon became what its owner made it; that the most essential things in applying methods, and in the management of fowls, were good judgment and a thorough knowledge of the fowls with which one worked, and the various articles used; that—in short—the poultryman was the determining factor in every poultry venture.

Nearly every beginner supposes that he appreciates this. He counts as an important part of his equipment for the business a liking for fowls, or for outdoor life, habits of industry and perseverance and intelligence. These are all necessary, but they become directly available and effective only as they are displayed in connection with practical personal knowledge of the details of poultry keeping. The acquisition of such knowledge requires time, because variety in experience is required to give one such a general working knowledge of any subject that he is ready to act promptly and quickly in any situation in which in his line of work he is likely to be placed, and the beginner in poultry keeping often finds himself in situations that are full of trouble for one who does not know just what to do and how to do it, while one who did have that knowledge would soon have matters right or on the way to mend with the least possible loss.

Again, in every poultry undertaking there is a very large element of chance. Opportunities come which only the poultry keeper who is qualified to use them can estimate at their true value and take and use to advantage. This is, of course, equally true in all lines of work, but I doubt whether there is any other line in which so few of those engaged in it have had a thorough training. The newness of poultry culture as a business, or on a business basis is largely responsible for this. As I have explained in earlier lessons, there are conditions in regard to training of poultry keepers which limit opportunities to get a thorough practical training. But because this is so it is not necessary that the poultryman who learns by keeping his own fowls should get his experience regardless of expense.

The waste and loss of capital and of inclination to continue poultry keeping due to efforts to learn it on a large scale, are appalling—the more so because they are so utterly unnecessary. There is absolutely no need of anyone losing any considerable amount of money in poultry keeping while establishing a business, if he follows the simple rule of increasing his stock no faster than he is sure—entirely sure of his ability to handle it to advantage. If when making his plans a poultry keeper will base them on what he has done, rather than on what someone else has done or what he hopes to do, there is little danger of his planning beyond his capacity to perform. To be safe in his venture he must observe the necessary relation between his own development in knowledge of poultry and the growth of his plant. He must remember that it is always possible to adjust operations to his ability, but not always possible to adjust his ability to the scale of operations on which he endeavors to work.

In such matters as the purchase of stock, of appliances, etc., the only way a poultry keeper can buy goods to suit is by buying and discarding until he gets what suits him, not being too hasty about discarding unsatisfactory stock or goods, but giving each a fair trial. What suits one does not suit another, and each has to suit himself. It is possible, and when it can be done it is advisable, for a while, for a beginner to rely to some extent on the advice and suggestions of others, though I believe the beginner gets along best and advances fastest who, while considering advice and suggestions, makes the decision for himself when the responsibility for it, and the consequences, are his, and no one else's. I believe it is better for the beginner who is learning by himself to put the responsibility for what he does with himself, and not with his advisor, for—after all—when he takes advice, and acts upon it, he usually makes a choice between the advices available, and so the responsibility really is his own.

He needs to consider that he is likely to make mistakes, to fail to fully understand instructions given him, to neglect to do some things that ought to be done, and, in a variety of ways, to be personally and directly responsible for things that go wrong. I do not urge this with the idea of making novices feel that others are always blameless if advice they give does not result

satisfactorily. There are cases where information given is misleading, and the novice cannot know it until by repeated experience the truth is made clear to him. But the usual attitude of the beginner is to look anywhere and everywhere but to himself for the causes of his troubles, and this attitude is a greater handicap on his progress than anything else could be, for it keeps him always searching outside of himself for reasons for the things that go wrong, when the commonest source of trouble is his own inefficiency.

So I say that the most important factor in poultry culture is the poultry keeper. It is only as he makes himself a poultryman that one is able to get value out of good methods, good stock, a good location, and good general ability.

LESSON XI.

The External Parasites of Poultry.

IN his book, "Diseases of Poultry," Dr. Salmon gives a list of more than forty kinds of lice and mites which infest domestic fowls, — parasites which make poultry their special prey. If a poultryman takes pleasure in that kind of knowledge, and has the time at his disposal, there is no reason why he should not study these creatures, learn their names, study them microscopically, learn to distinguish between them, and in general become well informed on the subject. But practically all that is necessary is that he should know how to keep them out of his premises, both by preventing their increase and reducing their numbers when increased to the point where they become troublesome.

A few lice on a healthy fowl do no perceptible harm — so long as they are few in numbers. It is even asserted by some authorities that a few lice are beneficial rather than injurious, consuming dead cuticle and causing just enough irritation to prompt the fowl to dust itself — its way of bathing — regularly; this, however, is all theory, and has not been demonstrated. The evident facts are:—

That fowls are very rarely wholly free from lice.

That in limited numbers lice do little damage.

That when from any cause they become numerous they are a very serious pest.

Many writers on poultry topics preach constant preventive treatment as the only sure way of avoiding losses through the ravages of lice. It is a very common thing to see statements proclaiming lice as a constant menace to the health and profitableness of fowls, and urging the necessity of unceasing warfare against them.

Impressed by such statements many poultry keepers carry on a systematic treatment for lice which takes a great deal of time and labor, adding greatly to the drudgery of their routine work.

Such continuous preventive treatment is not necessary when fowls are kept under ordinary good conditions, with no conditions existing which are favorable to the increase of lice.

When I make this statement I do not wish any reader to misunderstand it. It will not do to assume that conditions are right, and therefore — in accordance with my statement — precautions against lice and treatment for lice are not needed.

Look at the matter from the other side. Find out — if you do not already know — to what extent lice affect your poultry, or would affect them under your management with special precautions against lice omitted, and then, if lice are troublesome try to find in what respect conditions supposed to be good, are favorable to the increase of vermin, and therefore bad.

The most frequent conditions favorable to the increase of lice, are debilitated stock, dark ill ventilated houses, and buildings that by reason of the abundance of conveniences in the fittings are difficult to keep clean, and furnish many nooks and corners to which the sunlight rarely penetrates.

When lice once become established in a house in sufficient numbers to cause serious trouble, the most common reason for difficulty in exterminating them is lack of thoroughness in treatment. Often the treatment while of the right kind is done by piecemeal, and when repetitions of treatment are required the intervals between are allowed to be too long. I find that this is nearly always the case when complaint is made that usual remedies are not effective. I have often had letters from poultrymen who said that they found it impossible to rid the fowls and premises of lice, though the treatment — as they described it — left nothing to be desired.

It being out of the question to go back of their reports and ascertain the facts in any case, I several years ago concluded to let some of my own houses become badly infested with lice, reproducing as nearly as possible the conditions of the typical poultryman who found the lice too many for him.

So one season, beginning in the spring, I systematically neglected or omitted every usual operation which might prevent the increase of lice. By midsummer I had one house badly infested with red mites. It is worth noting in connection with the fact that under ordinary good conditions lice rarely become troublesome, that the mites did not appear in numbers that made their presence plain without close investigation, until the conditions became very bad. The droppings had been allowed to lie for months. Even then it was only after a period of nearly two weeks of very hot damp weather that the mites began to be noticeable. Then within another week the place became literally alive with them.

At the same time — in order to give the body lice a chance to develop — I omitted to make provision for the hens to dust themselves. So I had at once a flock of hens badly infested with lice, and their house alive with red mites. The ravages of the insects under such conditions began to be discernible almost at once. For the lice I did nothing whatever but provide dusting places as usual by spading up here and there in the yards a few square feet of ground. Had the hens been badly infested for a long time this would not have been sufficient. As it was, they made almost constant use of the dust baths for a few days, and soon had the lice reduced to normal numbers.

The red mites which prey on the fowls at night, and leave them during the day to hide in rough places or crevices about the roosts, are said to remain on the fowls during the day as well as night when very numerous, but I could find none on the hens in these houses by day, though they were in such numbers at the ends of the roosts that they could not begin to find places for concealment by day, and remained in a mass so great that a slight movement of the roost would make a great bloody smear of them.

The first thing done for these was to remove all roosts and nests from the house, taking out also the cleats of wood on which the ends of the roosts rested, which were screwed to the wall. Then I brushed down the walls thoroughly with a broom preliminary to whitewashing. In doing this, quantities of mites were brushed to the floor, and undoubtedly many of them worked back again, but I paid no attention at all to them.

I began treatment by applying to the mites on roosts and nests, taken out into the sun, various preparations, and carefully noting their action. I found kerosene effective, but did not think after trying chloro-naphtholeum in water, applied to the mites and roosts with a brush, that kerosene was as economical. I did not feel like using it as freely as I did the water and C. N. Whitewash also was effective for all mites it reached, though not as quickly as the chloro-naphtholeum preparation. I used some of this in quite a weak solution, pouring into a pail just enough to color the water up well, and with a brush threw and spattered it over the walls for some distance from the ends of the roosts, taking care to get it into joints and cracks as much as possible.

In one pen I used nothing but whitewash, putting it on the underside, edges, and ends of the roosts, as well as on the walls of the pen. In the other two pens I gave roosts, supports, and nests a free application of water and chloro-naphtholeum, and then whitewashed the walls. Note that: — Every part of walls, roosts, and attachments was thoroughly treated at one time with some preparation destructive to mites.

The fowls roosted in the houses the same as usual that night; the whitewash not being yet quite dry, no special indications of mites were looked for until after the second night. Then enough mites that had escaped treatment had worked their way back to be quite conspicuous.

But here is a point for the poultryman who is combating mites to observe. The mites which escaped the first treatment were those which were most concealed, and, perhaps, some brushed to the floor in the preliminary sweeping which had worked their way back. My observation of mites on some pieces of board well covered with them to which I applied road dust freely was that many of them were killed by it. But these mites, having worked their way back to the fowls, and got a full feed, would not retreat to the inaccessible places in which they had escaped the treatment, but stopped in the first place that afforded a refuge, and after that one thorough application to all parts of the house I directed my attention exclusively to mites found on the roosts in the morning, working on the theory that it was easier to take time and gradually exterminate the mites as they remained on the roosts where they were easy to get at than to try to follow them to their furthest possible hiding places.

In the pen that had been treated wholly with whitewash, I would turn over the roost in the morning at intervals of two or three days, and whitewash it, thus killing all mites that happened to be on it. In the other pens I would do the same thing with the other preparation mentioned. At each treatment the number of mites found became less until within two weeks practically none could be found, and they made no more trouble until the next season. Then with the houses neglected for a little while they began to multiply, but were quickly checked by a repetition of the treatment. I have since used C. N. in water whenever traces of mites became numerous, but have never found it necessary to treat more than once a season. I suppose the better policy would be to make a thorough application, or possibly two or three in succession at the beginning of warm weather, and thus prevent their increasing to the troublesome points, but since my first experiment I have rather liked to have at least one opportunity during the season to demonstrate that the red mites were not so troublesome a proposition if one made a thorough job of the treatment.

The plain indication of the presence of these mites is found in their excrement, little grayish patches, like fly specks, on the roosts and adjacent parts which they traverse. When you see these specks you may know with certainty that the mites are there. If treatment is begun at once the mites may be practically exterminated with a few applications to the roosts and adjacent parts where their tracks are seen. Promptness is important as much on account of the loss of vitality to the fowls, and profit to the owner, as because of the greater difficulty of getting rid of the mites when their numbers have greatly increased.

With prompt and thorough treatment whenever signs of mites are observed, there is no need of regular weekly, or even monthly, applications to prevent their increase.

For lice on the bodies of fowls, as I have said, no treatment is necessary if the fowls are vigorous and have an opportunity to dust as they wish. Lack of inclination to dust is a symptom of lack of vitality. If a fowl showing such a symptom is found to be lousy, treatment for lice may be given a time or two, but unless the fowl then with such other treatment as is necessary on other accounts, begins to show vitality enough to keep itself free from lice it is not likely to be worth doctoring.

It is when hens are incubating that they require treatment for lice by the attendant. They may not suffer if neglected. Indeed I have had many hens go through an entire period of incubation, bring off a good brood and rear every one with no treatment for lice at any time, but the conditions during incubation are so much more favorable to the increase of lice, and the annoyance of lice is so likely to cause hens to break eggs or leave their nests, that it is better to take regular precautions against lice.

Similarly with the chicks when hatched. I have this season a number of very thrifty broods from nests which I allowed to become badly infested with lice. These chicks have had absolutely no treatment for lice except the opportunity given them and the hen to dust as soon as the chicks were ready to come from the nests. Some of these broods, after being kept for a week or ten days where they could dust at will, were put in coops on the grass with no dust bath, but have shown no signs at all of lice. I do not advise this as a practice, but the experience is useful in showing how great a part the opportunity to take proper care of themselves plays in keeping stock free from lice; and I think it will nearly always be found that by making conditions unfavorable to lice and mites, and giving the fowls and chicks suitable opportunities to take care of themselves, systematic and regular precautions against these parasites may be

reduced to two or three a year for the adult stock, and as many for each brood of young stock.

In this lesson I have mentioned only a very few insecticides, none but articles commonly used for other purposes, kept on hand in many homes, and easily obtainable everywhere. Chloronaphtholeum is a special preparation, but as far as its use in the manner described is concerned, seems to me to be just the same as sulpho-naphthol, which I have since used sometimes in the same way with the same results, and I suppose that there are other preparations of the same character which may be substituted. The point I want to impress is that a common article of household use, with water, everywhere abundant is an effective remedy for mites, and an inexpensive one. Hence there is no occasion for delay in treatment while waiting for some special insecticide ordered only when actually needed.

It would be possible to greatly extend this lesson, giving a long list of insecticides, both proprietary and home made, but of these I shall say nothing here except that if convenient any standard insecticide may be used, provided it is applicable for the special purpose for which an insecticide is wanted. For adult fowls use a powder, if it seems necessary to give them individual attention. For chicks use a powder, treating each brood as a whole. For lice and mites in coops and on fixtures, use a liquid, applying with spray, brush, or broom as most convenient. In every case be thorough and persistent. Let the intervals between treatments be short, a week or ten days for lice to which powder is applied, and two to four days for liquid appliances.

Don't keep up a constant warfare on possible parasites, not knowing whether they are there or not, but keep a sharp lookout for parasites and signs of parasites, and when necessary go after them aggressively.

LESSON XII.

Internal Parasites of Poultry.

PARASITIC worms — particularly intestinal worms — infest many fowls whose owners do not at all suspect their presence. By “infest” here I mean that the worms are present in sufficient numbers to be troublesome. Some good authorities say that intestinal worms, like lice on the skin and feathers of the fowl, are almost invariably present, but as long as they are not too numerous they make no trouble, and may even have some function of benefit to the fowl. Just what this is, or how it operates, I have never seen stated, nor so far as I have read on the subject have I seen any suggestion of usefulness for the gape worm which infests the œsophagus of the fowl.

The literature of this subject is not large. Salmon in the “Diseases of Poultry,” devotes about thirty pages to worms, giving them, I think, more space than all other American poultry books combined. His material is drawn largely from European writers and investigators. Little original work in investigation of diseases of this class has been done in this country. Dr. Paige, of the Massachusetts Agricultural Experiment Station, has investigated several mysterious troubles in poultry yards in the state, and found worms causing the trouble, and has had a good many diseased birds at the station for observation and experiment. When I was last at the station he was testing remedies on a number of diseased specimens, and, as I understood, finding results too variable to warrant any general conclusions.

Salmon's treatment of worms, while the best accessible to poultrymen, is often far from satisfactory. He seems to write almost wholly after the European investigators of the subject, and is often too technical in descriptive statements.

Worms, when present in troublesome numbers, interfere seriously with the health of the fowl. Considering the conditions produced by them as diseases it is found that the symptoms are not marked until a rather acute stage, and even then are not so unique as to immediately identify them. The presence of the gape worm in the throat is most easily determined, yet “gapes” is commonly confounded with other troubles like gastritis, in which gas escaping through the mouth causes belching; acute lung troubles accompanied by labored breathing; or, indeed, any difficulty or distress in breathing. As — especially in small chicks — general weakness from any cause is apt to be accompanied by difficult breathing, it is readily seen that the possibilities of mistaking other things for gapes are quite unlimited. And, as a matter of fact, a great many reported cases of gapes are not gapes at all, and the general impression that “gapes” is a malady that annually ravages the crop of young chicks all over the country is a great big general mistake due to the fact stated above that a symptom which might be described as gaping accompanies other more common diseases.

With regard to intestinal worms we have just the opposite popular attitude. They are rarely suspected as the cause of trouble, and rarely discovered until diseased specimens or infested premises are examined by men with medical training. All in all, the detection and effective treatment of these parasites that live within the body of the fowl is one of the most puzzling propositions the poultrymen to whom it comes have to deal with.

What I can say on the subject is said from the rather peculiar standpoint editors sometimes

attain. I have never seen a case of gapes, nor have I had any trouble with intestinal worms in my own fowls. I have frequently been able by reference to authorities on poultry diseases to indicate intestinal worms as a probable cause of troubles about which readers of the paper asked me, and in many such cases treatment for worms has seemed effective, furnishing reasonable grounds for concluding that worms caused the trouble, though I must say that in more than one case in which satisfactory result of treatment for worms was reported to me the correspondent had not been able to discover worms, and could only say that after applying the remedies conditions improved. So I am in the position, not of an authority on this or other diseases, but of a plain poultryman with perhaps a little more than average familiarity with both unprofessional statements of cases and the professional descriptions of diseases and prescriptions for the same.

The Gape Worm.

The disease known as the "gapes" takes its name from a small red round worm which attaches itself to the mucous membrane of the windpipe. The conspicuous symptom of the disease is the gaping which gives it its name. As has been said, gaping, while the characteristic symptom of this disease, is not peculiar to it, but is a symptom in several other troubles. So to make sure of the nature of the trouble, and of the proper treatment to apply, the windpipe should be examined for worms. If they cannot be detected by opening the mouth of the bird wide and looking into the passage, take a stiff feather, not too large, and having stripped the quill to leave only a little brush at the end of it, put it gently down the windpipe, turn once or twice, and then withdraw. If there are gape worms present some should be found adhering to the feather. If the worms are found, the only way to treat them effectively seems to be to operate on each chick separately with a feather, as just described, or with a looped horse hair, or a gape worm extractor made of fine wire. Anyone can make such an extractor for himself, using No. 30 wire. Take a piece about 12 or 14 inches long, double it, and then twist the two ends so that a loop just wide enough to go down the windpipe, and half to three-quarters of an inch long is left at one end, while the wires twisted together for the rest of their length, make the long handle for the instrument. When this is inserted in the windpipe, and turned around, the worms are cut loose, and what are not withdrawn with the wire will be coughed up by the chick. Several other remedies have been given. One that used to be very generally recommended was to put the chicks in a box, and cause them to inhale lime dust. This treatment seems to have survived on paper rather than in satisfactory practice, for though it seemed to have the indorsement of many writers I never could learn that it was effective.

When the disease is discovered on premises, give the affected birds the individual surgical treatment just described; then take precautions to prevent it in future. According to the best authorities, and also to the most observant poultrymen who have had to contend with it, the gape worm, (*syngamus trachealis*), is communicated to fowls through earth worms which they eat from ground on which chickens with the gapes have run. The eggs and embryos of the gape worm are scattered over the ground, some in the excrement and some coughed up by the sick birds. They may be taken by other chicks or fowls direct from the ground, but the common method of receiving them is believed to be through earth worms. It is said to have been shown conclusively that they are taken into the digestive tract of earth worms, and may be carried for some time there, and communicated to the chick by the worms it eats.

Sometimes the infested tract is small, and trouble may be avoided by fencing the chicks out of it. A lady in Pennsylvania wrote me some years ago that she found she had no trouble with her chicks if she kept them away from a particular spot in the garden.

A poultryman, some time ago, stated in one of our leading poultry journals that he raised chicks on infested ground by keeping them confined while small to pens or sheds, the ground under which had been treated with lime. In these enclosures the chicks could get no worms, and were free from gapes, while those outside soon became diseased. He says that he has found that if chicks are kept off an infested piece of ground for three years few gape worms will be left in it.

Where the gape worm is prevalent it is a most serious pest. It abounds most on wet heavy

soils, that is, on soils least suited to poultry. On the sandy hills and knolls of New England, we have no trouble with it. It might get a foothold on some of our low, rather swampy spots, but very little poultry is kept in such places, the "sandy, well drained" locations having been favored more perhaps than their merits deserve.

When I was a boy in Illinois we used to hear much of the gapes, and from the character of much of the soil there, it is probable that many of the cases were genuine, but I never happened to come in contact with them. In Colorado, with its dry sandy soil, we had no gape worms. I am inclined to think that if a careful investigation of poultry and yards were made all over the country, and a map prepared to show the areas free from the gape worm, those in which it was found, but not generally as a serious pest, and those where it was very troublesome, poultrymen would be surprised at the small area actually badly infested. I mention this particularly because people so often, supposing they have a case of gapes, fail to prove it or find out what really is the trouble, and so allow some other serious trouble to develop to a stage where it is hard to deal with, when, if they had been more thorough in the first diagnosis they might have learned just what was wrong in time to treat the disease easily and successfully.

Intestinal Worms.

Salmon gives a list of forty-five parasitic worms found in the intestines of fowls and in the neighboring parts. Some of these are found only in one kind of fowls; others infest all kinds of domestic land and water fowls. These worms he groups as tape worms, round worms, flukes, and thorn headed worms, the most numerous in varieties and the most common in occurrence being the tape worms and round worms.

The general symptoms of worms in the intestines are the same. The kind of worm present can only be determined by finding worms in the droppings, or by post mortem, showing them fixed in the parts of the fowl. If the droppings as voided by the fowl before treatment show no traces of worms, a vermifuge may be given, and the fowl kept where its droppings are easily examined. It is not certain that no worms are present because none are evacuated. Some worms are very difficult to dislodge. But a dose of the remedy to endeavor to secure from the droppings confirmation of the suspicion of the presence of worms in the intestines of the fowl is the only way practicable for the poultry keeper, short of killing one or more fowls, and making a careful examination of the intestines.

The inexpert examination is, of course, especially liable to error, though often it does show the presence of worms. Wherever a state has its experiment station equipped for the examination of such animals and fowls, poultrymen in that state should communicate with the director or the veterinary at the station whenever a serious trouble arises which they do not understand. Write the experiment station authorities stating the case. If they find on correspondence that there seems to be a case requiring investigation they give directions how to proceed. In practically all of the eastern states the experiment stations are prepared to do work of this kind.

"The symptoms which indicate worms in the intestines," says Salmon, "are not very characteristic, but are such as would be expected from ill health due to any chronic disease. The birds become dull, weak, emaciated, isolate themselves, are indisposed to search for their food, are stiff in their walk, their plumage loses its brilliancy and becomes rough, they have diarrhea, and sometimes epileptiform attacks. In certain cases the symptoms develop rapidly, and the birds die as though from an acute disease. The most certain evidence of the nature of the trouble is the discovery in the intestines of large numbers of one or more species of worms * * * upon examination of birds from the flock which have died or have been killed."

For treatment Salmon recommends first hygienic preventive measures. Says he: "One of the most important of these measures is to move the fowls upon fresh ground every two or three years, or certainly in all cases where such parasites are frequently observed in the intestines of the birds. Another practical measure which may be adopted at the same time is to remove the excrement daily from the houses and destroy any parasites or their eggs which may be in it, by mixing with quick lime, or saturating it with a ten per cent solution

of sulphuric acid. The acid is cheap, but requires that great care be used in diluting it, owing to danger of it splashing upon the clothing and flesh, and causing severe burns. It should always be poured slowly into the water for dilution, but on no account should water be poured into the acid, as it will cause explosions and splashing. When treating diseased birds these should always be isolated and confined, and their droppings should either be burned or treated with lime or sulphuric acid as just recommended. Without these hygienic measures, medical treatment can only be partially successful."

For medical treatment the same authority says:—"One of the best methods of treating tape worms in fowls is to mix in the feed a teaspoonful of powdered pomegranate root bark for every fifty head of birds. In treating a few birds at a time it is well to follow this medicine with a purgative dose of castor oil (two to three teaspoonfuls)." * * *

"For the treatment of the heterakis (round worm) Meguin recommends mixing santonine with the food given to the fowls. The powdered santonine may be incorporated in a cake, the dose being 7 or 8 grains for each bird. An efficient remedy is made by boiling an ounce each of male fern, tansy, and savory in a pint of water. The resulting liquid is mixed with flour, which is then made into pills and administered to the affected birds. * * * Oil of turpentine is an excellent remedy for all worms which inhabit the digestive canal. It may be given in the dose of one to three teaspoonfuls, and is best administered by forcing it through a small, flexible catheter that has been oiled and passed through the mouth and œsophagus to the crop. The medicine is less severe in its effects if diluted with an equal bulk of olive oil, but if it fails to destroy the parasites when so diluted it may be given pure."

The remedies given by Sanborn in "Farm-Poultry Doctor," are slightly different. He advises for round worm a two grain pill of santonine followed by a half-teaspoonful of castor oil. This to be given about an hour before feeding every other morning for a week. For tape worm he prescribes five drops of oil of male fern in one teaspoonful of sweet oil. This to be given before feeding in the morning, and the morning feed given about two hours after to be a warm mash of bran and milk containing for each bird one teaspoonful of castor oil.

The Last Resort.

When worms of any kind become so troublesome as to cause heavy losses it is probably the best policy to discontinue keeping poultry on the premises for a time proportionate to the violence of the epidemic and the general condition of the buildings and soil. On an old plant it might be advisable to keep no poultry for two or three years. On a new plant a thorough cleaning up and disinfecting preliminary to the introduction of new stock presumed to be free from the trouble should be sufficient.

To what extent losses of poultry are due to worms, it is not possible to say. Doubtless many epidemics of so-called cholera and dysentery are caused by worms, and the unfortunate poultry keeper never suspects the real cause of the trouble. It is for this reason that anyone engaged in poultry keeping who has heavy losses he cannot account for ought to try to have an expert examination of diseased fowls made. This will in most cases show where the trouble lies.

LESSON XIII.

External Characters of Poultry, and Their Values.

Introductory.

THE title of this lesson is borrowed from the chapter of the same title in Mr. Edward Brown's book, "Races of Domestic Poultry," to which I am indebted for the idea of attempting a complete discussion of the subject. The practical value of the matter seems to make it worth while to preserve such a treatment of it in form that will make it available for future distribution. Hence, I include it in the series of lessons, and adopt for it the method of treatment appropriate. Mr. Brown, in his treatment of the subject, seemed to me to limit the discussion to superficial characters, that is to those points of which fanciers make much, but which poultry keepers who are not fanciers generally regard with indifference if not with disdain, and to treat these characters solely with reference to their relation to the production of food values in eggs or meat. That may be the best present treatment of the subject for the British public for which primarily he writes, but in this country we have a very large class of poultry keepers whose aim it is to combine fancy and utility qualities, and in ever increasing degree we find poultrymen producing "fancy" and "practical" fowls from the same stock, the difference between them being a matter of individual selection, rather than of breeding.

Under such circumstances the proper disposition of a fowl becomes simply a matter of correctly classifying it, and using or disposing of it accordingly. It is not far from the truth to say that wrong principles of or errors in classifying fowls according to the purpose for which they should be used, cause by far the greater part of the dissatisfaction with results which buyers of eggs and stock for hatching manifest. To misunderstandings and misapprehensions of the points involved we must also credit the perennial discussion of "beauty and utility," which, in general, confuses more minds than it clears.

External Characters Enumerated.

Whether we consider a fowl as an individual whole, or consider it section by section and point by point, the various characteristics we see impress the eye by either form (including size) or color, or both. The impression in any particular may be favorable or unfavorable. Without attempting to make and maintain sharp distinctions as to their proper classification, I enumerate the following characters visible to and measured by the eye as having value or meaning beyond the mere fact that in themselves they please, or fail to please, the beholder:—

Size, shape, and carriage of body.

Size, shape, and carriage of head, (including head appurtenances—comb, wattles, ear lobes, crest, beard).

Size, shape, and carriage of wings and tail.

Size, shape, and carriage of legs and feet.

Color, quantity, and quality of plumage.

Color and texture of skin, both bare parts and those covered with feathers.

Even without any knowledge of ideas prevalent among poultrymen, a person would conclude after reading that list that many of these points were of special importance only under

special circumstances, and that in a great many cases, if not generally, they were immaterial. And that would be a correct conclusion. But, to a very great extent, profitable modern poultry culture consists in the development and use of special features for special purposes, a proposition which brings us back again to the relations of "fancy" and "economic" qualities of "beauty" and "utility," and the possibility and advisability of producing from the same stock individual fowls to satisfy more than one special demand. The practical question, then, in each instance is whether the features the breeder would like to combine are compatible or necessarily antagonistic.

The Logical Fallacy.

In considering the possibility of producing for different purposes from the same stock, a great many fall into an error which apparently has its origin in the fact that most of us are by nature partisans, inclined to take extreme positions, and to regard those who will not go with us to our extreme as, therefore, at the opposite extreme, and the things which do not suit our purpose as, therefore, adapted to their needs, or produced by their methods. There is a very general disposition also to regard everything especially prized for some purpose we do not appreciate as on that account objectionable for purposes we seek, and this is responsible for no small part of the idiocies that enter into most discussions of the attitude of fanciers to practical poultrymen, and vice versa.

Such a statement as the above, when put in the form of a general proposition, always seems to overstate the case, but if the reader will note the literature of the never ending debate, and the frequent incidental references to points in controversy, I think he will soon agree that the application of a little simple logic to the situation would often show one the error of his ideas more forcibly than reams of argument in opposition.

When we prove a proposition false we do not necessarily thereby prove a contrary proposition true. Oftener we prove only that the point is immaterial, but that "only" may mean a great deal, may, in fact, be of greater importance than to have proved what was desired, for the more immaterial points we can establish the easier it becomes to cater to demands based upon such immaterial points, while still maintaining those points which we consider of first importance, and for our purposes essential.

Practical Value of Fancy Points.

Before taking up the detailed consideration of the points enumerated, let us consider briefly the practical value, the economic or cash value of fowls valuable for "fancy points." As we shall see as our investigation proceeds, some "fancy points" are of very substantial value, and fanciers are to be blamed not for preserving them, but for not giving more attention to them. But, in considering his own attitude toward points of no importance to him which the fanciers prize, the so-called practical poultryman should look at these points, not merely with reference to their value to his trade. He should consider their selling value to whoever appreciates them and wants to buy them.

While it is true, as often stated, that only a very small part of the poultry produced is or can be of the kind that commands high prices for fancy purposes, it does not therefore follow that it is better for a variety or breed of fowls, or better for most poultry keepers, or for the industry as a whole, that the regulation of standards and types should follow the ideas of the class containing the greatest number. The reasonable position to take in a matter of this kind is that, provided the qualities the mass of poultry keepers want are maintained, every point for which they care nothing that can be added is so much prospective gain, for it opens up possibilities of profit beyond what is possible in the class of fowls which suits the average keeper.

It is after we have reached this point that we come to the parting of the ways between "fancy" and "practical" ideas. It may, and often does happen, that a fowl, or the fowls of a certain stock generally possess certain characteristics or an all round high quality from the fancier's point of view, but have faults which make them far from desirable for economic purposes. Now as long as these are not faults which in time will also affect their "fancy" quality, the breeder who can sell them all at fancy prices can continue to be indifferent to

those faults. Indeed it would be foolish for him to neglect the trade that pays good prices, and cater to that which halts at very moderate prices. He is working for the dollars and cents the beauty of his fowls will bring him, just as another is working for the dollars and cents he can get for their eggs and meat. The end of each is the same — dollars and cents. It is on the method of getting these from poultry that they differ. The question comes how far the same kinds, classes, breeds, and varieties of fowls can be maintained of the same uniform type and yet be well adapted to both purposes.

The study of the values of external characters of fowls should give results that will answer this question as well as indicate their relation to strictly consumptive uses.

Size.

It is evident from a comparison of fowls of sizes within the ordinary grades, that size has no necessary relation either to the prolificacy of the fowl, or the quality of its flesh, or to its vitality. When we come to a consideration of the extremes in size the conclusions are not so plain. In bantams, in which the smallest specimens are preferred, these small specimens are to some extent the result of inferior digestive and assimilative power, and in such cases it is reasonable to suppose that the functional inferiority which brought about the desired reduction in the size of the fowl would be a bar to productiveness — perhaps not so much to sexual activity as to high actual prolificacy. However, no study of that point has been made, and we must leave the question open. There have been instances of very good laying by bantams, and there does not seem to be reason to say that bantams in every way normal and with digestive power proportionately the same as that of medium sized or large fowls, should not lay as well. In fowls that are extremely large of their kind it sometimes appears that their great bulk resulted from failure to develop in some function — notably the sexual function, while digestive and assimilative power were equal to all requirements of the system. If at the age when sexual activity should manifest itself it fails to do so, and the usual quantities of food are consumed the result may be either excessive fat or growth, the former condition being, I think, by far the more common. Such conditions are abnormal. That very large fowls may be as prolific as any, has been seen again and again. The common opinion that large fowls are always coarse meat, I believe to be erroneous. The coarsest fibred poultry meat I have ever seen was on medium sized fowls, and I have seen as fine grained meat on very large fowls as on any. The shape of the fowl, especially the character of the bony structure, seem to me to have a much more intimate relation to texture of meat than has size.

The reasons given for some small and some large fowls being poor producers, or in some cases barren, explain how it might often appear that large fowls were lacking in productive capacity, when in reality the size resulted from some interference with the functional development of the fowl.

In small fowls again we can see how general constitutional weakness interfering with the full development of every function would bring about lack of size and lack of reproductive quality at the same time. This, however, would not be observed once in ten times for the other case, for very small fowls are apt to be marketed, while the best developed specimens are retained and often regarded as the most desirable from which to perpetuate the race.

But if we accept the reasons given we may admit that to some extent departure from the normal or average size may be objectionable. That the objection applies to actual size cannot be maintained in the face of results of comparisons between fowls of the same size from breeds in which the average size is different.

The final conclusion in regard to size is that in any long established breed the best results are likely to be obtained from specimens of the average size. To put it another way, a lot of average sized fowls of any breed taken as they run, would be much more likely to give good uniform results than an equal lot either below or above the average size. But in making and maintaining improvements in poultry, we always seek to go a little beyond average conditions or results, and when we find, as we sometimes do, specimens large or small of their kind with normal vitality, productiveness, and meat quality, we can, if we succeed in reproducing in its progeny the combinations in an individual, soon establish a stock of whatever type, including size, we desire.

Apart from any possible or fancied relation between size and actual quality and productive capacity, the matter of size is sometimes of great importance. Certain sizes of fowls are in more general demand for certain purposes than others. Thus in our markets generally consumers call for fowls dressing four to five pounds each. This size is what is most in demand for ordinary roasters and for fowls. The demand for larger fowls is more limited, and many times the large fowl has to be sold at less per pound than the smaller one. Except in localities where there is a special demand for extra large roasters, it is no advantage to a poultryman producing for market to have his stock run larger than five pounds each. From the point of view of the fancier breeding Asiatics or breeding fowls of the American class generally up to standard weights, fowls dressing five to four pounds each are medium to small in size. Compared with the bulk of poultry marketed they are good sized to large fowls. Breeders of thoroughbred fowls divide quite sharply on the question of size, especially as to the desirability of maintaining full standard weights, or, perhaps, exceeding them. In the hands of most poultrymen all breeds deteriorate in size. Hence there is a very widespread demand for large fowls for breeding purposes to counteract this tendency. But this demand is not merely a demand for size. It calls for good size with general excellence and vigor. I think it may be truthfully said that great or excessive size in fowls that have no other claims to attention is not especially valued by one poultry man in a hundred.

Taking five to six pounds live weight as the most desirable weights for the poultry farmer, and therefore his standard weights, we may say that above these weights size is desirable sometimes in special markets, and quite generally in breeding birds, counteract the tendency the other way; while everything below these weights falls short of the standard for general demands, is a little less satisfactory for market, and to be used in breeding only with mates large enough to offset its deficiency.

Shape of Body.

Not as much now as some years ago, but yet a great deal, is said of the shape of the body of a fowl as an index of laying capacity. Like many other theories, the idea that a fowl with a long, deep, wedge shaped body is the best "machine" for the production of eggs, looks very plausible. But it has not stood either close observation or practical tests. Still there is a certain correlation between shape of body and producing capacity. There must be an appreciable fullness in the lines of the body to give suitable accommodation to well developed internal organs. The proportions may not be ideal. They may seem objectionable according to accepted standards of shape for the breed to which a fowl belongs, but if there is nothing in the shape suggestive of weakness or deformity, one type is as good as another for egg production as far as the evidence goes.

In table quality shape counts for a great deal. The most desirable carcass is that which carries the largest proportion of white meat. This meat is on the breast, body, and wings. It constitutes the muscular system for the wings, and there is therefore a very necessary correlation between good breast development and power of flight, (or perhaps I had better say capacity for flight). With power of flight, as a rule, we also find associated greater general activity. This is as true when we compare specimens of the same breeds as when we compare different breeds. I have often had occasion to note in handling Light Brahmas that those with well developed breasts were more energetic and active than the others, and consequently less liable to the ills which result so quickly from inactivity in heavy fowls. In such comparisons as this we must of course make allowances for the effects of condition and habit, but I think it will be found generally true that under the same conditions fowls with well developed breasts not only look more robust than those deficient in that section, but are inclined to be more alert and, as a class, are more free from disease, and have a longer productive life.

The apparent size of the breast does not, however, depend exclusively on wing power or capacity. Sometimes we find fowls which, when carved, yield more breast meat than their appearance indicated, because the bones of that region are contracted, reducing the space occupied by the heart and lungs, thus compressing those organs within the space they normally occupy, or by crowding them on others. Such specimens are usually those which a poultryman with an eye for good shape discards on general principles even before they have had time to show what excellence they might develop.

Conversely, we find many specimens much more deficient in breast meat than their appearance as they stand in life would indicate. In these the "trunk" is amply developed, but the capacity for flight is small. Naturally the most conspicuous instances are found in the larger breeds, but cases in plenty may be found everywhere. It is a fact sometimes lost sight of that in proportions of desirable meat such breeds as Polish, Hamburgs, and Leghorns excel so-called general purpose and table fowls. The objection to them for table purposes is their lack of size, and the precocity which makes the meat, especially in the males, hard and dry long before they have reached full growth.

Breadth and straightness of back are highly desirable attributes of shape in fowls. The apparent shape of the back, (more perhaps than of any other part, though all are subject to the same influence), depends much on its length, on the general carriage of the fowl, and on the quantity of the plumage. Close observation of this section in fowls will soon show the reader that it contains a great deal of "character." Apart from its outward expressiveness of strength and vitality which a good back gives in a fowl as in man and other animals, the straight wide back in the fowl indicates a normally formed body cavity in which the organs are in all probability constitutionally and mechanically perfect, while any irregularity or narrowness or deformity of the back indicates weakness of structure, possibly malformations or internal organs, and, quite certainly, limitations on the operation of the functions of those organs.

With good development of back and breast it is usual to find the abdominal region in keeping; but we do sometimes see specimens in which the development here is conspicuously lacking. The length and texture of the feathers on the abdomen have much to do with its appearance. If it is evident that the deficiency is not a superficial one, but that there is an actual lack of development here, I think it will be found that a female so formed is either a poor layer or a producer of small eggs, or that she is especially liable to trouble in passing eggs, all of which faults are associated with the fault in mechanical structure of the fowl. The posterior development which some regard as a sure "sign" of a good layer may be a help or a hindrance in the production of eggs, but it neither causes nor regulates egg production.

In males the abdomen is naturally not so well developed as in females, and has no particular significance as long as it does not suggest deformity. Males from a line in which the females are full in this section will sometimes be larger here than is consistent with a trim figure and pleasing carriage in a male, but such a fault belongs to the class known as "good faults."

Shape as the characteristic of a breed, is simply the type which those interested in the breed have decided upon as the standard. In some strains and stocks of fowls the breeder has succeeded in fixing shape to which his fowls conform with quite as much accuracy as to the standard for color, but in most stocks of all varieties variations in shape are common and numerous. It is only the occasional breeder and judge that give breed shape the consideration it should have. While the breeder of thoroughbred fowls for sale and competition will find some recognition of success in breeding fowls that are models in form, he will rarely find it fully appreciated unless combined with a superiority in superficial points which challenges attention. Then it is likely to get due recognition.

It is held by some that in each breed there is a certain shape which represents the highest utility development of the breed. According to the same authorities there is also for each breed a certain size with which the highest excellence is associated. It requires but a very limited observation of fowls to convince an unbiased mind that these views are both erroneous.

Carriage.

The carriage of a fowl, its habitual attitudes and movements, have significance first of all as an expression of its degree of vitality and health. When sick or tired the actions and attitudes of fowls of all breeds are singularly alike. When in health and good spirits different classes of fowls and sometimes to a lesser degree different breeds of the same class, exhibit peculiarities of carriage which are regarded as desirable characteristics of the breed, and which sometimes are a considerable factor in breed shape. But without strict regard to breed characteristics many specimens show a distinctive and pleasing carriage which commends them to a buyer, and often wins them a better place than they would otherwise get in competition.

Head Characters.

Fowls differ as much in size, shape, and expression of the head as in size and shape of body and color of plumage. Marked differences in head types may be found in the same variety, and even in birds of the same strain or stock. We are so accustomed to consider the head as a mere base for its appurtenances, beak, comb, earlobes, wattles, crest, beard, that it is only in a very few breeds that size and shape of the head proper are given particular consideration. The head least adorned with superfluities in flesh and feathers is the most expressive of quality, for in it the correlation with the other parts of the fowl is discernible, while a head profusely ornamented does not show for what it is. Undoubtedly the character is there, but the appendages are so much more prominent that it is not readily observed.

This lack of discernment of the character of the head proper is not, however, a serious matter. For as the head expresses with reasonable accuracy the character of some points of structure of body and of constitution, its appendages generally partake of the character of head and body, and by their greater conspicuousness show them even more unmistakably to those versed in their meanings. The comb, the wattles, the earlobes, the face, the beak, the eyes, all tell the shrewd observer something worth while for him to know. I would not be too positive in making a statement of this kind, but I think that though they may not always realize it, most critical judges of a fowl by external appearances are more influenced by the character of the head of the fowl than by the shape of the body, that the expression and impression on their eye of the head of the bird has an influence on their judgment of it as a whole which is not often changed as they pass the other sections in detail. To the average poultryman of tolerably keen perceptions, crests and beards have less meaning as expressing the general character of the fowl, but to the breeder of crested and bearded fowls who has studied them closely they mean much. Indeed it is in perception and appreciation of the correlation of the parts and qualities of fowls with details which ordinarily escape notice that the skillful breeder has his greatest advantage over others.

I do not think it can be shown that the size of combs, wattles, earlobes, crests, and beards has any special relation to any practical quality. Large combs are sometimes said to indicate laying capacity, but I have not found it so in individuals, nor will a comparison of breeds differing in size of comb substantiate this idea.

The shape of the comb we must consider in two ways: First, as to the kind—single, rose, pea, leaf. It is often said that rose and pea combed fowls stand cold better than those with single combs. This is but a half truth. It depends as much on the size as on the shape of the comb, and we have to consider also the development of the wattles, with relation to susceptibility to cold and frost. A very large fleshy rose comb that has no spike, is lumpy and only a "rose comb" because it is not anything else, is often associated with very long, pendulous wattles which freeze as quickly as the wattles of a large single combed fowl. A rose comb of the type generally preferred in Wyandottes is usually associated with a medium sized wattle not readily affected by cold. A single combed fowl having wattles of the same size generally has a comb low enough not to be affected by frost at any temperature that would not affect the wattles. We must count size of comb then as a point indicating in a general way the capacity of a breed of fowls to resist cold.

When it comes to the matter of individual resistance to cold, the comb, unless quite inconspicuous, becomes a very accurate indicator. Observe your fowls on any raw cold day, and see how some combs are bright as usual, others slightly discolored, and others quite blue or purple. The discoloration of some combs may indicate only constitutional susceptibility to cold, or it may mean that the fowl is at the time out of condition and therefore unusually susceptible to climatic influences.

The texture of the comb is also a point of importance. The fancier prizes fine texture in the comb for itself; the poultry grower because he considers it an indication of fineness of fiber in the meat of the fowl. The carriage of the comb in single combed fowls conveys impressions which probably are misleading, though I would not care to dogmatize on this point. A comb that is erect and smooth looks strong and gives the fowl an appearance of strength. A comb that bulges, bends, lops or wrinkles suggests weakness, just as any lack of symmetry does, but I doubt whether any ratio dependent upon such variations could be established.

Considering the shape of the comb and wattles as compared with others of the same kind: It is found that there is a type of unsymmetrical comb quite common in all fowls, and especially conspicuous in single combed fowls, which gives an expression in the fowl corresponding to that made by a human profile with retreating forehead and chin. With such a comb is usually associated a rather long narrow head and a bill that without being abnormally long, and giving the fowl a "peaked" look, yet conveys an impression of lack of force and stamina. It is commonly held that such fowls are lacking in sexual vigor. I think this opinion requires modification. My observation of such fowls suggests that the reproductive faculties are as active in them as in others, but that their operation tends to exhaust the vitality of the fowl more rapidly, that it is a lack of general stamina rather than of sexual capacity. The precise understanding of it, however, is not a matter worth quarreling over. It is a quite well assumed fact that such birds are not desirable breeders, and the hens not likely to be as persistent layers as those more symmetrical in these points.

To the shape of the bill fanciers attach considerable importance. In nearly all breeds a strong, sometimes stout, well curved or moderately curved bill is required. Such a bill looks better than one that falls short of the specifications. Market poultrymen find the strong, stout, well curved bill the mark of a good feeder. Experimenters in special fattening methods say birds with such bills are much better subjects for fattening.

The color of the bill is a point of importance to the fancier. He requires a bill of a certain color in each breed. To the market poultryman the color of the bill is of importance only as it indicates the color of the skin. The bill is almost invariably of the color of the legs, and generally the skin of the fowl corresponds both as to kind and quality of color. Thus in bill and legs one may judge the color of the skin of a fowl without examining under the feathers.

To the color and expression of the eye breeders attach great importance—far more than a careful comparison of results has ever showed me. It is held that a red eye indicates vigor and vitality, especially sexual vitality. It certainly gives an impression of boldness and strength to a bird, but I question whether this impression has any better basis than general opinion. We in this country also think white or flesh colored bills and legs make a fowl look weak as compared with one in which bill and legs are a good yellow, but the facts about the breeds do not substantiate this view.

The Wings and Tail.

The size and shape of the wings of a fowl would naturally be expected to be in proportion to the development of the breast, which is largely the development of the muscles which move the wings. In general the proportion is probably maintained. This we may conclude from a comparison of breeds. How closely the correlation of size of wings and development of breast is maintained in individuals, I do not think has ever been made the subject of inquiry.

We look usually for a similar degree of development in the feathers of the wings and tail of the fowl, and such probably exists, according to a natural law, except where, by artificial selection, different degrees of development have been brought about. With general similarity of development there is always much individual variation. This probably has no particular meaning. Indeed, if one were to attempt to make the supposed meanings or values of different external characters harmonize with each other he soon arrives at a situation where he must either admit that some things he felt very sure indicated certain qualities are really immaterial with respect to those qualities, and their simultaneous occurrence merely a coincidence, or, that the whole subject is so complex that he cannot follow it in detail. For instance: We may note in general that a fowl with large tail has large wings. The tail of the male bird is a sexual character, and its development is with some reason supposed to bear some relation to his sexual development. That it is a measure of such development I would not affirm, though it is well known that males with "hen tails," the Standard type in Sebright bantams, are likely to be sterile or quite so. For a male to be well furnished with distinctive male plumage, neck hackle, saddle, hangers, and tail with abundant coverts is generally supposed to indicate virility.

There is as we have seen, a general correlation of the size of the wings to the development of the breast. Now, unless we assume that there is no correlation, or no meaning in correlation of the stiff or main tail feathers with the soft feathers of the tail which cover them, we find, reasoning from one conclusion to another, that a well developed breast is an indication of sexual activity. And if we pursue this same course of reasoning from section to section throughout I think we will finally resolve the whole matter into the simple general proposition that the fowl that is best developed physically, that is, with the best all round development, should be the most productive rowl and the most reliable breeder. Such a proposition looks very reasonable, but every experienced poultryman and breeder knows that though partly true it is true with so many modifications and limitations that it does not furnish the simple rule it would if absolutely correct.

The carriage of wings and tail we do not readily dissociate from the general carriage of the fowl, for its habit with regard to them is what makes fully fifty per cent of its distinctive carriage. Fanciers find that bad faults in carriage of these parts, whether due to malformations or to laziness and general lack of liveliness, are very persistent in the progeny of fowls. Not only so, but they are distinctly a handicap to a fowl in the exhibition room, and also contribute to an unfavorable first impression which makes them less salable than birds that are full of life and style.

Any departure from the usual habit of carrying tail and wings indicates a degree of exhaustion or perhaps the presence of disease. A fowl that is weak and debilitated carries its wings and tail as if they were burdens and incumbrances, dragging it down. A fowl in the full vigor of health carries wings and tail so easily and naturally as to attract no special attention to them as parts of itself, or uses them so handily that they add to the impression of beauty, strength, and gracefulness which it makes.

The Legs and Feet.

In the shank and foot of the fowl we have the most reliable external sign of some things of importance. It is the only part of the frame of the fowl not so covered with feathers that we cannot judge by sight of the general character of the skeleton or frame work of the fowl. The shank, and especially the clean, unfeathered shank, indicates very accurately the character of the skeleton of the fowl. If it is fine with small, neat joints, that same structure will be found throughout, and in such a fowl there will appear to be a larger proportion of edible meat and less waste in bone, tendons, and cartilage. The common belief is that this not only appears to be, but is actually the case. Mr. Brown, in the chapter of his book to which I have frequently made reference, quotes M. Abozine as stating at the poultry conference at St. Petersburg some years ago, that "on examination of the skeletons of a large number of fowls he always found that the relative weight of the dried skeletons to that of the entire living bird and its edible parts is the same for all breeds, and equivalent to six per cent." Mr. Brown quotes this statement as one calling for further inquiry. I would not deny it in the face of what purports to be a careful report, nor would I indorse it without more extended investigation. If it is correct there is no variation in proportions of weight of skeleton to flesh, and some of our ideas about producing table poultry carrying the largest possible proportion of edible meat, seem to be wrong.

However, this theory, though it may, if proved, contradict the old dictum that in a fine boned fowl the skeleton is produced at less cost, does not necessarily interfere with the idea that fineness of bone is associated as a rule with fineness of flesh. This, I think, is the general and apparently well founded belief of most of those who handle poultry. Prof. W. R. Graham, in a recent lecture called attention to the texture of the skin of the shank of a fowl as always indicating the texture and quality of the flesh as well as of the skin covered with feathers. This point I had noted in a number of cases, but not enough to enable me to be as positive of its general truth as he was. Knowing how thoroughly he has gone into the subject of table poultry, I think his judgment on this point worth acceptance.

The carriage of the feet and legs—the fowl's way of standing and walking—go far toward the making of the impression it presents. To some extent the position of the legs and feet are dependent upon the general structure of which they are a part, yet often peculiarities in

regard to them are plainly local, and in their contribution to the carriage of the bird they express its spirit quite as faithfully and conspicuously as do some of the superior sections. I do not know that there is anything indicated in the legs and feet of a fowl that cannot be known without special reference to them. Their indications of structure and of quality of flesh are discernible also in the head and comb. The testimony of different parts of the fowl to the same facts, however, is cumulative, and ought to make the requisite impression on the person seeking for evidence of quality, or lack of it, much more forcible than if confined to a single section. Further, all do not value the same sections alike, and evidence of a fault appearing in one section might make little impression on one mind, while the evidence of the same fault in another section would make a very strong impression. So, also, with respect to excellence. Some require one sign; some another, of the same quality. Whoever depends on a single point is apt to find his judgment on it occasionally leading him astray, while with two or three points of view, if his judgment misses on one he is likely to be set right on another. Thus I have known men who saw in a peaked looking beak and head only evidence of "fineness," but when they looked at the unsymmetrical, rough, or shriveled looking shanks and toes of the same specimen, saw at once that it was weakness.

The condition of the legs is generally considered a reliable index of the age of a fowl, but it is as often misleading. To mistake the legs of an immature fowl for those of a mature fowl, if both were in good condition, would be quite impossible to most experienced poultrymen, but as soon as the legs and toes begin to be out of condition, either because of external conditions or because of the condition of the fowl, judgment by them becomes all guessing, while in the case of mature fowls age alone may make little difference in the appearance of the leg of the yearling and the bird of two, three, or four years.

In young chickens the leg and foot often furnish the first indication of trouble. Especially is this the case with chickens raised artificially. Improper temperatures and lack of ventilation soon show their effects on the feet, which seem to wither away, while the chick that finds conditions right has a smooth skinned, well rounded, sturdy looking pair of legs under it.

Color, Quantity, and Quality of Plumage.

The color of a fowl in no way influences any other quality, though color defects are sometimes (perhaps rightly) held to indicate a degree or period of weakness. Thus in black fowls if a feather containing some white or gray, when plucked, is replaced by a solid black feather, the presumption is that the first feather was not perfect because of some lack of perfect condition in the fowl. But it would be hard to show by comparison of black fowls that those with a trifle of white in the plumage were in any way, except in this variation from Standard color, inferior to either the solid black birds or to those which, from excess of coloring pigment, showed purple bars in the black. The actual difference is too trifling — even if it does exist — to have an influence marked enough to be noticeable.

Superficially, however, and considered with reference to the demand for certain colors and markings in exhibition fowls, and with reference to such points as ease of dressing and the better appearance of fowls of certain colors when dressed, color is of great importance. With the fancier excellence in color compensates for many serious faults in other matters, and a fowl remarkable for color will sell or win regardless of other faults where a fowl poor in color would not be considered for its other merits. It is the fowl of this character which the "utility" poultry keeper should buy of the fancier — a cull for superficial faults in no way affecting any substantial quality. This is a point both breeder and buyer should keep constantly in mind. The utility poultryman wants not any cull from the fancier's yard, but the bird which is a cull from the fancier's point of vision, and at the same time not a cull from his own.

The history of the popularity of varieties of poultry indicates that even those who do not breed for high excellence in color and markings are not long satisfied with fowls that, as they run with ordinary selection in breeding, show too great diversity of color. This accounts in part for the steadily increasing preference for white fowls — the fact that the white fowl is at any age easy to dress clean, the pin feathers not being full of pigment which, if it exudes, stains the carcass, and if it remains in the quill disfigures it.

The quantity of plumage, profuse or scanty, is advantageous or otherwise according to conditions. The Asiatic with abundant plumage will stand cold and exposure better than any other fowl, but in a long experience with Asiatics I have found that in extremely hot periods a much larger proportion of the adult fowls will die simply from the effects of heat than of any other fowls.

The young stock, not often being in full plumage in summer, is not often so affected. Fowls with short or scant plumage stand hot weather best, and are most susceptible to cold and to such temperature changes as are common in fall, winter, and spring. There seems to be a close connection between abundance of feathering and foot feathering. Not that the two points are not separable, but in general in a feather legged breed the volume of the foot feathering is in proportion to the length and abundance of the plumage of the body. It is notable, also, that an excess of plumage on the body and feet of the fowl is often, (if not generally) associated with a shortening of the feathers of the wings and tail, and (whether there is any necessary relation of these facts, I do not know) twisted wing feathers and wing feathers narrow almost to deformity, are far more common in heavily feathered fowls than in those in which the development of feathers is more moderate.

The quality of the plumage, like the texture of the skin of the fowl, is an index of its physical condition, and varies with it. This is a point to which little attention is given by any class of poultrymen.

Color and Texture of Skin.

Some reference has already been made to the texture of the skin of the legs in relation to the texture of the flesh. The fancier, as a fancier, takes no specific account of the skin of the fowl that is covered with feathers, but if the skin of the exposed parts, the head, legs, and feet, is what it should be the skin that is concealed is not at all likely to be wrong, for there is a natural correlation of texture and quality of the skin which extends to all parts.

The skin of the exposed parts not being as desired or required, does not necessarily mean that the skin of the body is not right. There are numerous diseases and some conditions which affect the exposed skin, but may not extend further. The bleaching of the skin of the legs and feet of fowls which run on very dry earth or ashes may be quite marked, yet the skin of the body be of good color. Dust and dirt may disfigure the comb of the fowl so much as to give it a faded or unhealthy looking color, yet the protected skin show no such effects. The texture of the skin of the legs is of great importance in the matter of resisting disease and conditions injurious to the skin. Fine grained, firm skin and scales resist to a remarkable degree the action of soils, ashes, etc., and also of the insects which cause the loathsome disease known as scaly leg.

In general it will be noted that a fine soft oily skin is associated with fine quality, firmness, and glossiness in the plumage. These conditions or characteristics are to some degree dependent upon the constitution and general health and condition of the fowl, but it seems quite clear also that this quality contributes much to the health and good condition of the fowl. It may be a question of opinion which is the cause and which the effect in such matters, but the value of the external characteristics and their meaning are apparent.

In most American markets the demand is for poultry with yellow skin and legs. In this respect the color has an actual cash value for table purposes, just as color of plumage has for exhibition. Of course in the consideration of single specimens, the value of color of plumage may be represented by many dollars, while color of the skin of a table fowl increases its selling value only a few cents, but the demand for yellow skin in table poultry is general and insistent, while preferences for colors of plumage are various and changeable.

In Conclusion.

We have seen as we have discussed these various characteristics that in the majority of instances where a character has special value, it is because it meets an artificial demand. This is as true of "practical" as of "fancy" points. If demands change we change our fowls or our styles, sizes or types of fowls accordingly. As we have, even with the most careful breeding and skillful growing, considerable variety in each year's product, the profitable disposition of

it depends on selecting for each demand to which one caters such fowls as will best meet that demand and would not meet a better paying demand. Not all good qualities can be combined in equal degree in the same fowl, but by proper selection of breeding stock year by year a breeder can have stock in which he combines with good market and laying qualities the possibility of great excellence from a fancier's standpoint. If he does this he has always three classes of prospective customers—fanciers, farmers, and poultrymen who wish fowls which they are not ashamed to have those who know good fowls see, which will at the same time give a good account of themselves at the nests and on the table. All these can be supplied from the same flock, if the needs of the two extreme classes are always jointly considered in breeding. If either is neglected the stock is quickly brought to the point where only one class can be satisfactorily supplied. No matter which class this is the possibilities of immediate profit, and what is more important, the opportunity to extend one's business are greatly curtailed.

Breeders should distinguish between essential and non-essential points, work for every point essential to any profitable demand, and despise no non-essential because it is immaterial to them personally.

LESSON XIV.

Poultry Nomenclature and Abbreviations.

BEGINNERS in poultry keeping, interested — as many are — in everything pertaining to poultry culture, and regarding every breed they hear of as a possible favorite, are often puzzled by the use in poultry literature of abbreviations of names of varieties. The habit of abbreviation is so universal that poultrymen need make no apologies for it. At the same time, there are so many varieties of poultry, and so many varieties and sub-varieties have names that to one who has an idea of the breed constitute a very good description of them, that it is worth while for a novice to inform himself in regard to the abbreviations used.

As nearly everywhere, abbreviations of poultry names are not made to follow one consistent system. The method of giving names, while to a considerable degree systematic, is not wholly so. What, considering other varieties and names *should be* the name of a variety, is not always the name given it. An abbreviation of a part of the name of a variety commonly used for it, and equally applicable to the name of a second variety, may never be used in the name of the second. Hence in making abbreviations one must consider what is common usage much more than what would be logically correct. This is a point the reader who occasionally writes either to give or to ask information about fowls, should keep in mind. An abbreviation may be admissible, but if people are not in the habit of using it many will not take the trouble to be sure they know just what is meant, and sometimes those who do try to make sure of what is said have difficulty in doing so. Indeed the use of abbreviations by those not familiar with most of the abbreviations of names in common use often use an abbreviation which does not clearly distinguish the fowls to which they apply it because equally applicable to another variety. The most troublesome cases of this kind are where an abbreviation in common use for years is made ambiguous by the advent of a new variety having a name with the same initial. The boom in buff varieties caused more trouble in that way than any other recent occurrence.

In Plymouth Rocks we have three varieties — Barred, White, and Buff. The original Plymouth Rock was the Barred variety, and for a long time Plymouth Rock meant nothing but Barred Plymouth Rock. Even now the club devoted to Barred Plymouth Rocks is "The American Plymouth Rock Club." With the introduction of the White variety it became necessary in speaking of Plymouth Rocks to differentiate. Even before this it had been common to speak of the Barred Plymouth Rocks simply as Rocks. Now in addition to the abbreviations B. P. Rock and W. P. Rock, we had B. Rock and W. Rock for Barred Rock and White Rock. Occasionally someone would use the term Barred Plymouth or White Plymouth, but such usage was rare. With the coming of the Buff Plymouth Rock an element of doubt was introduced into the use of the initial B. as an abbreviation for names of varieties of Plymouth Rocks. B. might stand for either Barred or Buff. Though more than ten years have passed since then the plain B. is still often used, especially in connection with the Barred variety. Some poultrymen and writers make a point of doing this on the ground that the Barred had preempted the use of that abbreviation. Enough, however, will not look at it that way to make it generally uncertain what is meant by a B. Rock, or B. P. Rock. I have sometimes

used Br. for Barred and Bf. for Buff—a usage which looks all right when only Rocks are considered, but as Br. is becoming somewhat generally used for Brown Leghorns and for the word Brown when occurring in the name of a variety of Games or Game Bantams, Bd. for Barred would be preferable.

The breed name Wyandottes is very commonly shortened to 'Dottes, and abbreviated to "Wy." The original Wyandottes were the Silvers,—a laced variety. In the American "Standard of Perfection" they are still called Silver Wyandottes, and the abbreviations S. for Silver, and S. Wy. for Silver Wyandotte are common. Since there has been also a Silver Penciled Wyandotte, there has been an increasingly general use of the more complete descriptive name Silver Laced Wyandotte, abbreviated sometimes to S. L. Wyandotte, or S. L. Wy. For the Golden Laced variety the abbreviations have been the same with the substitution of G. for S. For Whites the initial W. with the abbreviation Wy., is very common. Buff and Black having the same initial, the abbreviations may be Bf. and Bl., though there is no established usage. Partridge Wyandottes are properly described as Golden Penciled Wyandottes, though the other is the "official" name of the breed. Partridge may be abbreviated to P. or to Part., which is more suggestive, but I think you will find the name used in full many times oftener than you will find it abbreviated. Silver Penciled Wyandotte may be abbreviated to S. P. Wy., or Wyandotte. It is quite common to call them especially Penciled Wyandottes, but that leads already to the habit of speaking also of the Partridge as Penciled Wyandottes, and I frequently get communications speaking of Penciled Wyandottes, which leave me in doubt as to which is meant. For Columbian Wyandotte Col. Wy., or Wyandotte, seems right, and is occasionally used, though Columbian without the breed name seems to gain favor.

For Javas and Dominiques no abbreviations are in use. Rhode Island Red is commonly shortened to R. I. Red, or simple Red. The two varieties being distinguished by the shapes of the comb, as Single Combed or Rose Combed, it is common to abbreviate either to S. C. R. I. Red, and R. C. R. I. Red, or still further to S. C. Red, and R. C. Red.

The varieties of Brahmas—Light and Dark—have variety names which indicate their colors as compared with each other. These descriptive terms are abbreviated sometimes to Lt. or L. for Light, and Dk. or D. for Dark, but the abbreviations are not as much used as the full names.

In Cochins we have the varieties Buff, Black, White, and Partridge. W. Cochin, and P. Cochin, for the two latter cannot be misunderstood, but to be sure of the others we must add a letter to the B.

Langshans have but two varieties—Black and White, the names often abbreviated to B. Langshan, and W. Langshan.

In Leghorn names, the Brown for years was given a monopoly of the use of the initial B., though the Black might claim it, and there was little if any trouble, because Browns were common and Blacks very rare. I suppose there are in this country today several thousand persons who have Brown Leghorns to every one who has Blacks. But when the Buffs came with some promise of popularity, it had to be Br. and Bf., or else use the words unabbreviated—which has perhaps been the more common practice. The Browns, Whites, and Buffs being subdivided according to the shape of the comb, we have the abbreviations S. C. and R. C., which were explained above in connection with the R. I. Red. In all of these varieties when there is no reference to the comb the Single Combed variety is usually meant. Silver Duckwing is abbreviated to S. D.

The two Single Combed varieties of the Minorca are the Black and White, and the usual abbreviations for these color names used without reference to the shape of comb will almost always mean the S. C. Minorcas. In writing of the R. C. varieties of the same colors the abbreviations of the full name should always be used.

For the Spanish, the full descriptive name (or its abbreviation) of White Faced Black Spanish is very generally used, though there is no possibility of error in speaking of Spanish, there being only the one variety. For Andalusians and Anconas we have no abbreviations.

For Dorkings the Silver Gray is quite generally abbreviated to Silver Dorkings, Gray Dorkings, or S. G. Dorkings, but the White Dorkings and the Colored Dorkings names are not often abbreviated. For Redcap no abbreviation is used.

For the Orpington variety names we have the usual abbreviations for the colors of the varieties, White, Black, and Buff, — and for the subdivisions of these according to shape of comb. Spangled and Jubilee Orpington are not abbreviated.

Of the Polish, the White Crested Black is the only name generally abbreviated. This is reduced to W. C. B. Polish. There is a Buff Laced Polish, and there are both Bearded and Non-Bearded divisions of the Golden, Silver, and White varieties, but these names, perhaps because of the infrequency of occasion for using them, are usually written in full.

For Hamburgs, the names White and Black, are but rarely abbreviated; the names Golden Spangled, Silver Spangled, Golden Penciled, and Silver Penciled, are quite generally reduced to the initials giving G. S., S. S., G. P., and S. P. Hamburgs.

No shortening or abbreviation of any kind obtains in our use of the names of the French breeds — Houdans, Crevecœurs, and La Fleche.

Abbreviations of names of Game and Game Bantam varieties cause most inquiry. A B. B. R. G. Bant. is a Black Breasted Red Game Bantam. Omit the Bant., and you have the abbreviation for Black Breasted Red Game. In both the large and the small fowls there is also a Brown Breasted Red, known as a Brown Red. The other is sometimes called simply a Black Red. As far as proper discrimination in abbreviation of these names is used, the usual way is to write B. B. R. for the Black Breasted Red, and B. R. for the Brown Red. Golden and Silver Duckwing Games and Game Bantam are abbreviated to G. D. and S. D., etc. For Birchen, Black, and White, abbreviations are seldom used. Red Pyle is abbreviated to R. P.

In the "Standard of Perfection" the word Game is dropped from the names of Cornish Indian and White Indian Games, and they are known simply as Indians, Cornish, and White.

The precedent seems to have found little favor, and the old usage quite generally continues with the abbreviations C. I. Games and W. I. Games. For Malays and Sumatras no abbreviations are used.

Golden Sebright and Silver Sebright Bantams may be abbreviated either as to one or both descriptive names. Rose Comb Bantams are of two colors — Black, and White. It is customary to use the abbreviation R. C. (there is no S. C. variety of the breed), but not to abbreviate the color term. In fact, it is not uncommon to see it written R. C. Blacks, or R. C. Whites, with particular reference to their being Bantams. For Booted White Bantams no abbreviation is commonly used, except that as in all varieties of Bantams it is quite customary in writing the name to shorten Bantam to Bant., even when the rest of the name is written in full. With those who abbreviate intelligently it may be said to be the rule — perhaps not specifically framed in the mind, yet still generally observed in practice to abbreviate, to cut short, as soon as the meaning is clear. In names of Brahma, Cochin, and the three varieties of Polish Bantams, we have the same sets of abbreviations as for the larger varieties of the same name, always, of course, with the name Bantam or its abbreviation added.

Of Japanese Bantams there are three standard varieties, — Black Tailed, White, and Black. The first of these is more fully and correctly described as a Black Tailed White Japanese Bantam. This gives us a very long name — for a very small fowl. It may be abbreviated to W. T. W. Jap. Bant. The other two varieties are in the same way made W. Jap. Bant., and B. Jap. Bant. The non-Standard Gray Japanese Bantam must be Gray Jap. Bant., for G. generally stands for Golden, and would be misleading.

Names of Silkies, Sultans, and Frizzles are not abbreviated, nor is it common to abbreviate names of either turkeys, ducks, or geese, though abbreviations of a few of them are admissible. On the contrary, it is more customary in some cases to use more words than is necessary. Thus a Pekin Duck is sufficiently described by that term, for there is only one variety, the White, but it is very common both in speaking and writing to say White Pekin Duck.

Most of the varieties of the turkey take their names from the color. There are Bronze, Buff, Slate, White, and Black. Then there is the Narragansett, which might be described as a bronze-gray in color. The White Turkey described in the Standard is called the White Holland Turkey. White Turkeys called Mammoth (a name also sometimes applied to the Bronze), have also been shown. Finally, there is the Bourbon Red Turkey which is perhaps best described as a Buff with the constituent colors unmixed, and tending to go each to certain sections instead of being evenly distributed.

The Pekin Duck takes its name from the port of Pekin, China. The Aylesbury, also a White Duck, from the district of England where it is most extensively grown. The "Standard" gives Rouen Ducks as of one variety, "Colored," but I do not remember ever having heard or seen the expression Colored Rouen Duck. The Cayuga Duck is Black, and it is quite usual to use the full descriptive title, Black Cayuga Duck. East India Ducks also are generally mentioned as Black East India Ducks. The Call Ducks, White and Gray, generally get their full titles. Muscovy Ducks, too, are fully described as Colored or White. The term "Colored," when applied to the name of a breed of poultry is, as is very evident, used as the readiest term to differentiate the variety to which it is applied from others which get a more specific description. Hence it may be observed that in the making as well as the using of names we may find evidences of easy going tendencies. A Colored Muscovy Duck is black and white. A Colored Dorking is a Dorking that is not white nor yet silver gray, but runs rather to shades of red or brown. A Colored Rouen Duck best deserves the term, for in the male, especially, there is a profusion of colors. The Crested White Duck is just a plain white duck with a top-knot. The Indian Runner Duck has a sort of hybrid name. It is not an Indian Duck, but according to best authorities, a Belgian production, and properly named and described as a simple Runner Duck, the name coming from its active habit. The Blue Swedish Duck takes its name from its color and from the country of its supposed origin.

Names of geese are seldom, if ever, abbreviated. The breed name may be used alone or with the color more specifically describing it. Toulouse and Embden Geese are quite frequently mentioned as Gray Toulouse and White Embden Geese, thus describing them more fully, though it is not necessary to do this to fix their identity. African Geese, described in the Standard as "Gray," are not at all such a gray as the Toulouse, but rather on the brown order. The Chinese Geese are the only breed having two varieties. These are Brown and White. It is quite common to call them China geese, instead of Chinese. The Wild Goose is also known as the Canada or Canadian Goose, and frequently given both titles, Wild Canada Goose.

LESSON XV.

Eggs and Egg Production.

IN this lesson we consider the egg and the subject of egg production from the "business" point of view, and for the common people not versed in any of the "ologies" into which the study of the egg is most fittingly introduced, or which may be applied most interestingly to the examination of the egg and the problems of egg production.

The egg owes its great commercial importance first of all to its food value. In it we have combined as in few other simple food articles the qualities of delicacy and substantial nourishing quality. Eggs alone constitute an important article of diet. But in the average family or hostelry their use as a separate article of diet is second in importance to their use as an ingredient in an almost endless variety of dishes. Except in the homes of the well to do the use of the egg as a separate article of diet depends largely on the relative prices of eggs and meat, the general tendency being to use eggs freely when they are cheaper than the popular cuts of meat, and to be economical in their use when the meats are cheaper.

The matter of cost also enters into the question of the free or economical use of eggs in cooking, though not to the same extent, for so many are the common dishes requiring eggs for their preparation that it is impossible for most housewives to make any considerable reduction in the quantity of eggs used in that way without entirely changing the ordinary bill of fare.

As lack of freshness and flavor are less noticeable in eggs when mixed with other articles, it becomes possible, and is customary to use as "cooking eggs" eggs which served separately to most people would be rather unpalatable. Indeed it is a matter of common knowledge among poultrymen that the infertile eggs from an incubator, tested out the fourth or fifth day, find ready sale to bakers — and possibly also to go into channels of more particular trade. Eggs preserved by various processes or kept in cold storage, and "held" eggs, that is, eggs kept without preservatives by the producers for weeks or even months in anticipation of rising prices, are also salable as "cooking" eggs. Of course these inferior eggs from various sources are not as good even for cooking as nice, fresh eggs, but so many people are satisfied to use them when the prices of fresh eggs are very high, that almost any kind of an egg that is not actually bad will sell readily for cooking purposes.

Eggs sell according to their quality as they reach the buyer. This is true as a general proposition — though some exceptions and seeming exceptions to the rule may be found. If they reach the buyer in as good condition as they left the producer there is no occasion for differences of opinion as to quality and value, but it is only when they go direct from producer to consumer that this is, generally speaking, possible. Most producers of eggs must send their goods to the consumer through channels of trade which require several transfers, more or less delay, and sometimes exposure to deteriorating influences. Sometimes the producer can exert some degree of control over the vicissitudes to which the egg in transit is subjected by investigating the course his goods take after leaving him, and selling to the middlemen who get them into consumption by the most direct route and with the least possible delay. It might be supposed that as a matter of business every dealer in produce would do that, but as a matter of fact there is a great deal of slackness in the handling of eggs, much more than in the handling of poultry, which more quickly shows deterioration whether alive or dead.

However, the producer's control of his eggs after their delivery to the first buyer or transportation company practically ceases as far as personal ability to protect their quality is concerned. Every producer of eggs can be very sure that there is no possibility of his eggs ever becoming better in quality than they were when produced. Age does not improve them to the normal taste, nor will any process of "ripening" render them more palatable. No tricks of manipulation will improve their appearance. The shipper of poultry may find the skill of the salesman who wipes, and shapes and makes more presentable the carcasses of the fowls, of benefit to him, making the fowls show often to better advantage than originally. But dirty eggs are graded as "dirties," and sold at an appropriate price. Small and misshapen eggs reduce the grade of their entire lot. Weak and watery eggs are readily detected by dealers and buyers. Bad flavored eggs in a line of good trade cannot come from the same place very many times in succession without someone in the line being called to account, and ultimately it comes back to the culprit among the producers.

When one begins to give special attention to the production of eggs, he must work for quality as well as for quantity, otherwise he gets but a part of the benefit of his efforts. Producing eggs in quantity and of good quality, he must market them to the best advantage. If he does not he may be no better off than he was in the first place.

Now let us take that the other way around. Suppose a man desirous of getting a better price for his eggs begins to study the ways of the markets, and finds that his eggs compete not with the best, but in the grade of cooking eggs. It is not impossible that there is discrimination or misrepresentation on the part of those handling the eggs, but it is far more likely that the eggs never were of the quality that they should be to command the best prices. This is especially the case with eggs from fowls for which most of the food is purchased, eggs from yarded fowls and eggs from fowls whose ration is too carefully balanced. It is a matter of common observation and frequent comment among eastern handlers of eggs that the western eggs as a class are superior in original quality to the eastern or nearby eggs. They are richer in color of yolk and in substance of white. At seasons when there is little deterioration in transit these western eggs may come into our eastern cities actually better than the nearby product, but during the greater part of the year time and exposure in transit operate to take away their freshness and flavor.

Now, as we have seen, it is easier for the producer to control original quality than to provide against a quick deterioration after the eggs leave his hands. Hence it should be apparent to the eastern producer that it is much easier for him to get good quality in his eggs than it is for the western producer to provide for the preservation of quality in his. There is really no excuse — but that of mistaken economy — for the producer near a good market not getting every advantage of price which excellence of product and nearness of markets combined should give him. Yet many producers do not get them. Why not?

Here are the principal reasons:

Debilitated stock.

Lack of variety in food and insufficient supplies of green foods and fats.

Excessive feeding of swill and other wastes.

Mistaken ideas of the food constituents required for egg production.

It takes healthy hens to produce eggs of first rate quality and fine appearance. Compare the eggs of individual hens in a flock, or better select certain eggs and then find and compare the hens that lay them. Your flock and their eggs may be too uniform in condition and appearance to make the comparison I suggest remarkable, but the average flock is not so. I succeed in having mine that way only in proportion as I limit my breeding to individuals carefully selected from stock bred in my own yards for generations. I find that when I go outside for new blood to improve some point in which I wish to make improvement, my most careful mixture of the new blood introduces a variety into the appearance and to some extent into the quality of the eggs which was absent during the years of close breeding. I find also that the lack of quality in eggs is coincident with a lack of vitality in the individuals producing them. It has sometimes happened, too, that in fertility my best layers and most vigorous birds were

inferior to some of the others, and so I have sometimes had a larger proportion than desirable of laying hens from the weaker stock, and in such cases I have found the eggs averaging lower both in appearance and quality than when I succeeded in getting what pullets I wanted from my most vigorous birds. One can make more careful comparisons in matters like this in his own stock, but it is possible to see the facts in observations of the stocks of others. It is as unreasonable to expect first class quality in eggs from hens in poor condition as to expect good fruit from an unhealthy plant. A laying hen should be in good condition, with smooth, healthy looking skin and firm flesh. Some fat is desirable. Fat hens generally will lay richer eggs. A distinction should be made between fat and excessive fat, between healthy fat on an active fowl and the dead weight of fat an unhealthy fowl may carry.

What is variety? To different persons it means different things. A farmer may say that his cow gives so much milk or makes so much butter on grass. That may mean a considerable variety, though the one term *grass* covers it all. It is said that there are often as many as forty varieties of grass on an old pasture. Such a fact as this should be taken into account in considering the diet of hens on good grass range. On a western farm they may be fed nothing but corn, but they get also all the various kinds of grass which the pasture provides, many succulent weeds besides, and an almost endless variety of seeds of weeds and grasses, in addition to such waste grain other than corn as the farm may afford, and worms and bugs in great profusion. Compare such variety at this with the usual variety given hens kept in confinement, and it is easy to see where the greater variety is, and how meager by comparison is the variety afforded in a balanced ration containing even a dozen articles.

Where hens in confinement suffer most for lack of variety is in green and succulent food. Variety in grains is more readily provided. Grains are not perishable, and supplies can be kept on hand. But the dried substitutes for green foods, while excellent as far as they go, fall far short of the natural provision that way. Where fowls must be kept in confinement, and the ground room is very limited, I am inclined to think it is better to give up as much space as is necessary to the growing of vegetables especially for the fowls, even though by doing so the fowls are confined much more closely than desirable, and grow a variety of vegetables for them, lettuce, cabbage, rape, anything that they will eat.

The lack of fats in the ordinary ration results from overcaution in feeding fowls. To this is due the abhorrence of corn, which is far more prevalent in the east than it should be. A dealer in eggs in Boston who is also proprietor of a poultry farm has told me repeatedly that he had had many shippers whose eggs were so lacking in fats that they would not sell to the best trade, who had remedied the trouble by feeding corn. Indeed, he said, he always felt so sure that a shipper whose eggs were weak did not feed corn that he was in the habit of advising such to feed corn. Many handlers of eggs claim that they can readily distinguish between the eggs of corn fed hens and of hens fed wheat and oats and no corn by the appearance and consistency of the eggs when broken. Fats may be provided in other ways, but corn is cheapest.

The excessive feeding of swill is very common on "egg farms" near cities and towns where large quantities of swill and table waste can be had for the collecting, and there is generally a disposition to feed all of this that the hens can possibly be made to eat, and as little as possible of anything else. Weak and watery eggs and stock debilitated by an excess of soft food are common results. Much of the refuse food thus used is spoiled before being collected, and often the waste contains stuff the fowls ought not to have. Table waste properly saved and properly used is one of the best of foods for poultry, but feeding almost wholly on such food makes neither good poultry nor good eggs.

It is a common idea that for egg production "protein" especially is required. The fact is that what is needed in much larger proportion than it occurs in ordinary food articles is "fat." This fact explains why laying hens may be fed so freely of fattening foods and not only not become excessively fat, but even lose fat, sometimes. In this connection I would emphasize another point too generally unappreciated. The prevailing idea of egg production is that eggs are the product of such surplus of food taken into the body as a hen digests and assimilates,

and does not require for the maintenance of other functions. This is a sort of half truth. Food taken in excess of current needs of the body for maintenance goes to eggs in one hen, to fat in another, causes digestive disorders in another. What makes the difference?

The attempt to answer that question brings us face to face with one of the most puzzling of the poultryman's problems — the control or regulation of egg production. Novices almost without exception suppose that expert poultrymen can regulate egg production. Experienced poultrymen know that when hens have started laying they can generally keep them laying, but that to assure the hens starting at or about any desired time is beyond their power.

Given a laying hen, and the volume of her egg production does depend very much upon the amount of food that she can use in excess of her bodily needs, though the maintenance requirements do not always take precedence. On the contrary it is quite a common thing for a laying hen's food to be diverted to egg production at the expense of bodily maintenance. When this continues for a long period the hen is greatly weakened, sometimes to the extent of becoming emaciated and exhausted beyond recovery. Such cases, however, are exceptional. The rule is that when egg production has appreciably exhausted a hen it ceases, and for a period longer or shorter according to the readiness with which the system is rebuilt all the energy of the fowl goes to restore it to perfect physical condition.

Generally speaking, it is correct to say that because a hen is laying she requires and takes food in excess of the needs of her body for maintenance and the performance of other functions, and that the volume of her product depends largely upon the amount of such surplus of food that she is capable of digesting and converting into eggs; but it is not correct to say that furnishing a surplus of food compels egg production and makes the hen lay.

What difference does it make which way we look at this matter? Just this difference:—Our way of looking at this matter is likely to govern our efforts to "make hens lay." If we believe that a surplus of the right kind of food will force egg production, we, very logically, devote ourselves to experiments with foods until we find one that seems to answer our purpose. If we believe that the activity of the hen's organs of reproduction depends upon something not so directly within our control as the kind, quality, or quantity of food furnished her, we are more ready to settle down to a good system, and have more patience in waiting for results when they do not come when we want them. It is conducive both to peace of mind and to continuing faith in a good method to know that egg production is measurably dependent upon causes or conditions beyond our control, and that failure to have hens begin laying when we want them to does not necessarily imply anything wrong — which by foresight or management we might have avoided.

LESSON XVI.

Some Elementary Moral Science For Exhibitors.

THE novice in exhibiting fowls finds, when he ventures into the show room, certain conflicts between the rules of exhibitions, as he reads them, and some common practices of exhibitors.

Thus the rules almost invariably say that specimens, except Games, which may have the combs dubbed, must be exhibited in their natural condition, but it is the universal practice among exhibitors to improve in various ways on the "natural" condition and appearance of the fowl. As to the legitimacy or illegitimacy of these practices, opinions may differ. All grades of opinion are found, from severe condemnation of even the most harmless and apparent forms of "grooming," to apology for or justification of practices which need only to be described to be recognized as wrong.

It is in the list of practices intermediate between these extremes that the things are found which cause the most concern to exhibitors who wish at the same time to be honest and fair, and to take advantage of every permissible method of improving a bird's chances of winning.

To the beginner in the exhibition room some of the practices which seem to the older exhibitor necessary and right appear to be of a very heinous nature. As he becomes more familiar with the conditions which occasion these practices, and learns to know the men he at first condemned for practicing them, he is very likely to considerably modify his views about both the men and the practices, even though he may not be able fully to approve them, or to join in them with a conscience entirely clear.

In this lesson I have no purpose or wish to persuade anyone to adopt a course with reference to these matters which he cannot justify to himself and his own conscience. I shall merely present certain facts in the relations in which they are commonly considered by experienced breeders and exhibitors, with the arguments by which the practices generally regarded as legitimate are justified, indicate the common attitude with regard to them, and occasionally give a personal opinion when it seems appropriate.

Some of the Evils of Exhibitions.

The great evils in poultry exhibitions as they discover themselves to the novice are:—

- 1.—The faking of birds; that is, treating them in some matter to circumvent a rule or gain an unfair advantage of a competitor.
- 2.—The borrowing of birds for exhibition.
- 3.—The collusion of exhibitors and judges.

What is Faking?

In the above classification of show room evils I have given a brief and comprehensive definition of a common term which means many different things to many different people.

Strictly and literally interpreted, the rules, as promulgated by most shows, do prohibit practices which it may be said are followed by experienced exhibitors without exception, for it would be utter folly for an exhibitor competing with experienced exhibitors in strong competition not to do these things. His chances of winning without them would be so rare that

it would be foolish for him to enter his birds at all. Hence we may assume that a man who continues to successfully engage in strong competition in shows of any degree of importance does habitually do a number of things which the rules of the show say he shall not do. On this point there can be no dispute. The facts are self apparent to anyone who knows the conditions with which exhibitors have to deal.

Let us briefly examine these conditions:

To the visitor at a poultry exhibition, to the public at large, it is merely an exhibition, a display of fine fowls. For the exhibitors the poultry show consists of many competitions in the results of skill in breeding to a prescribed set of ideals, the full accomplishment of which, in combination, is practically impossible.

In some respects these standard requirements are absurd:—as when a fowl is disqualified for a defect inconspicuous until the fowl is subjected to a very close examination, or so obscure that its existence may not be positively identified without the aid of a magnifying glass. Were these requirements part of a consistent system they might be treated with more respect by exhibitors, but as the application of the same standards admits with trifling punishment and sometimes even without punishment blemishes and faults conspicuous as far as any quality of the fowl could be distinguished, the more familiar exhibitors become with the difficulties of producing fowls free from faults and with the incongruities in standard requirements the less evil they will see in disregarding or breaking rigid requirements about trifles.

Novices in the breeding of fowls rarely appreciate the scarcity of specimens which even approximately measure up to an educated conception of the requirements of the standards for their variety. The erroneous prevalent idea of the uniformity of thoroughbred birds and the fixity of characters in them is responsible for the common misapprehensions on these points as it is for many other difficulties of beginners.

To illustrate:—In many varieties what are known as “foul” feathers (that is, feathers not colored or marked as required) are likely to be found even in stock that has been most carefully bred. Indeed specimens on which an expert judge who made a thorough search for them could not find such feathers are very rare. The rule which requires specimens to be exhibited in their natural condition is commonly held to prohibit the removal of such feathers. It would generally be affirmed by officers of associations who might be questioned on that point that the intent of the rule was to prohibit the plucking of such feathers.

But the plucking of feathers which mar the appearance of the fowl, and the removal of which makes no visible defect or lack in the plumage is an act practically impossible of detection, after the job is done, and between this protection from consequences and the general feeling of exhibitors that the rule is unreasonable it has come about that exhibitors almost without exception — after a few seasons experience — pluck all the feathers that should be removed to make the bird appear at its best. Hence the rule is practically a dead letter except with novices who wish to strictly observe regulations and do not know the facts in regard to the common neglect of the rule, and do not appreciate the conditions which have made it obsolete.

While the facts given above do not justify a violation of such rules by those who consider such violation wrong, they do explain how it is that a great many exhibitors consider the violation of such rules an act involving no special moral turpitude. I have always maintained that such rules were wrong, because they could not possibly be enforced, and the disregard of unreasonable rules, while perhaps not of itself deserving severe condemnation, is to be deplored because of its effect on the observance of reasonable requirements. From this point of view I say that of the two evils the rule which prohibits fitting of this kind is the greater. The constant publication of such a rule also tends to confirm the prevailing error among beginners as to the possibility of producing fowls which are fit for exhibition without special attention to the removal of superficial faults. They naturally argue that if it were not a reasonable requirement it would not exist.

To show that such disregard of rules or laws is not peculiar to poultry exhibitors, and has been, and is, practiced by very large numbers of people without subjecting them to condemnation as particularly bad, let me cite the general disregard in this country of laws of the kind known as “Blue Laws,” and the almost universal failure of people subject to taxation to return full schedules of their taxable property. If the reader disposed to be severe on poultry

exhibitors for their peculiar disregards of regulations will consider the number of regulations of all kinds which are practically obsolete so far as observance of them goes, it may dispose him to be more lenient in his judgment of them.

To me the evils of these practices, as between competitors, do not seem to be of as much importance as the evils which may follow after the exhibition. Every exhibitor understands—or has opportunity to know and understand—that such manipulations of birds as plucking foul feathers, washing white birds to give them the pearl white color required, coloring, or strengthening the color of legs and toes, etc., etc., are generally practiced, and knows also that the results of competition in the show room depend as much on the ability of exhibitors to condition their birds and fit them properly as upon their skill in breeding. The competition in the show room may, therefore, be considered one in which all meet on the same level, it being understood that each competitor, in addition to exerting his utmost skill to produce fine specimens, has also availed himself to the extent of his ability of the advantages to be gained by skillful preparation; it also being generally appreciated that birds which could go into competition without special fitting, with any hope of winning, are very rare.

Now, if with this general understanding the competitors meet, prizes are awarded, and each takes his birds home, we cannot readily discover that any particular harm has been done to anyone. The breeder who has exhibited birds whose faults have been treated knows what these faults were, and therefore can make an intelligent effort to eliminate them or reduce them in the progeny of the stock in the next generation. But suppose he sells them with the assurance to the customer that they have not been treated in any way, and the customer, relying upon his positive assurance, buys the birds, and perhaps in his ignorance of their fault mates them in just the way that will reproduce and perhaps exaggerate them in the offspring. Here we have a case which the consensus of opinion among poultrymen does not excuse, and while there are, of course, no data covering such points, I think it is a fact that in transactions between exhibitors the sellers will, with few exceptions, inform buyers of faults of this class. I have known many instances where, without stating their reason, exhibitors refused to sell such birds.

Another fact not generally understood by novices in exhibitions is that a fowl, having none of the blood of a variety, or perhaps but a fraction of blood of that variety, may to all outward appearances be a fine specimen of that variety, and the owner of such a fowl may exhibit it in the class to which, in appearance, it belongs without violating any rule of either the Standard or the association giving the show to which he sends the bird. The judge pronounces judgment on the specimens as they come before him. Neither he nor any officer of an association assumes to go back of the entries in considering the merits of a fowl. The Standard calls for certain peculiarities, but does not prescribe how they shall be produced.

I do not think it misrepresents the general attitude of poultrymen to say that they would see no special wrong doing in entering such a specimen for competition, but would consider it wrong for the owner of the bird to sell it except for just what it was. The distinction they make may not satisfy every requirement of a rigid moral code, but measuring the extent of an evil by its special results their attitude has something to commend it.

In a general way the extent to which a practice prevails affords a tolerably accurate measure of the degree of toleration or condemnation which the general opinion of the community or class interested assigns it, and the newcomer in a community and the novice in an interest alike need to be slow to condemn what may at first seem to them very serious and inexcusable faults commonly practiced by persons of general good character, for on further acquaintance with the facts it may develop that considerable justification of the practices in question may be found, and that toleration of them by those accustomed to them is as likely to be the toleration developed by a better understanding of conditions as the toleration of indifference to wrong through familiarity with it.

Buying and Borrowing Exhibition Birds.

Though I had cited only the borrowing of exhibition birds as an evil to be specially considered here, that can hardly be discussed as it should be without some reference to the buying of birds for exhibition.

Every novice in the show room, and I think I may say every veteran as well, is possessed of the ambition to put into an exhibition a string of birds of his own breeding that will win prizes enough to give him high honor as a breeder. To the novice it looks like a matter of buying good stock to start with and carefully selecting and reserving his choicest specimens. The veteran sees the matter differently. He knows that while it might be an easy matter to do that if he had the field to himself, with so many others striving to do the same thing there will almost invariably be a general division of prizes in any competition which is a competition in fact as well as in name. It is only at rare intervals that a breeder of a variety in which there is strong competition produces in his own yards as many first class specimens as he needs to enter in a strong class with reasonable expectation of getting his share of the prizes given. The really first class specimens are as a rule produced a few here and a few there — many of them by persons who either do not care to exhibit or would rather part with them at a good figure than take the trouble, risk, and uncertainty of winning in exhibition. Hence there are every year for sale a good many birds such as the breeders who wish to make large displays need to supplement their own production.

The rules of shows generally require that the bird exhibited shall be the *bona fide* property of the owner. That means that it must be his absolutely without any understanding or reservation. Occasionally at some show or in some special competition it is required that only birds *Bred by* the exhibitor be entered by him, but as a rule the shows make no requirement of this nature going back of present ownership. The buying and selling of exhibition fowls cannot by any reasonable interpretation or application of common principles of right and wrong be made a wrong or even an objectionable practice. On the contrary, in its legitimate phases it may be said to be the most important feature of the interest in standard bred poultry.

But about this entirely legitimate feature of the business have grown up several abuses, most conspicuous of which is the lending and borrowing of specimens for exhibition.

This is carried on in two ways:—By simple borrowing and lending with not even a nominal change in the actual ownership of the bird; and by fictitious sale, or sale on such terms that it is substantially fictitious.

The practice began with simple borrowing and lending, but as poultry exhibitors generally frowned on it and general opinion would not condone it as it does some of the more prevalent forms of faking, those who wished to avail themselves of the use of exhibition specimens which they could not buy outright, and those who for various reasons were willing that their birds should be exhibited by others, devised the plan of selling birds conditionally, the bird to be returned after the show, and the price paid for it to be refunded. Such an arrangement is of course a mere juggle with right and wrong. The fiction of a sale does no more than make it impossible to prove the facts in the case until after the awards are made and the premiums paid. It does not often happen that birds "lent" in this way get back to their owner without interested competitors of the exhibitor finding it out sooner or later. Actual and positive proof of wrong doing and identification of birds is however so difficult that so far no effective check has been put on the practice. I do not think anyone has ever attempted to justify it. The advantages to be gained by it, both for those who borrow and those who lend, are so great that the temptation to make arrangements of this kind are very strong, and though the proportion of specimens in any show not actually the property of the exhibitor in whose name they are entered is probably always very small, I suppose that there are few exhibitors who have not at some time, perhaps in a very small way, yielded to the temptation to lend or to borrow. Many who would not exhibit birds not their own, have occasionally lent birds. Many who think the practice wrong have in emergencies borrowed birds. With the great majority such lapses have been exceptional, not habitual.

The disposition to lend—to do a fellow fancier a favor—is a manifestation of an excellent trait in human nature. With many fanciers the need of not indulging it does not become apparent until, having indulged it, they find that they must share in the common condemnation of the borrower.

The opportunity to borrow, say, at the time when a loss of or injury to a specimen upon which an exhibitor was relying has greatly diminished his prospects of making a good winning, presents itself as an evil of very small importance compared with the loss from which

it may save him; but unless of feelings more callous than is usual among poultrymen, the borrower in the end resolves that he will never do it again.

On the whole, it may be said of this particular abuse that while it is prevalent enough to be a very disturbing influence, the general attitude of exhibitors toward it, and the fact that of late there has been a good deal of serious discussion of practical ways of preventing it, give reason to hope that it is an evil practice which is doomed to become less and less prevalent. Much might be said of the results of this practice, but the limits of this lesson make it necessary to pass over that phase of the subject with the remark that it develops consequences similar to those consequences of faking which especially concern the purchasers of stock, and develops them in larger proportions and more aggravated type.

Collusion of Exhibitors and Judges.

Poultry judges, as a class, are scrupulously careful and honest in placing their awards. Such a statement may surprise some who have at the same time the opposite idea about poultry judges, and think they have observed that I try to make no statements I cannot maintain. But I make this statement deliberately from a tolerably large acquaintance with poultry judges, extending back over many years, in which I have watched their work in the show room, seen some of their mistakes there, talked with them, and heard them talk with others about their errors, and learned also of their shortcomings outside of the show room.

There are few positions in life where it is harder for a man to avoid the appearance of evil than in the position of poultry judge, and few men who in that position are not constantly called upon to meet situations where they must decide off-hand matters for which anyone would, if possible, ask time for deliberation. This is true of points which must be passed upon in judging; equally true and of more importance on points that come up with reference to his relations to officials and exhibitors. To some extent it is true of any transaction of any kind in which he may engage. For instance, a judge, as a breeder, may sell exhibition fowls to parties upon whose exhibits he never expects to be called to pass, and in the course of his judging engagements may recognize those birds. There are very few judges who, in such a case, would not endeavor to place the awards honestly and fairly, yet probably every judge who is ever placed in such a position has realized the difficulty of feeling sure that he was acting without bias either for or against this stock, and has realized also that if it received awards he would be charged with having favored it — charged with collusion with the exhibitor; and that if it failed to get recognition the exhibitor might charge him, as a breeder, with selling as first class stock which he, as a judge, would not award a prize.

There are few, if any, judges who have managed to keep clear of every possible ground for suggestion or suspicion of collusion with exhibitors. Most judges, without giving chapter and verse, would probably admit in a general way that at times they had erred in their relations with officials and exhibitors, as well as made mistakes in the placing of awards. With so many exhibitions, so many judges, and so many exhibitors, there is always somewhere something that furnishes occasion for talk about the mistakes or the crookedness, or the vices of judges, and, given the occasion, there is generally a great deal more talk than the circumstances warrant. The result of it all is to give to many an impression of prevailing wrong doing by judges entirely out of proportion to the actual conditions.

While it is the little mistakes and little errors of judges that furnish most of the material upon which people build the opinion that crookedness prevails, there are unquestionably sometimes very wrong things done by judges, and often in such cases there is good reason to believe that they are done deliberately. Whether the judges who do them are indifferent to common standards of right and wrong, or feel so convinced of their own integrity and reputation that they think they may disregard appearances, I do not know. The general poultry public, and the novices who form an uncomplimentary opinion of judges, hear comparatively little of the larger and worse instances of delinquencies of judges.

Usually, with experience in poultry shows, a wider acquaintance with judges, and more particular knowledge of their faults, and of the judges who oftenest furnish occasion for criticism, one outgrows the attitude of general condemnation, and applies his disapproval more specific-

ally, and with better discrimination. With a more correct appreciation of the situation I think an exhibitor is much more likely to so govern his conduct toward his exhibits and the judge as not to put the judge in an equivocal position. Exhibitors who do this become more careful on their own account as they learn that while they may, by attempting to act on the supposition that a judge's decision may be influenced, put him in an equivocal position, their acts are observed by other exhibitors, and these may feel doubtful about the judge in such cases, but their attitude toward the offending exhibitor is one of unequivocal condemnation.

An exhibitor who feels tempted — and perhaps especially tempted because he has imbibed the notion that judges are crooked — to tamper with the judge, may be interested in knowing that instances of judges being directly influenced in the placing of awards are extremely rare. Almost as rare are instances where a judge does not resent any palpable attempt to influence his decision. The common cases of apparent bias or prejudice for or against an exhibitor depend generally on the fact that the occasion takes the judge off his guard — that is, the judge's errors are unintentional — unconscious. Probably if anyone had the same interest in circulating stories of instances where the judge had shown a judicial cold blooded disinterestedness in the exhibits of his friend it would be found that such instances were many times more numerous than the others.

The general disposition of officials at shows and exhibitions is to hold judges to a very high standard of work, and in their dealings with those whose interests their decisions in any way affect. At the same time a correct appreciation of the conditions under which their work has to be done makes the veteran show official or exhibitor much more lenient in his judgment of a poultry judge's occasional shortcomings, and he is not so ready to utterly condemn a judge for things which while objectionable or deplorable do not seriously affect his efficiency or irretrievably ruin his reputation with discriminating fanciers.

LESSON XVII.

Business Morality in Poultry Culture.

WHETHER becomes interested — ever so little — in thoroughbred poultry culture discovers almost at once that a considerable proportion of persons similarly interested believe that the moral tone of the industry is distinctly below the average. He will find many people who believe and say this, and many others who go further and declare that this extent of business immorality among poultrymen has so disgusted them with the business and those engaged in it, that they have either withdrawn from it entirely, or limit their active interest in it as much as is necessary to keep them quite strictly apart from those who indulge in or condone the practices which they condemn.

It is wise and well to take such statements with a liberal degree of allowance for the accuracy of the narrator's information as to general conditions and the correctness of his representation of his own case. The poultry industry, like every other, has its peculiar conditions offering temptation or inducement for peculiar manifestations of the errors of omission and commission to which human nature is prone, and the well known rule that men are much more impressed with the exceeding sinfulness of sin with which they are not familiar, applies here as elsewhere. So that it may readily be admitted that such evils as are complained of do exist, and that they do make a very strong impression upon the minds of many who see something of them.

Whether these evils are such and of such proportions as to give an uncommonly low general moral tone to poultry culture; and whether the persons who complain so much of them, and attribute their own lack of greater interest in poultry culture to them, are correct in their diagnosis of their case, are questions upon which I wish to make some comments before proceeding to discuss independently some of the real evils of the poultry business, their causes, and the means to be taken for minimizing them.

General Morality in the Poultry Business.

I think that, with very few exceptions — perhaps without exception — those familiar with the general conditions in the poultry business, and intimate with a great many men engaged in it, will agree that the general moral tone in the industry is the same as the general moral tone of the community. That means that, on the whole, the transactions of poultrymen and between poultrymen must be satisfactory to all parties concerned.

Now we know that it is possible in some kinds of business for those engaged in the business to do a dishonest business and still hold a large proportion of their clients or customers. This is accomplished by concealing the dishonesty of transactions, by deceiving customers as to their character. In the poultry industry by far the greater number of the acts of crookedness alleged to have occurred are of such character that to continually deceive the same persons by them is impossible. In fact, they are acts which — if actually committed — are detected even by a tyro in the business, with comparative ease. A bucket shop operator's victims cannot readily discover the mechanism, or follow the intricacies of the methods by which their separation from their money seems to be the result of causes beyond the control of the operator, but the man who buys a fowl that does not answer the description given

him, and who finds that other people buying from the same parties receive the same treatment, has to do with a very plain and simple case of error or fraud involving nothing beyond the personalities and judgment of the two parties to the transaction. Hence it is theoretically true, (and, as a rule, is found to be true in practice), that it is impossible for poultry breeders either to perpetrate colossal frauds, or to continue indefinitely a regular system of dishonest dealing. So true is this that it is commonly said that a fraud is more easily detected and more quickly compelled to go out of business in this industry than in any other line. As a general proposition, I believe that this is true, though occasionally we find a case which we think is the exception—a breeder of and dealer in poultry commonly believed to be habitually dishonest, yet able to go on doing business, and apparently a good business, for a long period. Such a man's successful dishonesty may be explained by unusual capacity for getting the benefits of crookedness without incurring its penalties. Such "crooks" in the poultry business have their counterparts in every calling. In no legitimate calling do they establish the moral tone of that calling.

How Some Failures Let Themselves Down Easily.

One of the commonest things in everyday life is to hear men assign for their conduct in a matter, or for any condition for which they might be censured, a reason more creditable to themselves than the true reason. This is not always done with deliberate intent to deceive others. Often the person giving the reason deceives himself first. He looks for a reason that suits him, and, having found one, takes it as sufficient for himself. I would not say that everyone who gives as a reason for his failure to develop his interest in poultry the crookedness of the business was a failure in what he had tried to do in it. I would say, and I think the consensus of opinion of well informed poultrymen who have thought the matter over will agree with the statement—that most of the persons I have known who have given this reason for going out of poultry, or doing little with it, have been persons for whose failure, or lack of interest, experienced poultrymen who knew them would have assigned other reasons. There is merely a case of "sour grapes."

Because of the frequency of instances of persons who not having realized their expectations in poultry culture attribute their lapses of activity to the evils of the calling in general, or to the deceptions or frauds of specified individuals or concerns, I advise those wishing to form for themselves a true estimate of the matter, to keep the point I have just mentioned in mind, and not to accept an explanation discrediting the calling generally from men who individually were no credit as fanciers or poultrymen either to themselves or to the fraternity.

Peculiar Conditions in the Poultry Business.

To properly appreciate moral conditions in the poultry industry it is necessary first of all to recognize in it certain peculiar conditions which foster what we may call the "sins of ignorance"—the mistakes of novices which furnish a much larger proportion of the transactions which might at first seem fraudulent than is commonly supposed.

In thoroughbred poultry we are dealing with a commodity in which good judgment of values cannot be acquired quickly, because the adjustment of values is a very complex problem. At the same time we are dealing with a commodity of the class in which, as a rule, novices who are much interested greatly overvalue their own judgment, because they do not realize how much values depend upon distinctions which, as novices, they are not yet able to make. To put it briefly and bluntly, the real cause of the failure of a great many sellers of poultry to do what they ought to do is ignorance of qualities and values in the goods in which they are dealing. This fact need not surprise anyone who will consider how common it is to see people beginning to sell thoroughbred poultry and eggs for hatching while their acquaintance with the breed or variety they handle goes no further than the stock they have in their own yards, and their experience with this may date back but a few months.

Now so far as the individuals in question are concerned, this period of ignorance of values is a stage in their poultry experience. Most of them outgrow it quickly as to serious errors, and quite completely within a few years. And so far as the industry at large is concerned, the presence in it of a class of novices who unintentionally make mistakes which are due to

ignorance, but may be attributed to crookedness, is a condition which, for all we can see now, must continue indefinitely, for each year the industry takes in a considerable body of new recruits, and there is no apparent diminution in the confidence of novices in their judgment of fowls. So we have always the same mistakes made, but made mostly by newcomers. I am speaking now of the great body of errors that furnish occasion for charges and rumors of crookedness and fraud, not of the occasional instances of intentional crookedness. Substantially all of those who continue in the business show by their later conduct in it that the errors of the first years were errors in judgment — not intentional frauds.

There is another side to the story of errors of this class. A considerable proportion of the buyers of poultry are even more ignorant of quality and value than the average novice selling poultry, and no whit less confident in their own judgment of these points. Such buyers are prone to find fault when no ground for fault finding exists; not always because they are disposed to find fault, but because their ideas of quality in fowls are badly distorted. These buyers, too, as they grow in experience and judgment, mostly pass out of the class who have many stories to tell to illustrate the prevalence of fraud and deceit in the poultry business.

While there are to be found here and there persons who, even after they are competent judges of the goods of different kinds handled in this industry and its allied branches, are still so much impressed by the evils they do see and meet that they see them out of proportion to the transactions which involve no crookedness, the bad reputation for morality, as is given the poultry business, does not in general get much confirmation from those who know the business. Among them it is regarded, as in fact it is, as neither better nor worse in a general way than other lines. The importance to the poultryman, whether a dealer or a buyer, of appreciating the real moral status of the industry is found in the connection between his ideas of business morality among poultrymen, and his own standards of practice in selling, and the attitude which he takes when buying. If one who has poultry to sell believes that the general moral tone in such transactions is low, he will often — perhaps unintentionally — be less careful in his own dealings than he would be if he believed that the usual practice was to give honest values. It is human nature to measure conduct by that of others, and to be satisfied if we can feel that we are a little better than the average. If one who is buying poultry believes that all dealers in fowls are rogues looking always for opportunities to defraud, and indifferent as to whether customers are suited or not so long as they get their money and escape the penalties of their practices, he is afraid to be satisfied with what he gets, and is apt to condemn it on general principles first, and then begin to look for specific faults.

Some Specific Alleged Evils of the Poultry Business.

When we say that the poultry business is neither better nor worse, on the whole, in moral tone, than the community, we admit that it contains a great deal of evil. I have already said that a very large proportion of the evils in the poultry business — of the wrongs done by poultrymen in their dealings with each other — consists of unintentional evils which most poultrymen avoid after they have learned wherein they were at fault. Another considerable proportion of the wrongs of which complaint is made consists of disappointments which come — according to my view — as phases of the ordinary risks of the business. In a great many cases these two classes of unsatisfactory incidents are mixed, both contributing to make the unsatisfactory situation. So, it would be difficult to make any hard and fast classification of evils according to causes, and I shall not attempt to do so, but simply mention a number of the most common sins attributed to poultrymen, and discuss each in order.

Doctoring Eggs for Hatching.

A beginner in poultry culture buys eggs for hatching, and gets nothing at all, or a few chicks from them. He is disappointed and sore. An acquaintance professing to be acquainted with the ways of poultrymen, suggests that probably the eggs were infertile, or were treated in some way to prevent their hatching. He will say positively that this is a common practice among breeders of fine stock who wish at the same time to get an income from their stock commensurate with its quality and reputation, and to prevent their customers becoming their successful competitors. So much is said and has been said with great positiveness in regard

to the prevalence of this practice that a great many people who are by no means novices in the business believe that the reports of it must be true, and that it must be very general, or there would not be so many people so sure of it.

Considering the extent to which descriptions of evil constitute to some minds suggestions of evil, it would be strange if, with so much said of this evil, instances of it were not numerous, yet I have never personally known of a single instance of this being done; nor have I ever heard an instance of it reported by one whose testimony could be accepted as conclusive. Hence while I would not affirm that such an evil did not exist, I think that, considering the exceptional opportunities I have had of discovering it, that I am justified in asserting my belief that instances of such dishonesty are extremely rare.

The fact is, that there is no reason why any sensible or shrewd person should not want the eggs he sells to hatch, and there are many reasons why it is to his advantage to have them hatch well.

Substituting Eggs from Inferior Stock in Filling Orders.

This is an evil which, on their general impression of the unreliability of poultrymen, many suspect even when they have no positive proof of it. Absolute and positive proof of it is hard to get, but traces of it may be found on all sides. While it is probable that the great majority of breeders are strictly honest in this matter, I think that there is ample reason to believe that the number of those who, either as a regular practice or in emergencies, will substitute eggs that are not what the customer ordered, is very considerable. I base this opinion not on complaints of persons who think they have been imposed upon in this way, but upon the number of poultrymen I have found who, without actually admitting that they did this, would refer to it in such a way as to give the impression that they considered it a not very culpable offense; on a number of instances coming under my own observation when visiting poultry plants where it appeared that the orders for the best grades of eggs said to have been received could not have been filled with eggs from the stock of that grade; and on the occasional statements of men I believe to be trustworthy who told me that it was a regular or occasional practice on certain plants on which they had been employed.

With regard to the matter treated under the previous heading, I would say that the probabilities of a buyer of eggs being supplied with eggs which the seller had treated to prevent hatching, were extremely small, and the point need not be considered in ordering. With regard to the matter of filling orders with eggs not filling the specifications, I would consider that a buyer ran some risk, but not a very great risk. In what ratio this risk would be represented, I do not know. Probably one in ten would be an excessive estimate of the chances of getting an order made up in any part of eggs not as ordered, and I would suppose one in fifty a liberal estimate of the proportion of poultrymen who make a practice of giving eggs of grade inferior to those ordered. I offer these estimates only as indicating how much more rare this practice is than many suppose.

The application of general moral principles to the situation presents two phases:

First, there is the seller's side of the question. This phase of it presents no complexities. There is only one thing for an honest man to do, and one alternative: The one thing is fill orders with goods of the class and grade advertised for sale at the price. The alternative is to state his inability to fill the order, and to return the money.

The other phase of the question is not so simple. Many persons who wish to buy eggs for hatching must buy of poultrymen of whom they know nothing, or not buy at all. To say that if one cannot be sure of the honesty of the parties with whom he is dealing he had better let transactions of that class alone, is not to offer a practical solution of the difficulty. Moreover such a rule imposed on transactions in eggs is unreasonable because it puts on a transaction into which an unusual element of chance inevitably enters a rule more rigid than could be applied even in transactions from which chance might be almost completely eliminated. In other words, "a person who takes the position that he will buy eggs or poultry only from breeders he thinks he is sure of, arbitrarily makes this a thing in which he will take no risks. It is his privilege to do that if he wishes, but doing it too often puts one in the list of those who are said to cut off the nose to spite the face. A more reasonable way to look at it is to

make allowance for possible fraud of this kind, and consider it not as an outrage to be carried to the press, or into the courts, but as an ordinary risk, figuring the price of eggs which, for any reason give unsatisfactory results, into the total cost of the articles purchased.

To illustrate: Suppose A is a novice who is so situated that he cannot have any direct knowledge of any breeder of the variety of fowls in which he wishes to invest. Suppose he wants to begin with eggs. It is clearly impossible for him to learn of the different breeders' stocks and of their methods of dealing with customers in any other way than by buying of them. He must take some risks or not buy. The first man from whom he buys may not use him right. He may avoid a large loss by making his first investment small. If he is in a position to buy a considerable quantity of eggs he can reduce the risks of unsatisfactory results by dividing his order among several breeders. By doing this he is not likely to get as good results in the aggregate as he would have had if he had placed the entire order with the party or parties whose eggs gave him best results; but he knew nothing of what to expect when he placed the order, and we may assume that he has done much better on the whole than if he had placed the whole order with one of those whose eggs gave him poorest results. Further, while a single test and comparison of this kind does not furnish conclusive evidence as to the character of breeders and the quality of the various stocks, it does afford useful information on these points, and the beginner enters upon his next transaction with better assurance of getting what he wants.

One who will not buy until he is sure of those he deals with may easily lose more by waiting than another who takes chances will lose by the crookedness of some with whom he may deal. It is simply a case of "nothing venture, nothing have."

Boughten Eggs Which Hatch Unsatisfactory Stock.

The result indicated in the above heading is properly classed as an evil only when the unsatisfactory results are due to causes reasonably within the control of the person selling the eggs. It is not always possible to say in any particular case whether the seller or the buyer is responsible for unsatisfactory results. It is a fact, well known to poultry keepers whose experience has made them observe the point, that eggs from good stock may produce chicks which, under certain unfavorable conditions of care, feeding, and environment develop into specimens so inferior to the parent stock as to make it hard to believe that they are the progeny of that stock. The fact that the inferiority is due to such causes as are mentioned above is established in cases where from eggs produced at substantially the same time, chicks hatched by one party develop as would be expected, while those hatched by another party are a disappointment. Most of the inferior chicks from stock of fine quality are accounted for by lack of accommodations and lack of skill in those caring for them; but change of climate sometimes has decidedly unfavorable effects on chicks.

From this the reader will see that the fact that chicks from certain stock were unsatisfactory, does not prove that the breeder was dishonest. It should leave it an open question in the buyer's mind whether the fault lay with the seller, with himself, or with some person who had opportunity to change the eggs in transit. That is done to some extent, though how much it is not possible to say. It can be prevented by sealing packages. Some poultrymen selling eggs for hatching seal every package sent out, and advise customers to take notice whether seals are intact, and report if it is found that they have been tampered with.

The point we are now considering is not readily separated from the preceding matter in an effort to determine what is wrong in an unsatisfactory case. A breeder of poultry may send eggs that are not as represented, which yet give satisfaction in their results. He may send just what he advertised at the price, and the buyer get stock not at all up to his expectations. It may be a question then whether the breeder properly estimated the quality and value of what he offered for sale, or if the buyer is a competent judge of the value of what he produced. We cannot here follow the intricacies of such questions. I mention them to show the reader how impossible it is to make off hand or general decisions as to right and wrong in such matters.

We can, however, say that when a person advertising poultry sells eggs he would not expect to give him the results he knows his customers want, he is acting dishonestly, and that when the poultry keeper who is not quite sure of his own judgment of his stock, relies upon his judgment only in selecting and mating it for selling eggs for hatching, he makes a mistake.

As far as the buyer is concerned, he takes the usual risks on this as on other points when dealing with parties not known to him. There are times when, were he disposed to take the matter to law, he might secure redress in that way, but usually the amount involved is too small to make that worth while, and the common sense of most poultrymen leads them to charge such losses to experience, to avoid further dealings with those they find unsatisfactory, keep buying in sample lots wherever they think they are most likely to get what they want, and having found one or more breeders of the variety of their choice, whose stock and methods suit them, to do business mostly with those breeders.

Fowls That Are Not as Represented.

The number of fowls not up to descriptions sold each year is considerable when reckoned in numbers, yet not so impressive when compared with the whole number that changes hands.

Transactions in fowls are on quite a different basis from transactions in eggs. Generally speaking it is not possible for any marked change to take place in the appearance or condition of the fowl in the few hours, or, at most, few days, that intervene between its shipment by the seller and receipt by the customer. It may reasonably be assumed that instances in which fowls do not reach the buyer in approximately the condition they were in when packed for shipment are exceptional.

So if a fowl, on receipt, is found to be unsatisfactory we say that either the seller gave too little or the buyer expected too much, or that their ideas of what was wanted were so different that the transaction was on both sides a mistake. I have known many instances where people finding fault with the quality of the stock sent them had no occasion to find fault at all, the stock being just as represented, and the fault being in the buyer's ideas of what constituted quality. I have heard breeders vigorously denounced for having shipped a customer high priced stock decidedly inferior to some they had bought at bargain prices, when the conditions as to quality were just the reverse of what the buyer supposed, and the trouble was that his ideas were all wrong. When so much dissatisfaction of buyers is due to ignorance it is inevitable that there should be quite as many instances of people well satisfied with goods that are not worth what they pay for them. In this is found the breeder's greatest temptation to take chances in selling rather low grade fowls to people who do not appreciate quality, but want fowls that represent considerable sums of money.

The ethical and moral arguments that develop in considering this phase of the question are too deep for me. I have never tried to come to any definite general conclusions on them. I will here only briefly allude to a few of them that the reader may, perhaps, get some insight into the considerations which influence men with no wish to do wrong to do things which to many may seem very wrong. Let me give first, in illustration two points given to me by two very successful poultry salesmen, one mentioning one point, the other the other point.

A poultryman whom I was once visiting, discussing the matter of values and prices of fowls of different grades of quality, remarked that the controlling factor in fixing prices was not the actual or relative quality of the birds, but the number of people who wanted to own expensive fowls. In illustration of his point he told how one day a gentleman and lady drove to his farm in a fine turnout and wanted to look at poultry. They were much pleased with the birds in the first yard shown them, and asked the price of a trio. He mentioned a figure which probably correctly expressed the value of the fowls, say \$25. Having named the price of these, he observed that the visitors lost interest in them. Being a shrewd man and experienced in the ways of buyers of thoroughbred poultry, he concluded that the price mentioned was too low. So he took them to a pen a little further along, and when they asked the price named a little higher figure; still further, and stopping before another pen, he priced what birds they wanted from that lot at seventy-five dollars, and a sale was quickly made. "You see," said he, "they didn't want fine fowls, they did not know or care anything about them. What they wanted was to have a few fowls that they could point out to their friends as having cost so much money. The birds I sold them at \$75 were a little better than those I priced them at \$25, but not much. But it would have been a crime to waste birds worth \$75 on people who could not appreciate them, and only wanted to pay money for fowls."

Said another man to me one day :— "The art of selling thoroughbred fowls to make a good profit on them consists in finding out what a customer wants, and giving him a fowl that will answer his requirements. I have customers who want fowls I could not use, and would have difficulty in disposing of to others, and they are willing to pay as much for them as for birds I would consider good. Why should I take the position that only the points I and those who think as I do prize make quality? It is demand that makes prices. Breeders often have to breed to standards they do not like in order to sell their stock. I will sell a man anything I have that will suit him, and ask the highest price I think I can get. If I make a mistake, and the fowls do not suit him, I take them back and refund his money. If both the fowls and the price suit him, why is not that the value of the fowls? You may say he is satisfied because he is ignorant of standard requirements. That is none of my business. I cannot put myself in the position of assuming that a customer is ignorant; I have to take him at his own estimate of his knowledge of what he wants. How do I know but that he can make good use of birds worthless to me, and not salable to others? I hold that when an order is filled to the customer's satisfaction it is filled right."

In such bald statements or in the extreme instances of their application we see things which most of us unhesitatingly condemn as, at best, questionable. But the more we consider them the more we find that logically they lead us back to the question: "What makes the value of fancy poultry?" and we find it difficult to place a boundary line between what is and what is not permissible.

In practice the question of values seems to resolve itself into the question of suiting the customer, while most of the friction that arises between buyers and sellers is traceable to errors in what were really sincere efforts to please the customer.

Selling Unsexed Fowls.

Occasionally someone comes out and charges a breeder with having sold him "caponized" males or females. It is not likely that any breeder ever knowingly or intentionally did this. It is not improbable that breeders have often shipped fowls that were sexually impotent, and that in some cases post mortem examination would show a condition of the reproductive organs which was abnormal. Even in such a case it is not necessary to assume that the abnormal condition of the parts results from an operation, for it may result from disease of the organs which would not ordinarily be noticed; but in the case of a fowl in which the poultryman had special interest might be discovered because an effort would be made to determine what was wrong. It would be the height of folly for a breeder to castrate a fowl he intended to sell for breeding, or to sell a castrated fowl for that purpose. There is no authentic instance of it known.

Honesty the Best Policy.

While there are many points upon which people may differ as to honesty of certain transactions, I find no reason, as my acquaintance with poultrymen extends more and more, to change the opinion that, with rare exceptions, they intend to be honest. But if one had a leaning the other way, he would soon find that, as a matter of business policy, he could not afford to have many dissatisfied customers. Competition in the business is keen. It costs money in advertising to get a customer. It costs most breeders so much that if they had to depend on their new customers they would soon go out of business. After the breeder has once secured a customer he hopes to have him continue with him, and if he does not know he soon finds that while advertising may bring customers and continue to interest them, what holds the customer and brings further orders is satisfactory treatment.

LESSON XVIII.

Winter Egg Production.

MOST poultry keepers want to get eggs in the early winter when eggs are scarce and high in price. The difference between the fancier who says he does not care whether his hens lay them or not, and the poultry keeper who is greatly disappointed if they do not lay at that time, is not as great as at first thought it appears to be. Fanciers, as I find them, are not so indifferent to egg production as they sometimes profess to be. When their hens do lay well early in winter they are as pleased and as ready to boast of it as anyone. When they do not lay well at that time they console themselves with the thought that there are two strings to their bow, and that what they miss on early winter market eggs may be made up to them in the spring when they can sell the eggs for hatching. The poultryman whose eggs are not salable for hatching purposes has not another period of especially high prices to which to look forward, hence his disappointment over failure to get early winter eggs is greater, for he knows that his loss, if made up, must be made up from the profits of the remainder of the year on sales at lower prices. His need of winter eggs being greater, his desire to get them is greater; he plans for them and works for them, making it a point to have his stock ready to lay by winter if possible.

The fancier may be indifferent about the laying of such fowls as he intends to show, but for the rest of his stock he would, as a rule, rather have it laying than not laying. There are few fanciers who are indifferent to the receipts from market eggs, and fewer still who try to discourage egg production in any considerable part of their flock, for fowls eat nearly as much when not laying as when laying, and it takes but a small egg yield to pay the feed bills.

We may say then that the difference in the attitudes of practical poultrymen and fanciers in the matter of winter egg production is a difference in degree — not in kind — of interest. All want as many eggs in winter as they can get — but the intensity of desire, and of effort to get them, varies in a general way between these classes of poultrymen and also between individuals in either class. Perhaps the difference may be illustrated by a remark a friend of mine made to me one day at the New York show. We were talking of a man well known to poultrymen who has been a marked success as a money getter. Said he: "All men want money, but some will work harder to get it than others, and some will do things for money that others would not. Now the difference between you and I and Blank in regard to money is this: If a dollar were rolling around on the floor, you and I would each make a grab at it as it passed us, but Blank would follow that dollar, on his hands and knees if necessary, until he got it."

In the ordinary course of events Blank will probably reach the age at which men retire from active life — if they can — with many times as much wealth as either my friend or I. He will get more because he cares more for it, and will work harder to get it. And this principle — or policy — (it is something of both) has a great deal more to do with the getting of eggs in winter than many would suppose. It has more to do with it than the kind of fowl, or the kind of food, or the kind of house. Within reasonable limitations it has as much to do with it as the period of hatching, the care and attention the chicks get while growing, and the treatment of the hens at the period when they are or should be laying. It is the intensity of

the wish to have the hens laying in early winter, joined to a fair appreciation of the means of getting them ready to lay in winter, that makes some poultrymen work for this steadily and without intermission from season to season. I have never known anyone who was so uniformly successful in getting winter eggs that he or she might rightly be said to know how to "make hens lay," but I have known many poultry keepers who were much more successful than the average poultry keeper, and I think that those most successful in getting winter eggs divide quite naturally into two classes: Those who, in connection with more or less unnecessary "fussing" with the fowls, do the things essential to egg production; and those who do the essential things and nothing more. Poultry keepers of the first class are likely to get big egg yields and make large "per hen" profits; those of the second class to make more on their labor.

Essentials in Winter Egg Production.

One of the best poultrymen I know, a man who grew up in the business, and has been in it on his own account since before he was out of his teens, once said that the only "secret" he knew anything about in getting winter eggs was to have the pullets ready to lay at the beginning of winter, and then give them enough to eat. The kind of food — within the ordinary range of poultry foods — he considered of little importance. Another good poultryman who violated many of the common rules of "correct" poultry keeping, speaking only of the handling of hens in laying condition, said that in his opinion the all important points were to give the hens an abundance of food, and to give it regularly. It was said by some poultrymen who knew him that they knew of no poultryman who could be away from home so much and yet get good results — better than any of those who looked after their stock much more closely. Asked about this, he replied that it was true that he took time off frequently in the middle of the day. He would not deny that at such times he "loafed," but he stated a fact which they had not observed, when he said that no one ever saw him leave or be away to the neglect of his stock, while various neighbors he mentioned would look carefully after their fowls for days or weeks at a time, and then for some reason or other there would be neglect, perhaps one feed omitted, perhaps the regular routine of feeding interrupted for one or several days, and this happening frequently, the hens did not get their full rations with the regularity essential to egg production.

Comparisons of the conditions, methods, and rations of poultry keepers and of the results they are getting, will clearly disprove any theory of breed, feed, or system of housing as superior to others, or as in itself essential to or assuring results, for in such comparisons we have to consider all kinds of results. We cannot consider only favorable results as advocates of special theories or ideas in any of these lines are wont to do. Comparisons such as I have just described would not so clearly prove the correctness of the ideas of abundant feeding and regularity as the essential things in egg production, for it is much easier in such cases to disprove a theory than to prove one, but such comparisons do generally indicate that good feeding — heavy feeding is essential to continued large egg production, and the reports and records of those who get large egg yields in winter especially generally indicate that the fowls get regular care.

Conditions of Greatest Egg Production.

A fair comparison of results in different types of poultry houses will show — I think — the greatest winter egg production in the warmest houses, provided the ventilation of these houses is given proper attention. The same comparison would show very poor egg production, and often a great deal of sickness in flocks housed in this way. Investigation will generally show that in such cases the houses are not properly ventilated. The proper ventilation of warm tight houses by the doors and windows is a very simple matter — if the poultry keeper can open and close them as temperature conditions require. In theory this is easy — nothing could be easier. In general practice I have found that very few of those who use warm tight houses ventilate them properly. The common thing is to find houses still closed long after they should be open in the morning; then — if opened at all — left open long after they should be closed in the afternoon. The result of this is that the fowls become overheated and then chilled.

The proper way to ventilate such a house is to open the windows, or doors, or both, a little

In the morning, wider toward noon; then close partially as the sun begins to get low, and altogether, or as nearly so as is customary, at dark. This for fair bright days. On stormy, cloudy, or windy days, the opening should be adapted to conditions. Here is where the tight house becomes a troublesome proposition to those who have to be away from the place much of the day, or find it inconvenient to vary the time of opening and closing doors and windows. The day starts bright, and everything is opened, the attendant leaving not to return until toward night. A storm of some kind comes up, and the house becomes very uncomfortable for fowls that are tender to such conditions. Or, the opposite case occurs. The morning is chilly and threatening, the houses are left closed. It clears, and the sun comes out warm, and the houses are overheated. It is such conditions that baffle the poultryman who with a warm house, hens fit to lay, and good food, has to take chances on the ventilation that is right in the morning being right through the day.

If one wishes to get the largest egg yield possible; if he can look after the ventilation properly; and if he is indifferent about the usefulness of the hens after the first winter, I would say, by all means use a warm tight house. One is surer of big egg yields in it. But if there are likely to be occasions when the ventilation of such a house would not be given proper attention, or if it is desirable that the hens should come through the winter in good physical condition, use a more open house, and be satisfied with the prospect of a more moderate egg yield. Bear in mind that the kind of house does not control the egg yield. It is only a factor — a factor which varies in value according to other conditions. The warm house seems to offer the greatest possibilities of heavy winter egg production, and at the same time to involve the greatest risks of poor egg production and debilitated fowls. It is a forcing house, and the dangers as well as the advantages of forcing are in it.

The matter of yard or range also seems to have an important bearing on egg production. The largest egg yields are almost invariably made by hens that are quite closely confined. The common experience is that as between two equal lots of fowls, fed as nearly alike as possible, but one confined quite closely and the other given a large yard or free range, the hens that are most restrained will give the better egg yield, often a very much better yield. The most reasonable explanation of this seems to be that the closer confined hens utilize all their food for maintenance and egg production, while the others put much of it into energy expended in running about. It is also reasonable to suppose that hens at large are more often frightened or disturbed, and it is well known that such experiences are likely to have a marked and immediate effect on egg production. Dairymen know that to get the largest possible flow of milk from their cows they must be kept quiet and contented — not disturbed or frightened; but poultrymen do not so generally appreciate the effects of such things on the functions of the fowls.

Exercise is not always essential. By exercise here I mean compulsory exercise, compelling hens to exercise for much of the food they take. Undoubtedly many poultry keepers find that their hens do better when compelled to take exercise than when fed all they will eat, and taking almost no exercise; but a great deal of good laying is by hens which take little exercise. If hens have sound digestion and are not overfat to start with, they are likely to lay fully as well without much exercise during the early part of the winter, though as spring approaches they may get too fat or develop digestive troubles. We may say of cases where exercise is found necessary as (in a preceding lesson) of cases in which very careful attention to diet is found necessary, that these are abnormal. We may leave the matter of exercise in this way:— Exercise is not always essential; when it does appear to be essential provision for regular exercise should be made; it is always advisable if it is desired that the hens should go through the winter in good condition. If they are to be disposed of in the spring it does not make so much difference about exercise.

Generally the most convenient and satisfactory way of providing exercise is by littering the floors and feeding the grain in this litter.

Winter Rations for Fowls.

In this connection the reader should refer to the sample rations given in Lesson I., in the preceding series (1905). Indeed, it would be well to review the entire subject of feeding.

Those rations may be used as given, or, if it is desired to further cheapen the cost of feeding, the proportion of corn and corn meal in them may be increased, especially for hens that are evidently not overfat, or that are laying. After hens begin to lay it is not as necessary to guard against overfeeding and overfattening as it is with those that are not laying. When the reproductive organs are active the tendency is for them to take and use all available nourishment. When the reproductive organs are not acting the fowl, as a rule, eats less, though it may still eat more than is required for maintenance. When that is the case the surplus goes to fat. How far such fat as is accumulated prevents laying, is a question not yet satisfactorily answered. I think that there are relatively few cases where the ovaries of the hen are normal where any ordinary accumulation of fat prevents laying. There is some reason to suppose that the activity of the ovaries, and consequent production of eggs, are often retarded for months after the hen is otherwise fully developed, and that the reasons for this are not easily controlled. When this is the case a hen is likely to fatten, but when the ovaries do become active — which may be earlier in the winter, but is more likely to occur after midwinter — these fat hens and pullets usually lay a few abnormal eggs, and then lay normal eggs regularly — and usually such hens after beginning are heavy layers for that period. I speak of this because of the prevailing impression that slightly overfat hens will not lay — that there is a point in physical condition that must not be passed if hens are to produce eggs.

The conditions in winter admit of more latitude in liberality of feeding, as well as of the use of more of the "fattening" foods. Whole corn may be used quite freely during the cold weather, but as spring approaches should be fed with more caution, especially if the fowls generally show a tendency to become very fat, and they are to be kept through the spring and summer. Meat and bone may also be fed more freely than in warm weather.

For vegetable food clover, alfalfa, cabbage, mangels, and waste vegetables of nearly all kinds are used, and there is practically no danger of using too much of anything of this kind that is fed separately to fowls liberally provided with grain.

Rarity of Heavy Laying in November and December.

Novices in poultry keeping are quite generally under some misapprehension as to what is considered a good egg yield in these months. While occasionally better yields are obtained a yield of twenty to thirty per cent is an unusually good yield, and a poultryman who is getting as much as a ten per cent yield from his flock in November, has no reason to feel dissatisfied, and much reason to feel encouraged. Those who watch their flocks closely enough to get some idea of what individuals are doing, and of the relative proportions of pullets of the same age that are laying and not laying at this season are likely to discover that for most pullets the age at which they begin to lay is greater than the age usually given for laying maturity in their breed, and this knowledge can be turned to account next season by hatching enough earlier to have the bulk of the stock come to laying at the desired time, though the earliest layers may lay earlier than is desirable.

LESSON XIX.

First Treatment of Sick Fowls.

FOWLS are subject to a great many diseases. Quite all the more common diseases of men have their counterparts in poultry diseases. This fact is more generally recognized now than even a few years ago. It does not seem to be definitely established that diseases of like symptoms are identical in fowls, animals, and human beings. In the few cases in which we have reports of comparative studies of germ diseases of like nature in fowls and human beings, the conclusion reached has been that the germs were not the same. Some scientists, following the theory of development by evolution, suppose that as men, animals, and fowls were originally of one stock, so were the germs which produce certain diseases in them, but that many generations of life in a particular kind of organism, as a fowl, animal, or man, has especially adapted the germ to development in that organism and unfitted it for development in organisms of the other classes, and that while it is not impossible for a disease to be developed in any organism as a result of the introduction of the peculiar germ of another class of organisms, that result is extremely rare, and authorities are not at all agreed on the subject.

The practical value to the poultryman of a knowledge of this general fact of the similarity of human and poultry diseases is that it gives him a more reasonable attitude toward the diseases of poultry, and also enables him to apply such knowledge of the treatment of human beings presenting certain symptoms as he may have to the treatment of similar symptoms or conditions as they appear in his flock. There is no need of any poultry keeper, however inexperienced, standing in the presence of any of the poultry diseases most likely to occur in his flock helpless until he can get explicit directions from some poultry keeper or supposed expert on poultry diseases as to how to treat such cases, unless he is as inexperienced in the treatment of human ills as in those of poultry. Very few people who have arrived at an age, whatever that age may be in any case, when they can take the small responsibility of caring for a flock of fowls have not some knowledge of the treatment of the minor and more common human ailments, colds, indigestion, diarrhea, etc., for which there are many simple treatments in use. This knowledge can be applied to the treatment of ailing fowls, perhaps not always with the best results, but still as much better than doing nothing until specific directions can be obtained.

A sick person shows that he is not in good physical condition in a variety of ways, and first of all in extreme irritableness or in a reluctance to follow the every day routine of his life. The mature person whose sense of responsibilities impels him to continue his work when nature honestly rebels against it, is apt to be cross. With children unusual restlessness or unusual inactivity occur according to the nature of the trouble and the disposition of the child. With fowls, so much lower in grade of organization, and comparatively so deficient in brain and nerve force disease almost invariably means inactivity, separation as far as possible from the remainder of the flock, and a general attitude of listlessness or distress. Occasionally instances of the other manifestation of ill condition are seen, but they are rare.

Now the first step in the treatment of any trouble that has reached the stage where the fowl shows a desire for quiet and seclusion, is to furnish those conditions. It may be noted, further, that fowls—(I will not continue the comparison between fowls and humans, for as I proceed discussing the case for fowls, the reader whose attention has now been fixed on the

point will observe for himself how like human beings fowls are in these matters) — it will be noted that fowls in this condition try to find a comfortable place. The most comfortable place that affords quiet and seclusion, or as much of them as can be obtained in their quarters, is the place they take. Too often the poultry house and yard afford no suitable place for the fowl that is not fit to rough it with its companions. Especially is this the case when houses are stocked to their full capacity, and yards are small. Then it is often pitiful to see a sick chicken knocked about and run over by the rest of the flock, and thus deprived not only of the quiet it seeks, but of the strength it needs to concentrate on nature's effort to restore health. The natural tendency of the organization to recover its balance when weakened at any point, or in any function, is after all the most important factor in the treatment of poultry diseases, and the doctors best whose first step is to place the fowl in conditions where nature has a chance to begin the work of recuperation.

Take the ailing fowl away from the others, see that it has an opportunity to rest. Make it comfortable, remembering that what conditions will be comfortable for it depends somewhat on the nature of the trouble.

A fowl that is weak and debilitated by indigestion and diarrhea, and has a low fever, with symptoms of alternate chills and fever, will be most comfortable in a warm dry place. So will a fowl that seems to have poor circulation, that acts sluggishly, and the comb tends to turn dark.

A fowl that has a cold with collection of phlegm and mucus in the throat and nostrils, and discharges from the head, needs more than anything else, pure fresh air. It would be foolish, as it is unnecessary, to expose such a fowl to severe weather to give it fresh air, but it will generally be found that such fowls are benefited rather than injured by a degree of exposure much greater than most poultrymen think advisable for their poultry as a regular thing. Probably the best place for such patients is in an open coop in a sheltered spot.

Lame fowls should be put where they will be warm and dry. It is often difficult to determine the cause of lameness. Rheumatism is a frequent cause. With laying hens a strain when extruding the egg often results in a temporary or partial paralysis, which may disappear within a few hours, or, at most, a few days, if nature is given full opportunity to perform the work of recuperation. In all sorts of cases of lameness in hens in flocks in which there are males, it is especially necessary to remove the hen from the pen, for whether it is that the unusual attitude of the hen attracts his attention, or from some other cause, it frequently happens that a male forces his attentions on a sick hen in his flock to such an extent as to completely exhaust the strength of the hen. Even when the trouble is not so serious the recovery of ailing hens will always be more sure and rapid if it is impossible for the male to annoy them. For this reason it is advisable in cases of general indisposition in a flock, when all hens may be somewhat affected, though not enough to require isolation for all, to remove the male, when the hens will get along very well.

A point worth noting is the tendency, under certain climatic conditions, for fowls, animals, and people to have similar distempers in epidemic form. Conditions which result in many cases of a disease like "grip" or pneumonia among the people of a community are almost invariably accompanied by similar diseases in epidemic form among the fowls. Observing this, the poultryman will find it quite safe to treat the fowls for the same trouble for which the people are taking treatment. When medical treatment is to be given in such cases, give an ordinary full grown fowl the usual dose for a child of two or three years of age.

In applying external treatment for such troubles as colds people give hot foot baths, sometimes giving the whole body a hot bath or a sponging with hot water, then rubbing with lard or vaseline, or a mixture of such substances with turpentine or camphor, or both, or with a little carbolic acid. Such applications are very effective with fowls, though the mode of application must be varied. Instead of treating the feet and body of the fowl we steam and bathe the head, throat, and nostrils, then anoint with mixtures described.

When fowls are found with the face slightly puffed, or the eyes closed, and the lids gummed together try steaming with hot water and carbolic acid, (2 parts acid to 100 parts water) then rubbing with lard and carbolic acid in about the same proportions. Do this at intervals of two or three hours for a day, and in nearly every case taken in the early stages

recovery will be immediate. Keep the fowl quiet and comfortable for a day or two before returning to the pen. Meantime try to determine whether there was any special reason in the conditions in that pen for a fowl to take cold that way, and if found, correct the trouble.

Fowls with diarrhea may be given a purgative if treatment is undertaken while the fowls, though somewhat distressed, are quite active, and eat and move about quite freely. But if the diarrhea has evidently greatly weakened the fowl it is better to check it promptly and to give a stimulant as well. For any of these purposes treat a fowl as you would a child of the age specified above, and you cannot go far wrong.

For a fowl that is crop bound, or that has the crop filled with gas and fluid as a result of disorders of the stomach, the first thing to do is to relieve the condition of the crop. It is in connection with such simple operations as these that the personality and deftness of the operator become factors. Some people are so rough in handling the patient, or bungle the operation so that the general condition of the fowl after relief is worse than before. Others will, without special instruction or experience, quickly and neatly do what is to be done. If one finds he is bungling such an operation badly he had better let it alone, and kill the fowl if the case seems too serious to be likely to recover without treatment.

Of what may be called minor ailments of poultry, I have found nothing so hard to deal with as the sweating and exhaustion that come from overcrowding young chickens in brooders or roosting coops. In these cases we have a combination of severe conditions continued for hours after the chicken has begun to be seriously affected by them. Either the crowding, or the overheating, or the partial smothering alone, if continued through the greater part of a night, would have very bad results. When the three are combined, and some chicks killed during the process, it is not strange that many of the survivors are so weak and exhausted that the system is very slow to begin to recuperate. How far very careful feeding, nursing, and care to see that each chicken was comfortable at night, would be successful in such cases, I do not know. With such attention as it is profitable to give ordinary chickens, those that have gone through an experience of this kind show the effects of it for months, or even all through their lives. This may not be observed if there is not another flock at hand with which to compare them, but when a poultryman's own stock furnishes opportunities for such comparisons he can hardly fail to notice it. My experience has been that, though some of them may turn out all right, on the whole it is more profitable to kill every chick in a lot that has suffered conspicuously from such conditions than to keep them for the sake of the few that may turn out well.

In cases of indisposition which might be due to food taken or some irritant substance taken with food, the best thing to do is to confine the fowls for a time where it is certain that they can get nothing but what the keeper gives them, and then feed only foods known to be pure and of good quality until the cause of the trouble has been discovered. Thus if a mixture of ground feed stuffs has been used, that is, an article sold in mixture, and there is any suspicion that something in it might be responsible for some trouble that has developed, discontinue its use, and feed only whole or cracked grains, or mash made on the premises of known ingredients of good quality. In most cases of this kind careful feeding alone will soon bring the fowls back to health. I doubt whether it ever pays to do anything more than this for them. In all such cases one should do all that can be done to learn the cause of the trouble. If it is in the mixture of food used, discontinue that article, but be reasonably sure first that it is in that food. The trouble may be due to irregularity in feeding, and all that is necessary to do for it is to be regular in feeding and let nature work the cure. No change of food may be necessary — just regulation.

For mild attacks of indigestion occurring when there is no reason to suppose the trouble is due to the quality of food, there is nothing better — nothing so good, in fact, — as fasting, letting the fowls go without food, except green food, for one or two days then feeding sparingly. In highly fed hens the digestive system is often overworked. A system of feeding and quantity of food that one hen or one flock stands all right may be too much for another. The poultry keeper has to judge of what and how to feed, not by someone else's results, but by results in his own yards. To get good growth and heavy egg production we must feed heavily, and in feeding heavily we are always running risks of breaking down the digestive system by over-

work. So the poultryman should watch closely for signs of indigestion, especially lack of appetite or looseness of the bowels, and when such symptoms appear let the hens go without grain for a feed or several feeds, as the case may seem to require. Careful attention to this point is the best preventive of digestive disorders. I have found it a good plan to omit one feed a week as a regular thing, and for many years have made it a practice to give the fowls one less feed on Sunday.

Another point of importance in the treatment of ailing fowls is to know when to let them alone — when to do nothing further than to put them in a quiet comfortable place, and let nature take its course. As an economical question I think that the poultry keeper who is wisest will adopt this sort of let alone treatment as his general policy, making exceptions only in the case of a fowl of unusual importance to him, or in cases where he feels sure a few very simple treatments will suffice. But apart from the economical question there is the question of when letting alone will be the best treatment for the fowl. This can only be determined by experience and experiment. When a number of fowls are sick at the same time, and with the same trouble, try treating a part and leaving the rest to recover if nature is able to work a recovery. You will be surprised to find how often the fowls that have no treatment recover just as quickly as the others.

Whenever a poultryman finds things going wrong in his flock, with no special cause for it that he can discover, he should sit down and consider whether there is anything in his situation or his methods, or any special condition existing, not in accordance with generally accepted ideas of correct conditions and methods, and whether any possible connection can be traced between his departure from usual things and the trouble that has arisen. In a majority of instances it will be found that the common practice of poultrymen is the safest to follow.

LESSON XX.

Poultrymen's Organizations.

IN concluding this series of lessons, and leaving for the present the method of treatment which in general has been pursued in the lessons of the past two years, I take the liberty of departing in a way from the method of selection of topics which I have heretofore tried to follow. The subjects treated in the forty lessons of the two series have been chosen because of the evident interest of poultrymen in them, and as far as circumstances permitted have been presented at times when they were most appropriate. The subject of this lesson is one in which too few poultrymen are interested, and most of those who are interested too little interested. The weakest point in the development of American poultry culture today is the lack of adequate organization of poultry interests and the almost universal indifference of poultrymen on the question of organization. True, conditions in this respect are improving somewhat, but unless the rate of improvement is greatly increased this generation of poultrymen will hardly begin to reap the advantages that must come to all when our poultry interests are efficiently organized.

We have in this country today these several kinds of organizations of poultrymen:—

- 1.—The American Poultry Association, a general organization in that it draws its membership from all parts of the United States and Canada, but so constituted that only a very few members can have any continuous activity in shaping its policies or directing its efforts. Poultrymen who are not fanciers rarely interest themselves at all in this association, and the average fancier is indifferent to it except when its existence is forced upon his attention by some inconvenience imposed upon him as a result of its manipulation of the standard descriptions of thoroughbred fowls.
- 2.—Various "state" poultry associations — a few of them properly so designated, but more of them merely local associations describing themselves as state associations either for the prestige the name may give them, or for the appropriation which may sometimes be secured from a state legislature for a state association, or one supposed to be of that class.
- 3.—A few sectional organizations, leagues of local associations; as yet none of these can be said to be completely organized and on an established working basis. So far they represent tendencies rather than actual accomplishments.
- 4.—Local poultry associations, organized primarily to hold a local poultry show and increase the local interest in fine fowls. Of these there must be now more than 400. The number is steadily increasing, and where a few years ago it was hard to find associations of this class that had been in active existence for more than two or three consecutive years, each season now adds substantially to the number which have had a continuous existence long enough to be regarded as permanent organizations.

- 5.—Local poultry associations organized for instruction and information and exchange of ideas on poultry topics. Of these there are only a very few in existence. A few local associations organized primarily to hold shows also hold a number of meetings of an educational character during the year.
- 6.—Specialty clubs — organizations of breeders of a particular breed or variety; the object of the organization being to advance the interest of that breed or variety. These clubs generally draw membership from all parts of the country, though in a few instances where interest in the breed or variety to which the club was devoted was strong in some locality or section, the local members dominated the club. In such cases the government of the club is likely to be very democratic, the members generally attending the meetings and taking part in them, but the specialty club usually is an organization of which the secretary is during the period of his incumbency the autocrat.

Most readers will agree with me that the above enumeration shows variety enough in organization. As to the numerical strength of these organizations, it varies from less than ten to over a thousand.

But with all these organizations it happens almost invariably that when the occasion arises for organized effort on the part of poultrymen, either to advance or to protect their interests, there is no organization in the field so constituted that it can make its influence felt and its power respected by legislatures and corporations. The estimates of the value of poultry products which make them outrank many crops commonly considered as of greater importance are doubtless often exaggerated. But allowing a great deal for exaggeration, it still remains a fact that the value of our poultry products ranges well into hundreds of millions of dollars annually, and far exceeds the value of articles whose producers by combined and persistent effort are able to force a consideration of their interests on those responsible for state and national legislation. Why is it?

My answer is:—Because most poultrymen are too absorbed in the details of most intimate concern to them to have more than an occasional passing thought for the larger matters which should be of interest to all poultrymen; because poultry keeping being with most poultry keepers a side issue, the individual poultryman's financial dependence upon it is not great enough to strongly impel him to unite with others for the remedy of conditions that need improving; and because poultry keeping as a hobby, fad, or recreation draws its recruits largely from people of very modest means who have neither the money nor the inclination to make it as conspicuous, and their wishes or interests as much regarded by the rest of the people as some of the other forms of recreation. In fact, the average poultryman's disposition is quiet and retiring. The push and rush and noise of strenuous and spectacular sports do not draw him as do the quiet interest and occupation he finds in taking care of and developing his fowls. He may be and often is somewhat interested in popular sports, but rarely follows them with the zeal of their more pronounced devotees. A little of them will do for him; then back to the quiet, restful recreation he finds in poultry keeping.

Now, in poultry organizations, as in all associations, differences of opinion and of interest promote jealousies, disagreements, and divisions. The average poultryman would rather keep out of these, or drop out of the association in which they arise, than stay in and endeavor to work out a harmonious solution of the difficulty. The result is that dissension in a poultry organization usually results in its collapse, or, at least, in greatly weakening it, when if the members felt the importance to them of maintaining an organization dissensions would not so often be allowed to develop to the breaking point.

It may not be possible by presenting reasons for faults like this to persuade people to avoid them, but if such a statement of the causes of weakness in poultry organizations impresses the reader as true or reasonable it may serve to make his attitude in such matters more favorable to adjustment. To return to our subject proper:

These various poultry organizations all have claims on the attention of poultrymen when they solicit membership. As a general rule: Every poultryman ought to be associated with every organization which he can help, or which can be of help to him. But in the present

condition of organizations many of us have to make exceptions to that rule, especially with regard to those organizations which draw membership from a wide territory, and still are controlled by a very few individuals.

In respect to what one ought to do in the present condition of poultry organizations, there is abundance of room for honest differences of opinion, but we find general unanimity in the view that every poultryman ought to belong to the local association in his town or district where such association exists. Even poultrymen who neglect to join their local association will usually admit that they think they ought to do so.

The local poultry association should be the unit of organization. No satisfactory general organization is likely to become established until poultrymen more generally appreciate the importance of maintaining a harmonious local organization, and the equal importance of alliance with other local organizations. Appreciation of these things is growing—but slowly.

The too common experience of local poultry associations is that within a year or two from a most auspicious beginning jealousies and disagreements reach the point where either the association divides, or a larger part of the members withdraw. For this the members individually are to blame, perhaps not all in equal measure, but it is rare to meet in such cases manifestations of the spirit of compromise which must exist in any organization which is to be permanent and efficient.

To this spirit every member can contribute. For the lack of it each member is responsible—for his share. There may be occasional cases where division or withdrawals are justifiable or inevitable, but to the impartial outside view such emergencies rarely exist, and in the great majority of cases, if the poultrymen who desire only harmony would work together in the interests of harmony, and not side with either one or the other of the opposing factions, but discipline both if necessary to bring about a satisfactory adjustment of the situation, its troubles would be short lived. And if, as a result of the common efforts of members of poultry associations who have no personal interest in the disputes which disrupt them, local poultry associations were made strong and permanent, as they should be; it would inevitably come about that these organizations would combine for the things that could be better accomplished or regulated through their combined efforts. While the tenure of life of the local association is as uncertain as it has been in times past, or even as it is today, that condition gives some warrant for the statement often made in defense of the autocratic and unpopular methods of some of the organizations of wider scope, that the lack of permanence in local organizations justifies the continuance of general organizations by methods constantly requiring the services of apologists and defenders. The uncertainty of continuance of local organizations also makes many of them reluctant to enter into league with others, and sometimes interferes seriously with the efforts to extend organization.

The individual poultryman who does interest himself in the matter, usually feels that he personally can do nothing to materially improve conditions affecting organizations of poultrymen, or that what he perhaps might do, he may not undertake because to do so would take time and attention which should be devoted to the occupation by which he makes his living. But what no one poultryman could do individually without a supreme effort, many individual poultrymen acting independently, though impelled by the same spirit, would accomplish easily, and if all poultrymen would interest themselves in their local associations, help those who are willing to bear the burden of the work of the association as long as their efforts are for the common good, and suppress those eager to take the lead when their efforts seem to be directed toward promoting their own interests or toward things of no value to the members, we would soon see far more healthy and vigorous life in local poultry associations, and a much more general intelligent interest in the constitutions and methods of the organizations of wider scope.

Beyond membership in local poultry associations I would not under present conditions insist on membership in any of them as a duty, for in them the individual member neither is, nor as they are at present, can be a factor as he may be in the local poultry association. In any of them a member may find or make opportunities to help along the cause of organization, but in the local association every man counts as nowhere else, and it is in the local associations that the foundations of a great and efficient poultry organization must be laid.

So in concluding this series of lessons I would like to say to all who have followed them, and especially to the many who have testified to the help they have found in them in such matters as feeding, building, breeding, etc., this question of an efficient organization of poultry interests is of as much importance to the poultryman — the one who stays a poultryman, as any subject in which poultrymen are interested.

In the course of these lessons I have at times imposed my opinions on readers. I have said of one thing and another: Take my word for this; or try this, and be convinced. As unhesitatingly I now urge on the reader who has not interested himself in organization, or has allowed his interest to lapse:— Interest yourself in and for a poultry organization in your locality. If there is one there already go into it and help and be helped. If there is none, organize one. Get together the few (there are always — nearly always — a few) interested in poultry, and have monthly meetings to exchange ideas. Thus you establish a nucleus about which local interest in poultry grows. Even the man or woman who is isolated in his interest in poultry has hope of companionship, for that interest is everywhere contagious.

Out of efficiency and permanence in local organization comes the power to protect poultry interests locally. This means a great deal in such a matter, as, for instance, a city ordinance prohibiting the keeping of fowls within the city limits. Usually a move to enact such an ordinance finds poultry keepers unorganized and unable to make any effective protest. Ordinances of this character are usually too rigid, arbitrary, and oppressive. There may be—there usually is — need of some regulation, but the entire prohibition of fowls within the city limits is not necessary, and if poultry keepers are organized and in position to make their rights respected they can secure such modification of a proposed ordinance as is desirable and fair.

As an illustration of what might be accomplished by concert of action by the local associations within a state, take the case of the proposed fox bounty law in Massachusetts a few years ago. This was a law to protect those engaged in an important industry. It was opposed by the fox hunters, who acted in concert, while the poultrymen did not. The result is that foxes flourish here increasingly.

As an illustration of what might be done by a powerful national organization, take the matter of express rates and regulations in regard to the transportation of fine fowls. Rates are unequal and often unfair, regulations mostly in the interest of the carrier, and to take away as far as possible protection to the shipper or purchaser. The express companies make and unmake rates and rules at will. Poultrymen find fault, protest ineffectively, and submit, because there is no collective force behind their protests.

These are but a few of the things that go wrong for lack of strong organizations of poultrymen, most of which would be righted with comparative ease if taken in hand by an organization having the united support of those whose interests were affected.

These matters may not obtrude themselves constantly on the poultryman as do those which we call the practical details of the business, but they are none the less vital. They can be dealt with only by concerted action, but concerted action can come only as individual poultrymen unite to make it. The responsibility is on everyone.

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