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AGRICULTURAL EXPERIMENT STATION

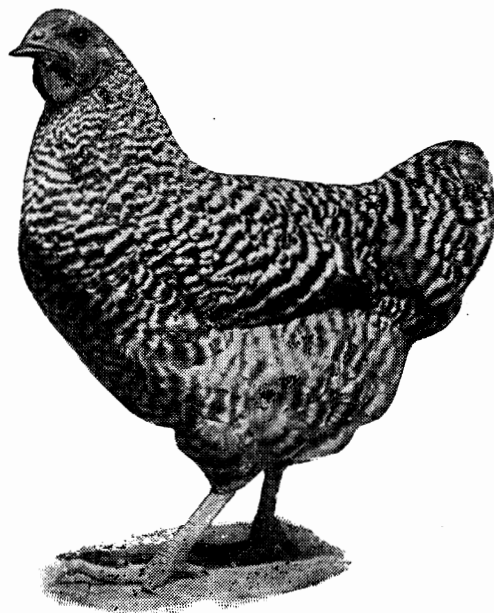
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STILLWATER, OKLAHOMA

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POULTRY

PART I

BY A. F. ROLF*

BREEDS AND BREEDING

The American Standard of Perfection (1910 edition) describes twenty-nine breeds and eighty-two varieties of chickens, besides nine breeds and twenty-six varieties of ducks, and six breeds and seven varieties of geese. In addition to these breeds and varieties, there are a great many others which are now claiming a great deal of attention, and which will probably be recognized by the American Standard of Perfection in the next and in subsequent revisions.**

Two important reasons—lack of space and the fact that this Standard is copyrighted—make it impossible to treat of all these breeds and varieties in detail. The breeds are classified on a geographical basis from point of origin or development, and these various classes will be considered briefly, mainly from a utility viewpoint.

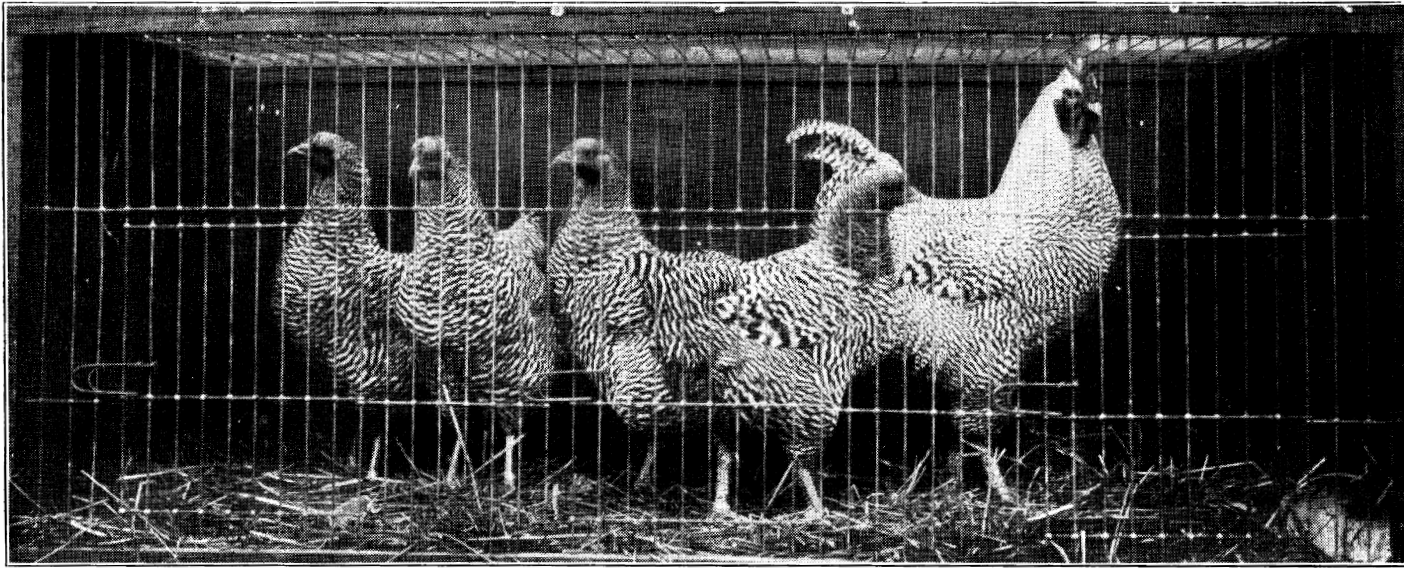
The following table shows the breeds and varieties in the American class, together with the standard weights:

American Class

BREED.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Plymouth Rocks	{ Barred White Buff Silver Penciled Partridge Columbian	9½	8	7½	6
Wyandottes	{ Silver Golden White Buff Black Partridge Silver Penciled Columbian	8½	7½	6½	5½
Javas	{ Black Mottled	9½	8	7½	6½
Dominiques	One	7	6	5	4
Rhode Island Reds	{ Single Comb Rose Comb	8½	7½	6½	5
Buckeyes	One	9	8	6	5

*Resigned November 15, 1914.

**In August, 1914, the American Poultry Association made some additions and changes. These changes are embodied in this text.



PEN OF BARRED PLYMOUTH ROCKS

Owned by Oklahoma Agricultural College; purchased from breeder, Mr. C. H. Latham, Lancaster, Massachusetts
The Plymouth Rocks "are very popular and, being active and good rangers by nature, they make good breeds for average farm poultry work". They are a General Purpose fowl.

All of the breeds in the American class have yellow skins; all except the Javas have yellow legs and toes (the Java having black, or leaden-blue, and yellow legs and toes), all lay eggs with brown or tinted shells, and the brooding instinct is well developed in all the varieties.

The Plymouth Rocks, Wyandottes and Rhode Island Reds are very popular breeds, and being active and good rangers by nature, they make good breeds for average farm poultry work. The Rhode Island Red has a long, rectangular body, its depth being about one-half of its length. The Plymouth Rocks have a shorter body, also somewhat rectangular in shape, its depth being about two-thirds its length. The Wyandotte has the shortest body of the three breeds, being about equal in length and depth, and being essentially a bird of curves.

The Javas and Dominiques are very old breeds, but are not very popular at the present time, except for fancier's purposes. They have been largely replaced for utility purposes by the Plymouth Rocks, Wyandottes and Rhode Island Reds. These newer breeds deserve this popularity and recognition as the desired utility points of combined egg production and meat production have been more successfully developed.

The Buckeye is a comparatively new breed, and looks very much like a Rhode Island Red, with a rangy or gamy carriage. Many breeders object to the Buckeye on the ground that there is too great a difference in the size of the males and females.

All varieties of Plymouth Rocks and Javas have upright, single combs. All varieties of Wyandottes and Dominiques have rose combs. The Rhode Island Reds have both single and rose combs. The Buckeyes have pea combs.

Asiatic Class

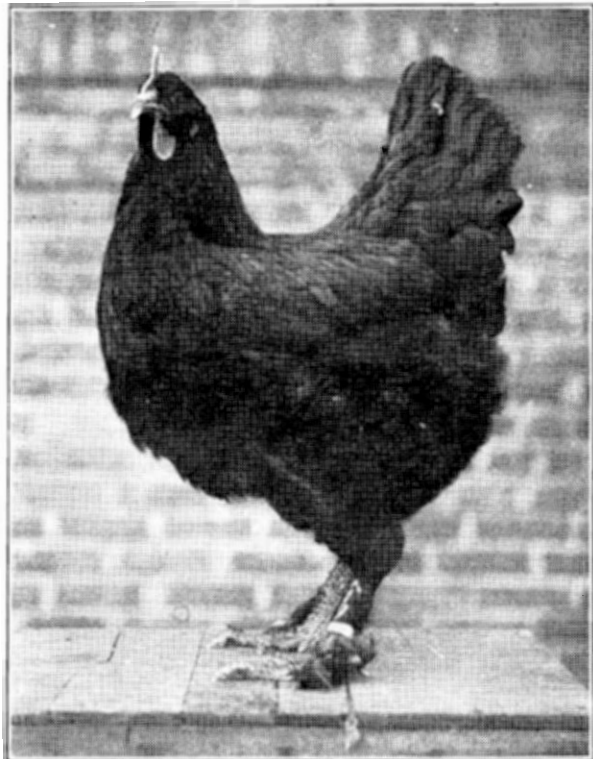
BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Brahmas	{ Light	12	10	9½	8
	{ Dark	11	9	8½	7
Cochins	{ Buff	11	9	8½	7
	{ Partridge				
	{ White				
	{ Black				
Langshans	{ Black	9½	8	7½	6½
	{ White				

The three breeds in the Asiatic class have feathered legs, large bodies; the Brahmas and Cochins have yellow skins, the Langshans have a white skin; all lay eggs with brown or tinted shells, and the brooding instinct is well developed in all varieties.

The Light Brahma is the largest chicken grown. The Dark Brahma has the same shape and general characteristics, but is one pound lighter in

weight. The difficulty of breeding Dark Brahmas true to color has placed them almost exclusively in the fancier's class. The chief objection to the Brahma for table poultry production is its slowness in maturing, and to partially overcome this objection many use a first cross of the Light Brahma and Plymouth Rock.

The Cochins have been developed for looseness of feather and other similar characteristics by the fanciers until they have lost a great deal of their popularity and usefulness to the practical poultryman.



BLACK LANGSHAN PULLET

Bred and owned by Oklahoma Agricultural College
"The Langshans are, perhaps, the most popular of the
Asiatic class", or Meat Type of fowl

The Langshans are, perhaps, the most popular of the Asiatic class. The reason for this popularity is because they come nearer to being a general purpose fowl than do the Brahmas or Cochins. Their white skin is objected to in some markets, but they produce high class table poultry and are very good egg producers.

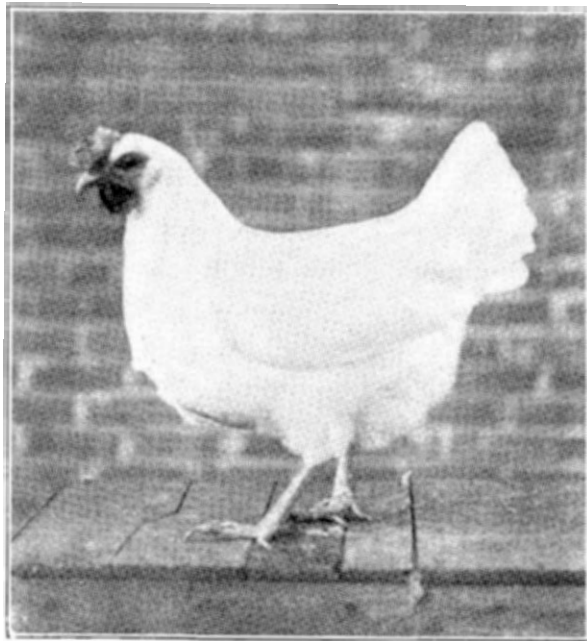
The Brahmas have pea combs. The Cochins and Langshans have single combs. This class is rather sluggish and therefore not adapted to farm conditions where the birds are expected to range widely and forage a great deal of their living. They are well adapted to intensive poultry keeping, for they may be confined by fences two or three feet high and stand confinement well.

Mediterranean Class

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Leghorns	{ Single Comb Brown Rose Comb Brown Single Comb White Rose Comb White Single Comb Buff Rose Comb Buff Single Comb Black Silver Red Pyle }	5½	4	4½	3½
Minorcas	Single Comb Black	9	7½	7½	6½
	Rose Comb Black				
	Single Comb White	8	6½	6½	5½
	Single Comb Buff				
White Faced Black Spanish	One	8	6½	6½	5½
Blue Andalusians	One	6	5	5	4
Anconas	Single Comb Mottled	5½	4	4½	3½
	Rose Comb Mottled				

The breeds in the Mediterranean class are very active, make good rangers and foragers, are noted for their production of a large number of white-shelled eggs, and their non-sitting characteristics. For the most part they are too small to be considered as meat producers, although they may be profitably used for the production of small broilers or fryers.

The Leghorns are the most popular breed in this class, and many claim the Leghorn has established the good reputation for the other breeds in the class. There is a wide range of colors and combs to select from, but we find that the majority of the successful egg farms use the S. C. White Leghorns.



S. C. WHITE LEGHORN PULLET

The Minorcas are the largest of the Mediterranean breeds, and it is generally conceded that the average size of their eggs is much greater than that of all other breeds.

Bred and owned by Oklahoma Agricultural College. The Leghorns "are very active, make good rangers and foragers, are noted for their production of large numbers of white-shelled eggs, and their non-sitting characteristics". The most prominent Egg Type of fowl

The White-Faced Black Spanish and the Blue Andalusians are both old-time favorites, but today very few are bred except for fancy purposes.

The Mottled Ancona is one of the newest in this class, and except for color it is almost identically the same as the Leghorn.

The Leghorns and Anconas have yellow skins. The Minorcas, Spanish and Andalusians have white skins. The Spanish, Anconas and Andalusians have single combs, while the Leghorns and Minorcas have both rose and single combs. The combs on all of the breeds in the Mediterranean class are exceptionally large.

Continental Class

BREEDS	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Campines	Golden Silver				

There is only one breed in this class with its two varieties. The Campine is much the same type of bird as the Mediterranean breeds. A small, active bird of the egg type. It is a non-sitter and lays white eggs.

English Class

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Dorkings	White	7	6½	6	5
	Silver Gray	8	7	6½	5½
	Colored	9	8	7	6
Redcaps	One	7½	6	6	5
Orpingtons	Single Comb Buff	10	8½	8	7
	Single Comb Black				
	Single Comb White				
Sussex	Red				
	Speckled				
Cornish	Dark	9	8	7	6
	White	8	7	6	5
	White Laced Red				

All of the breeds in the English class, except Cornish, have white skins. The Dorkings differ from the American breeds in that they have five toes instead of four. The Dorkings are rather sluggish and not good rangers. They lay an egg which is very lightly tinted or almost white, and have the brooding instinct well developed. They have never been very popular in this country.

The Redcaps are another breed which has never gained a great foothold in this country. They are non-sitters and produce a white-shelled egg.

The Orpington is generally included in the General Purpose class, although it is one-half-pound heavier than the Langshan. They have a deep, massive body, are fair rangers, produce a good quantity of eggs with brown or tinted shells, and have a strong tendency to broodiness.

The White Dorking and Redcaps have rose combs. The Silver Gray and Colored Dorkings and the standard varieties of Orpingtons have single combs. The Cornish have pea combs.

The Cornish are noted for their meat production. They have a type peculiarly their own, their bodies being very hard and compact, with most of the flesh carried on the breast and thighs. Short, close-fitting feathers make the Cornish look much smaller than they really are. The Cornish has a yellow skin, lays a fair number of brown eggs, and has a medium tendency to broodiness. The Dark and White varieties are the larger, but the newer variety—the White Laced Red—is a little faster in maturing and generally conceded to be a better egg producer.

Polish Class

BREEDS.	VARIETIES.	REMARKS.
Polish	White Crested Black Bearded Golden Bearded Silver Bearded White Buff Laced Non-Bearded Golden Non-Bearded Silver Non-Bearded White	The Polish have no standard weights. They are a purely fancy breed. The difficulty of producing perfect crest, beards, and the various colors make them ideal for the fancier.

Hamburg Class

BREEDS	VARIETIES.	REMARKS.
Hamburgs	Golden Spangled Silver Spangled Golden Penciled Silver Penciled White Black	The Hamburgs have no standard weights. They are almost wholly a fancier's breed, although some strains will produce a large number of eggs. The eggs are generally rather small.

French Class

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Houdans	Mottled White	7½	6½	6½	5½
Crevecoeurs	Black	8	7	7	6
La Fleche	Black	8½	7½	7½	6½
Faverolles	Salinon				

The Houdans, Crevecoeurs and La Fleche have white skins and produce eggs with white shells. The Faverolles produce tinted-shelled eggs.

The Houdan is a crested and bearded variety and carries the fifth toe. It is generally acknowledged to be a good egg producer, but the fact that the large, loose crests gather dampness causes the birds, especially the growing chickens, to be more inclined to colds than the non-crested varieties.

The Crevecoeurs and La Fleche are rarely met with in this country. The first mentioned is crested and bearded, while the latter has neither crest nor beard. The Faverolle is a comparatively new breed with single comb, no crest, but has a beard and muff.

All of the breeds in the French class have horned or "V-shaped" combs, except the Faverolle, which has a single comb.

Game and Game Bantam Class

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Games	Black Breasted Red Brown Red Golden Duckwing Silver Duckwing Birchen Red Pyle White Black	*	*	*	*
Game Bantams	Black Breasted Red Brown Red Golden Duckwing Silver Duckwing Red Pyle Birchen White Black	oz.	oz.	oz.	oz.
		22	20	20	18

*No standard weights.

The Games and Game Bantams do not hold a very important place in the utility poultry field, although some still think a great deal of the Game as an all-round farm fowl, one which will stand a great deal of abuse. They are bred mostly for purposes of sport and fancy.

Oriental Class

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Sumatras	Black	*	*	*	*
Malays	Black Breasted Red	9	7	7	5
Malay Bantams	Black Breasted Red	26 oz.	24 oz.	24 oz.	22 oz.

*No standard weights.

The breeds in the Oriental class are much like the Games. The Sumatras, Malays and Malay Bantams are purely fancy breeds.

Ornamental Bantam Class

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Cock.	Cockerel.	Hen.	Pullet.
Sebrights	Golden	oz. 26	oz. 22	oz. 22	oz. 20
	Silver				
Rose Comb	White	26	22	22	20
	Black				
Booted	White	26	22	22	20
Brahma	Light	30	26	26	24
	Dark				
Cochin	Buff	30	26	26	24
	Partridge				
	White				
	Black				
Japanese	Black Tailed	26	22	22	20
	White				
	Black				
	Gray				
Polish	Bearded White	26	22	22	20
	Buff Laced				
	Non-Bearded				
Mille Fleur	Booted	26	22	22	20

The Bantams are purely fancy breeds, with practically no utility value.

Miscellaneous Class

BREEDS.	VARIETY.	REMARKS.
Silkies	White	All these are purely fancy breeds with no utility value. No standard weights.
Sultans	White	
Frizzles	Any color	

Turkeys

VARIETIES.	STANDARD WEIGHTS.				
	Cock. Adult	Cock. Yearling	Cockerel.	Hen.	Pullet.
Bronze	36	33	25	20	16
Narragansett	30	25	20	18	12
White Holland	28		20	18	14
Black	27		18	18	12
Buff	27		18	18	12
Slate	27		18	18	12
Bourbon Red	30		22	18	14

Ducks

BREEDS.	VARIETIES.	STANDARD WEIGHTS.			
		Adult Drake.	Young Drake.	Adult Duck.	Young Duck.
Pekin	White	9	8	8	7
Aylesbury	White	9	8	8	7
Rouen	Colored	9	8	8	7
Cayuga	Black	8	7	7	6
Call*	Gray	*	*	*	*
	White				
East India*	Black	*	*	*	*
Muscovy	Black and White	10	8	7	6
	White				
Indian Runner	English Pencilled	4½		4	
	White				
	Fawn and White				
Swedish	Blue	8	6½	7	5½
Buff	One				
Crested	White	7	6	6	5

*The smaller the better.

Geese

BREEDS.	VARIETTES.	STANDARD WEIGHTS.			
		Adult Gander.	Young Gander.	Adult Goose.	Young Goose.
Toulouse	Gray	25	20	20	16
Embden	White	20	18	18	16
African	Gray	20	16	18	14
Chinese	Brown	12	10	10	8
	White				
Wild or Canadian	Gray	12	10	10	8
Egyptian	Colored	10	8	8	6

Limit space prevents any lengthy discussion of turkeys, ducks and geese. All of the turkeys are used for utility purposes, preference usually being given to those of greatest weight.

Of the ducks, we find the Call, East India and Crested breeds used purely for ornamental purposes. The Indian Runner and Buff ducks are bred for great egg production. The Pekin, Aylesbury, Rouen, Cayuga, Muscovy and Swedish are chiefly useful for meat production as well as for limited egg production and for fancy purposes.

The Egyptian goose is an ornamental breed. The Wild or Canadian goose is used somewhat for meat production, but mainly as decoys to aid

in shooting wild or migratory geese. The other varieties are used chiefly for meat production.

Non-Standard Varieties

No attempt has been made to discuss the numerous breeds and varieties of fowl which have not been admitted to the American Standard of Perfection. There are an exceedingly large number of such breeds and varieties; in fact, Edward Brown in "Races of Domestic Poultry" recognizes and describes eighty breeds and 183 varieties of domestic fowl alone, exclusive of bantams, turkeys, ducks or geese. Even then this book, which was published in 1906, does not include many of the varieties now recognized by the American Standard of Perfection, nor does it include many of the new breeds and varieties not yet in the Standard.

Many of the non-standard varieties show promise of great merit and usefulness, but we do not recommend them to the average poultry raiser. In selecting a breed the average person will do better to choose one of the older ones as the breed characteristics are more firmly fixed than in many of the newer breeds and varieties.

Selection of a Breed

More depends upon the way in which the birds have been bred and the manner in which they have been cared for than upon the particular breed or variety selected.

Where egg production is the chief point desired the following breeds should be found satisfactory: Leghorns, Minorcas, Anconas and Campines. All of these breeds lay white eggs; so, if a brown egg is desired, selection must be made from another class.

Where one desires good egg production, combined with the production of plump broilers or fryers of small size, selection may be made from Leghorns, Minorcas, Anconas, Plymouth Rocks, Wyandottes, Rhode Island Reds, Orpingtons and Houdans.

If the main object be a combination of profitable egg production with the growing of small to medium sized roasting chickens the following breeds will be found useful: Plymouth Rocks, Wyandottes, Rhode Island Reds, Langshans and Orpingtons.

If the production of capons, soft roasters or other particularly large market poultry be the main object, the following breeds should be found satisfactory: Brahmas, Langshans, Orpingtons and Cornish.

Study the breeds which will give the results you desire and then select the breed and variety which most strongly appeals to your personal sense of beauty. In other words, select the breed which most nearly meets your local conditions and your individual requirements.

In securing stock, be sure that the birds are perfectly healthy, of good size for the breed, that they are as close as possible to Standard shape and color, and that vigor and vitality are not lacking.

POULTRY DISEASES

In the poultry business one deals with large flocks made up of individual birds of comparatively small value. The poultry raiser cannot, therefore, afford to spend very much time or money on the treatment of individual sick chickens. Doctoring sick chickens is advisable only when treatment can be conveniently applied to the flock as a whole with reasonable promise of good results. Or occasionally individual birds may be treated when the treatment is simple, easy and needs to be administered but a few times.

The "cured" chicken should never be used in the breeding pen, for such a bird transmits its constitutional weakness to its progeny.

The most common causes of poultry diseases are:

1. Constitutional weaknesses due to improper breeding.
2. Nutrition disturbances due to improper feeding either as to quantity, quality or kind of feed.
3. Respiratory difficulties due to improper ventilation, causing a lack of oxygen, or to obstructions in respiratory system.
4. Functional disturbances due to lack of necessary exercise or too much exercise.
5. Poisons—from decaying animal or vegetable matter, or from spraying solutions, etc.
6. Mechanical injuries—such as broken bones, etc.
7. Animal parasites—both external and internal.

By attention to details one can easily avoid trouble from any and all of these sources of disease. The poultry breeder should endeavor to prevent disease rather than spend so much time in doctoring for attempted cures. Some of the essentials in prevention of disease are:

1. Breed only from sound, vigorous, healthy, well matured stock.
2. Feed a variety of sound foods, free from mustiness, moldiness or other taint; with a constant supply of pure, fresh water. Less trouble from disease is found where dry foods are used exclusively than where wet mashes are fed.
3. Keep the birds in a well ventilated house. The "open-front" house is the best; the "curtain-front" ranks next; while the "closed" or "tight" house is the poorest.
4. Strict sanitation must be observed if diseases are to be prevented. This not only means clean houses and yards, but the air, food and water must be looked after, together with the body condition of the birds themselves.
5. To keep up the natural body strength and the normal resistance to disease, exercise is necessary. If the birds are confined to small quarters this exercise may be secured by feeding grain in a deep litter, making the birds scratch for their living.

6. Sick birds should be separated from the flock as soon as noticed. Dead birds should be burned or buried deeply.

7. In case of any sickness, search for the cause and correct the trouble at its very source to prevent further trouble of the same kind.

Diagnosis of Disease

There are certain external symptoms which are nearly always found with any and all diseases. These symptoms simply show that the bird is sick, but do not show what the exact disease is.

A sick bird is usually quiet, sluggish and indisposed to move. It loses its sprightly carriage, but sits around in the sunny corners with its head and neck drawn in toward its body. The feathers lose their luster and are often very rough. The eye becomes dull and listless and the color of the comb is generally changed.

When such general symptoms are noted the bird should be examined more carefully and the cause of the trouble determined. Every part of the bird should be carefully examined and all abnormal characteristics noted.

Oftentimes the external symptoms alone will not be sufficient to diagnose the disease. In such a case a dead bird should be cut open carefully and the condition of all the internal organs should be noted. A careful notation of the external symptoms and the postmortem conditions will generally show the general nature of the disease. If more information or a specific treatment is desired, the Poultry Department of the Oklahoma Experiment Station is always glad to render any service possible. In writing for information describe the case in detail. Do not omit a single point, because it may seem unimportant to you. Include it in your description and let us judge as to its bearing on the case in question.

Some Common Diseases

Treatment is given here for a few of the common diseases:

Colds.—Simple colds are caused by improper conditions of housing, such as exposure to drafts or dampness. Overcrowding will also cause colds in some cases, due to the birds becoming damp with perspiration and then being exposed to drafts or cold winds. This condition is characterized by a thin discharge from the nostrils and eyes. This discharge has no offensive odor.

Treatment consists in first removing the cause, and in most cases this will suffice. It is often a good plan to use a small amount—say 1 teaspoonful to 2 quarts of mash—of red pepper (*capsicum*) for a few days. Potassium permanganate crystals put into the drinking water until it is dark red in color is also valuable.

Roup.—Roup is a germ disease and shows up in various forms. It often follows a simple cold and sometimes the first symptoms of roup are mistaken for colds. In roup the discharge is more profuse and has a very strong, offensive odor, and is usually accompanied by swellings of one or

both sides of the head. Birds suffering from roup should never be used in the breeding pen, even after they are apparently cured, for such birds have weakened constitutions and transmit to their progeny a predisposition to disease.

Remove all affected birds from the flock and use potassium permanganate in all drinking water. Disinfect the house and yard freely with a good disinfectant, such as cresol, zenolem or a 5% solution of carbolic acid.

If it is desired to attempt curing affected birds so they can be marketed, the following may be tried: Place the affected birds in clean, dry, well ventilated quarters, wash the face, nostrils and eyes with a 3% solution of boric acid and then with equal parts of peroxide of hydrogen and water. A medicine dropper is useful for forcing these solutions into and through the nostril cavities. Repeat this treatment daily until cure is effected. Give the birds easily digested mashes throughout this treatment. Burn or bury deeply all birds that die.

Sorehead.—This disease (also known as chicken pox) is recognized by the breaking out of small sores around the head, on face, comb, wattles, eyelids, etc. The exact cause of this disease is not definitely known.

Remove all affected birds from the flock and thoroughly disinfect all houses and yards. Soak the crusts or nodules with warm water and remove them. Treat the raw sore spots with a 2% solution of creolin and dust with iodoform. In bad cases this treatment should be repeated the next day. Then grease daily with carbolated vaseline.

Very little is known of the actual methods of transmission of this disease, but, to be safe, birds which have had sorehead should be marketed and not used in the breeding pen.

Crop Bound.—Various materials, such as long, dry hay, pieces of string, etc., may obstruct the outlet of the crop and cause the condition known as **crop bound** or **impacted crop**. Birds which are irregularly fed may also overload the crop sufficiently to cause a temporary paralysis of the crop muscles and result in this same trouble.

Give the bird a teaspoonful of castor oil and then knead or massage the crop thoroughly. Repeat this treatment twice daily. If the bird is not relieved on the second day, an operation will be necessary. Remove a few feathers and cut through the skin. Then push the skin to one side and cut through the crop so that the two openings will not be over each other. Remove the contents of the crop, using the finger or a piece of wood. Wash the crop out thoroughly and sew up the cuts with silk thread. Give the bird only soft mashes for a few days and feed sparingly at first.

Bumble Foot.—This is an abscess of the foot. One of the most common causes is too high roosts, the foot becoming injured when the bird jumps from the roost to the floor. It may also result from wounds caused by nails, thorns, splinters, etc. Tie a cord tightly about the leg above the foot to control the flow of blood. With a clean, sharp knife cut open the abscess, cutting clear to the bottom and dig out the core. Paint the skin around the

cut with dilute tincture of iodine. Powder the wound with iodoform. Grease the entire foot with carbolated vaseline. Then bandage the foot. In two days remove the bandage and again use the iodine, iodoform and carbolated vaseline as above. Keep the bird isolated in a small pen with soft litter on the floor until cured. If the injury was caused by jumping from high roosts be sure to remedy this trouble.

Limberneck.—Limberneck is a prominent symptom of several diseases rather than a disease by itself. The most common cause of limberneck is poisoning of some kind, generally a ptomaine poison caused by eating decayed animal matter. Remove the cause and give affected birds a teaspoonful of castor oil and 10 drops of turpentine. Repeat this dose for two or three days. In place of water, allow the bird all of the sweet skimmed milk it will drink. This will cure many cases, but really advanced cases rarely respond to treatment.

Worms.—Nearly all fowls have worms present in the intestines, but occasionally these worms become so numerous as to cause trouble. Where worm infestation is suspected it is well to give the birds some wet mash at least once a month, using in this mash epsom salts at the rate of 1 pound to each hundred birds. Oil of turpentine is an excellent remedy for intestinal worms. The dose is about 2 teaspoonsful, and if diluted with equal parts of olive oil it is not only less severe in its effects, but is easier to administer.

Lice.—For body lice on fowls, dust them thoroughly with any good louse powder. A good powder may be made as follows: Mix 3 parts gasoline and 1 part crude carbolic acid and stir in plaster of paris until all the moisture has been taken up, leaving a dry, brownish powder.

Stick-Tight Fleas.—Mix equal parts of melted lard and kerosene. When cold annoint the comb, wattles and ear lobes of the affected birds. Clean and disinfect the houses as directed under treatment for red mites.

Red Mites.—The red mites feed on the birds at night, but during the day live in cracks, crevices and filth in the henhouse. Clean the house thoroughly, especially all dark corners and then spray thoroughly with a strong solution of cresol, zenoleum or a mixture of 1 part crude carbolic acid to 5 parts kerosene.

FARM POULTRY HOUSING

Well bred fowls, proper feeding methods, business sense in marketing poultry products, and intelligent labor on the part of the attendant are necessary for success in the poultry business, but all of these count for naught unless the birds are comfortably and suitably housed.

Poultry House Essentials

There are many different styles and types of poultry houses in use, but it is impossible to state that any one size or shape will be the best under all circumstances. There are, however, certain essential points which every house must embody in order to give entire satisfaction. These essential points are:

1. The house must be dry—free from dampness.
2. The house must be well ventilated—free from drafts.
3. The house must have a good supply of sunlight—free from darkness.
4. The house must be economical of construction—free from excessive expense or investment.
5. The house must be easy to keep clean and sanitary—free from any tendency to cause neglect on the part of the attendant.
6. The house must be properly located—free from undesirable surroundings.

The house must be dry and well ventilated or the birds will suffer from colds, roup and kindred diseases. Dampness will often produce rheumatic troubles and provides conditions, especially if the house is dark, for the growth and multiplication of molds, bacteria and other disease-causing organisms.

A well ventilated house will have a constantly changing supply of pure, fresh air without drafts. Without such ventilation the house will be damp and the birds will suffer some loss of vitality and stamina from constantly rebreathing the same air. An open-front house will supply this ventilation better than any of the expensive ventilation systems that might be installed.

A plentiful supply of sunlight, which can reach all parts of the interior of the house during the day, will help to dry out the house if any moisture or dampness be present, and will do much to make the birds cheerful and comfortable. Sunlight is the cheapest as well as one of the most efficient germicides obtainable, since molds and disease germs will not grow to any appreciable extent when exposed to its direct influence.

Economy of construction and convenience for the attendant mean a small investment of capital and less business risk. All of the interior furnishings of the house should be easily removable, leaving smooth, blank

walls for cleaning. Strict sanitary measures should always be observed in the poultry house, and if the cleaning is thus made easy it is not likely to be neglected.

A great deal depends upon the location of the house, for a house could embody all of the above essentials and yet be rendered unsatisfactory by a poor location. There should be good drainage of both soil and air in order that the house may remain dry. If possible the houses should be sheltered from the prevailing winds of the cold season. At least the fronts of the houses should be faced so that the strong winds cannot blow directly onto the roosts. A south or southeast slope to the land is desirable, for then the sun will quickly warm and dry the soil, and unless local conditions render it undesirable the house should face the south or southeast so the sun's rays will enter the house in the morning and early afternoon.

Regardless of the shape or individual type, the house that embodies the above essential points will be found satisfactory for poultry keeping.

Materials for Construction

Under average farm conditions the poultry house constructed of **matched boards**, drop siding or other tight-jointed lumber, or of ordinary boards covered with roofing paper will be found the most satisfactory.

Galvanized iron, steel or other metals should be avoided as metals are excellent conductors of heat and cold and will cause too great a variation in the temperature extremes of the house. A house with metal walls or roof will make a colder house in winter and a warmer house in summer than a similar house constructed of wood.

Cement or concrete is very valuable for the foundations and floors of permanent houses, but should never be used in the walls of a house. Cement walls draw and hold moisture and are much colder than wooden walls.

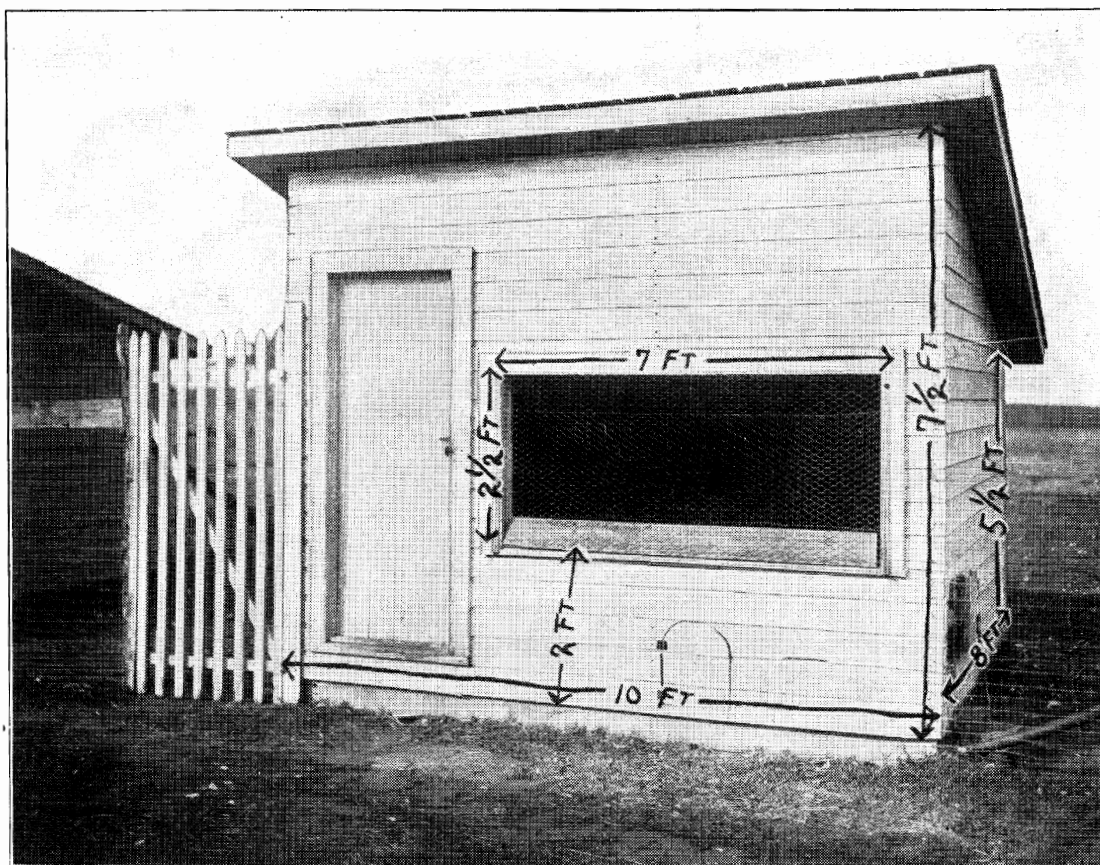
Building the House

It is not always necessary to build a new house. In many instances some building already on the farm can be remodeled so as to prove satisfactory. In remodeling such buildings it is simply necessary to see that the essential points enumerated before are embodied in the finished structure.

If, however, you are to construct a new house, it is best to start with a definite idea of what is desired. There are two distinct types of houses in use on the poultry plant of the Oklahoma Agricultural College and Experiment Station. These two types are illustrated and described in the following pages.

Shed-Roof Colony House

The accompanying illustration shows the general type and character of the Shed-Roof Colony House. Definite working plans are not given because under different conditions the details will differ greatly. As used and built at the Oklahoma Agricultural College this house is built with the floor 8x10 feet or 10x12 feet. Such a house will accommodate twenty to thirty birds in yards or thirty-five to fifty birds on free range.



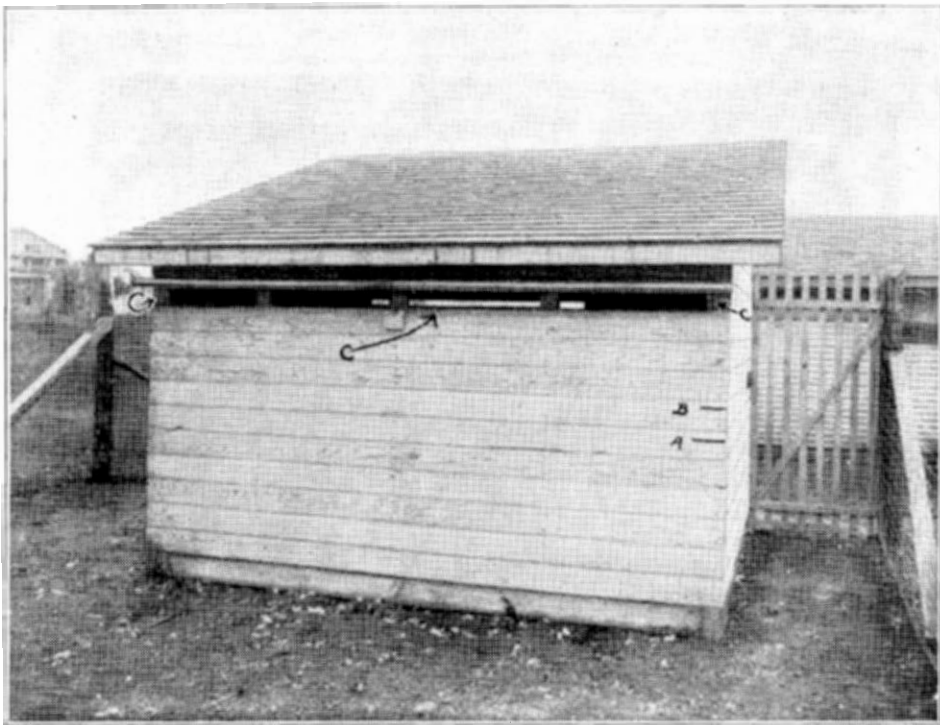
SHED-ROOF COLONY HOUSE

Described in this bulletin. Photograph taken on poultry plant of Oklahoma Agricultural College

The sills of these houses are made of 2x6 lumber. The remainder of the framing is of 2x4 lumber. The floor is made of shiplap, the sides of dropsiding, and the roof of ordinary boards covered with a good quality of roofing paper or shingled.

The door or entrance is on one end of the front or south side. To the side of this door there is a large opening 2½ feet high by 7 feet long. The bottom of this opening is two feet from the floor, thus keeping the direct winds from hitting the birds and throwing the sunlight well into the house. It is well to have a frame covered with burlap to close over this opening in case of driving storms from the south, thus keeping the interior of the house dry.

The house illustrated is 8x10 feet, but the size may be changed to suit the convenience of the owner. It is 5½ feet high at the rear and 7½ at the front.



REAR VIEW OF SAME SHED-ROOF COLONY HOUSE

Line at "A" shows level of roost boards. Line at "B" shows level of roosts. "C" shows summer ventilator, an eight-inch board hinged to swing open, allowing additional current of air in summer without striking birds or causing drafts. Kept closed in winter

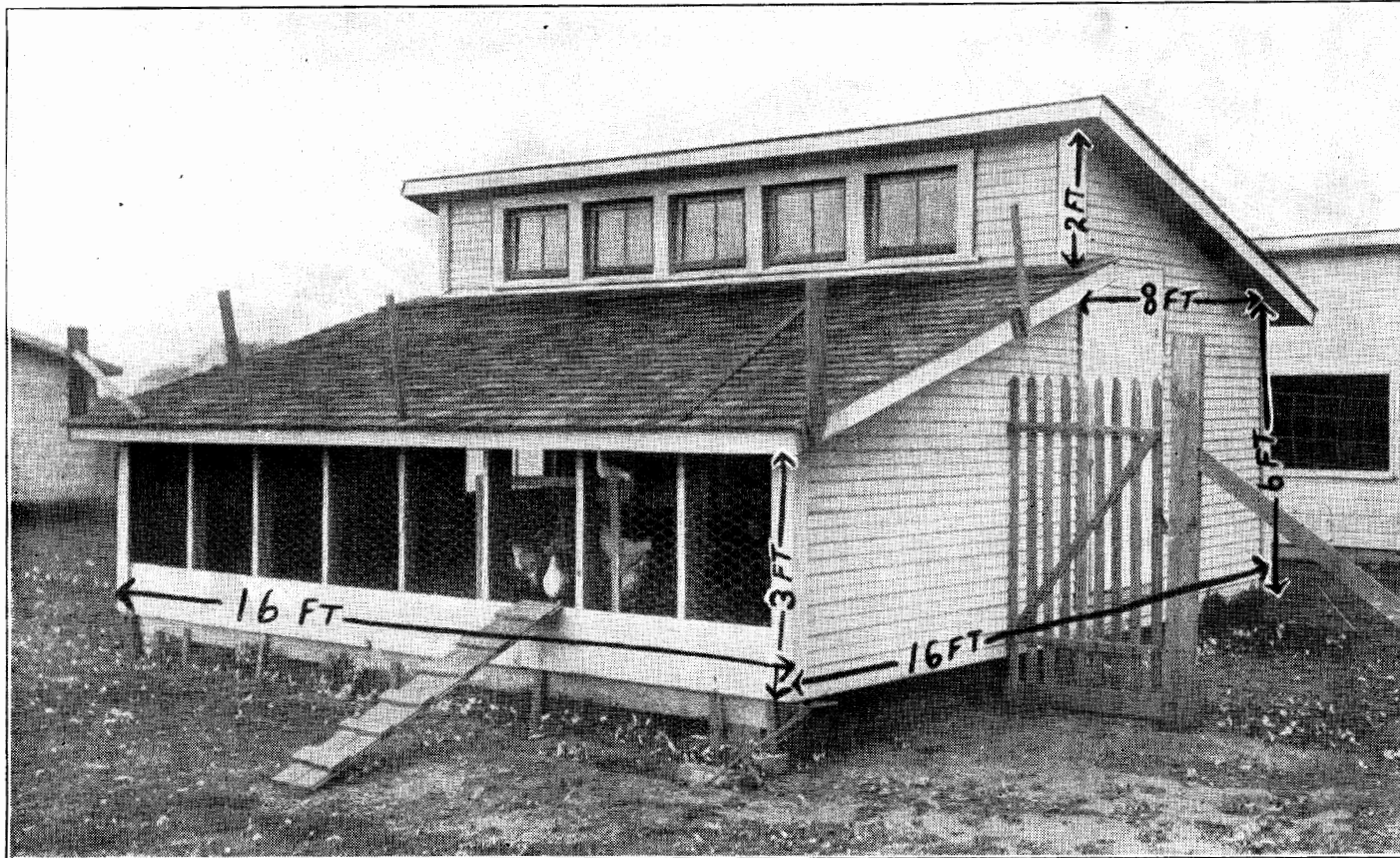
The Semi-Monitor House

The Semi-Monitor house—or Dr. Wood's house, as it is sometimes called—is a more expensive house than the shed-roof colony house just described. It is adapted to larger flocks and to communities which are subjected to extremes of temperature and quick weather changes.

Like the preceding house, the sills are built of 2x6's with shiplap flooring. The remainder of the framing is 2x4's, the sides being made of dropsiding or matched lumber. The roof may be shingled or covered with good quality roofing paper.

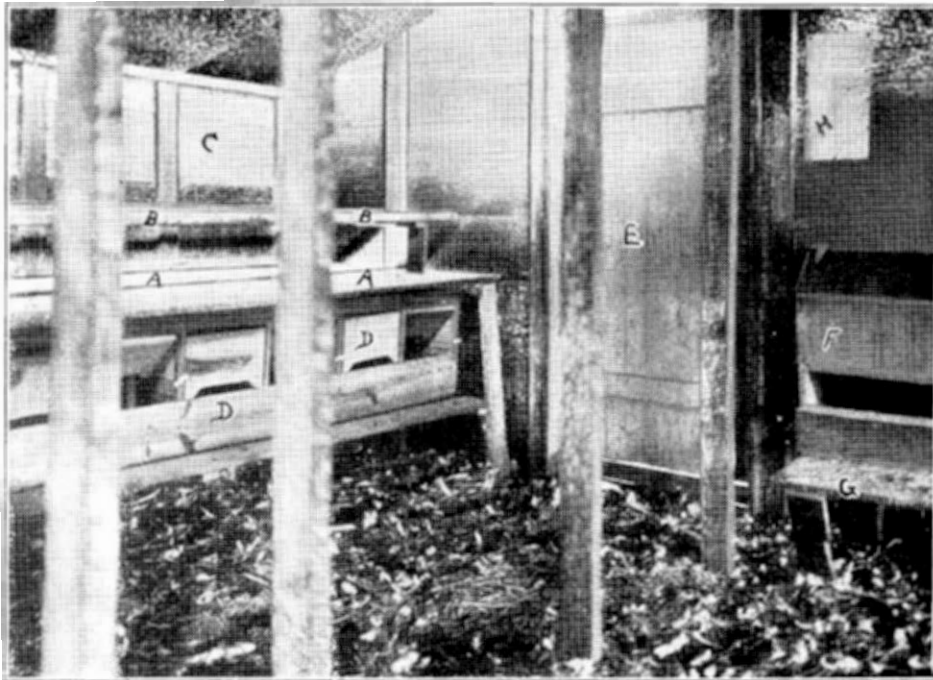
The house shown here is 16 feet square and will accommodate from seventy to eighty birds when they are confined to yards, or as many as 100 birds when allowed free range. It is 6 feet high at the rear, 8 feet at the peak, 6 feet at rear of front roof, and 3 feet at the front.

The front is left open at all times to provide ventilation without drafts. The peak is two feet higher than the rear of the front roof and has a row of single-sash windows which insure a plentiful supply of sunlight reaching the roosts and rear portions of the house. There is also a six-light single-sash window on the west side, opposite the door.



THE SEMI-MONITOR HOUSE

Described in accompanying text. Photograph taken on poultry plant of Oklahoma Agricultural College



A VIEW OF A PORTION OF THE INTERIOR OF THE SEMI-MONITOR HOUSE
 A—Roost boards thirty inches from floor. B—Roosts ten inches from roost boards.
 C—Summer ventilator, an eight-inch board entire length of north wall, opened in summer, closed in winter. D—Nests under roost boards and eighteen inches from floor, leaving all floor space available for birds. E—Door in east end. F—Dry mash hopper which rests on shelf. G—This shelf, which also contains drinking fountain and receptacle for grit and shell, is eighteen inches from floor, thus keeping litter out of food and water dishes, and also leaving all floor space available for use of birds. H—Egg and Feed Records, conveniently attached to wall near door. Note the large amount of sunlight striking roosts, nests and rear of house through the windows in the peak

POULTRY

PART II

BY L. F. PAYNE*

INCUBATION AND BROODING

Good results may be expected from incubating eggs either naturally or artificially, although there still remains a difference of opinion among poultry experts as to which is the better method. The general sentiment favors the natural method of hatching chicks from which the breeders are to be selected. There are certain principles, however, that must be followed in either case if the hatch is to be successful.

The Natural Method

When one has a small flock of general purpose fowls, as the Plymouth Rocks, Wyandottes, Rhode Island Reds or Orpingtons, and does not care to hatch more than 100 or 200 chicks, one can utilize the broody hens very profitably.

We know that oftentimes the hen that hatches the largest number of chicks is the one that hides her nest under a brush pile, crib or house. The agencies which help her make this possible are quietness, secluded and undisturbed environment, and eggs in contact with the damp ground. Then to secure good hatches from hens we should reproduce their natural methods as far as possible by secluding the nests, protecting them from laying hens and providing plenty of moisture. Broody hens should be dusted with a good lice powder two or three times before the eggs hatch. It will be found convenient to dust each time the eggs are tested for dead germs and fertility. Three or four lice on a hen can reproduce fast enough, if not checked, to thickly infest a flock of chicks in two weeks.

Artificial Incubation

The matter of artificial incubation dates back many hundred years to the time when it was practiced in China and Egypt, but for the colder northern climates it is a comparatively new art. After two decades of testing and experimenting, machines have been perfected until as good results may be expected from artificial as from natural incubation.

The selection of an incubator is the first thing that confronts the beginner. There are various makes of machines, and each one claims superiority over the others, but the fact is that all are operated on the same gen-

*Resigned August 15, 1914.

eral principle, and any good, well constructed incubator should give satisfaction, although different people have much better success with some makes than they do with others. It never pays to buy a cheap incubator. The good machine will need less care and attention, give better results and last much longer than one of a cheaper design, and the increased hatching ability will in a short time more than pay for the extra cost.

Incubator Record Sheet

A simple record sheet for the purpose of keeping track of the infertile eggs, dead germs and weak chicks will prove a great help to breeding up the flock by locating the causes of poor fertility and hatches. The accompanying sheet is a sample, but may be changed to best suit the needs of the individual:

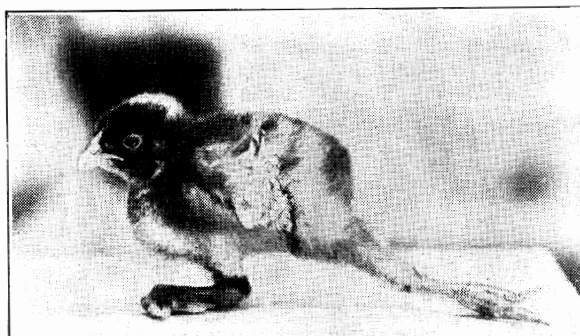
Breed or Pen No. Year

No. of Eggs	Date Set	7 Days Tested Out	14 Days Tested Out	Pipped	Not Pipped	Hatched.		Percent Hatched
						Strong	Weak	

Make as many lines on the sheet as you have hatches.

Care of the Eggs and Incubator

Select for hatching only the medium sized, uniform, smooth eggs. Keep them preparatory to hatching in a clean, well ventilated room, the temperature of which ranges from 45° to 70° Fahrenheit. Turn them daily and do not keep longer than two weeks before setting. Study carefully the directions that accompany the incubator, then set it up in a clean, well ventilated room which does not have too great range of temperature. The lamp should be filled and the bowl wiped clean each day. The wick must also be trimmed daily by brushing a cloth over it. The



SOMETHING WRONG SOMEWHERE

Crippled, weak and abnormal chicks may be caused by parent stock of weak vitality, or by improper methods of incubation, brooding, feeding or management

ture of which ranges from 45° to 70° Fahrenheit. Turn them daily and do not keep longer than two weeks before setting. Study carefully the directions that accompany the incubator, then set it up in a clean, well ventilated room which does not have too great range of temperature. The lamp should be filled and the bowl wiped clean each day. The wick must also be trimmed daily by brushing a cloth over it. The

heat should be raised to the proper temperature two days before the eggs are placed in the incubator for the purpose of insuring an even, uniform heat. The temperature ought to be kept at $102\frac{1}{2}^{\circ}$ Fahrenheit the first week and raised to 103° for the last two weeks of the incubation period. Careful watching is necessary after the eggs are put in to see that the machine varies as little as possible from the proper temperature. However, do not fear a slight change, unless it is of long duration. And do not throw away a lot of eggs unless sure they have been spoiled. Place eggs in the incubator and do not bother them for the first two days, after that turn them twice daily till the eighteenth day, and allow eggs to cool about ten minutes once daily, depending on the room temperature. Test on the seventh and fourteenth days for dead germs and infertile eggs. Do not open the machine after the eighteenth day as that allows the escape of necessary moisture and chills the chicks which have not dried.

Brooding

Feeding.—Chicks, whether hatched artificially or naturally, should not be fed before they are forty-eight hours old, as the yolk sack contains enough food to last them two to three days. After this age they may be fed coarse sifted bran and hard-boiled eggs, shell and all, equal parts by weight, mixed with a little charcoal. This should be given often and in small quantities, five times daily not being too frequent. Besides the mash of bran and eggs it is well to feed a scratching ration consisting of 1 part finely cracked corn, 1 part cracked wheat and 1 part pinhead oats; or a good commercial chick grain. This is fed in a thin litter at first, which is gradually increased in depth as the chicks are able to get the food. One must be very careful not to overfeed, as greater loss comes from too much feed, rather than not enough. Keep plenty of grit in the form of sharp sand in the coop at all times. The ration should vary as the chicks mature.

The boiled eggs and bran are substituted after the first few days with a mash consisting of bran, corn meal, middlings and animal food in some form, beef scraps or milk being excellent, with cracked corn and wheat, equal parts, which is fed in a litter. After the chicks are a month old the animal food may be decreased from the ration if free range be allowed, and insects are numerous, and feed three times a day will be sufficient. A great many mixtures are used in starting chicks, as cornbread and milk, toasted stale bread and milk, clabber cheese and a number of others, but hard-boiled eggs mixed with corn meal, bread crumbs or some ground food generally gives the best results for the first few days. The essential elements in all rations being bone-forming material and animal food.

Natural Brooding

To successfully raise chicks with hens a large number of small coops are necessary. The common inverted V-shaped coop gives as good satisfaction as any. A small amount of space with tight walls and latticed or partly closed front will suffice. The chicks may be allowed to range about the coop, but the mother hen should be confined for a week or so. Some coops

have frame attachments which allow the hen more exercise, and in case of hawks or animal pests the chicks may also be confined in this scratching coop by covering it with one-inch mesh wire. Cracker boxes, barrels and packing boxes are all used for chicken coops and they may be satisfactory during warm, mild weather, but for early-hatched chicks and stormy days the use of a larger building is necessary. An old stable or crib, providing it is free from mice and rats, may do, but never place chicks near the poultry house, as vermin infection is apt to follow.

Artificial Brooding

The incubator trays should be removed after the hatch is completed and the chicks may be left in the machine until they are old enough for the first feed. The brooder coop should be clean, disinfected and the floor covered with a layer of clean sand with some kind of litter scattered over it. Alfalfa leaves are best, but finely chopped straw or hay may be used. Hovers should be heated up two or three days before the chicks are ready to come off to insure an even temperature. Best satisfaction is obtained where the temperature is 95° Fahrenheit for the first week and lowered 5° each succeeding week to 80°. Just so long as chicks have a "warm retreat" it does not make very much difference as to the temperature of the coops or ranging space. However, for early hatches it will be found better practice rearing the chicks in a building where hovers can be used rather than trust the little outdoor brooding coops, the walls of which are too thin to prevent the occupants from chilling.

The prime requisite for rearing young chicks is cleanliness—clean chicks, clean coops, clean sand and litter, clean feed and clean water. Droopy individuals should be removed at once and either killed or placed by themselves. It does not pay to doctor them unless treatment can be administered to a large number at one time. Begin with clean chickens and keep everything sanitary and the sick chick will be the exception rather than the rule.

After the hovers and small coops have been outgrown, allow the growing chicks all the exercise possible. Maximum development is impossible without it. Provide plenty of outdoor shade, as chickens do not like to take refuge in the house during the day.

A common sheet of white paper ruled off and filled in so as to make a Brooding Record Sheet will be of great value when the time comes to figure up the losses and gains.

POULTRY FEEDS AND FEEDING

Like most birds, poultry is omniverous; that is, they eat both animal and vegetable food, although they may live a long time on seeds and grains alone. But in their wild state we know that the diet of turkeys, ducks and birds, both old and young, contains a large amount of animal food in the form of insects, worms and other forms of animal life. When compared with other farm animals we find that beside the anatomical difference there is a decided difference in disposition. Birds are active, have a higher temperature, and their digestion is more rapid. About six months represents the age of maturing. Bearing in mind these facts we see that in handling poultry we are dealing with a high-g geared, high-pressure machine which may easily be thrown out of adjustment. And, as the inexperienced fireman has great difficulty in keeping up the steam, so the amateur feeder finds it hard to keep up a profitable production in the hennery.

Feeds for Oklahoma

The principal grain crops of this State which are well adapted for poultry feeding are: Wheat, kafir corn, milo, oats, feterita and sorghum. Wheat is preferred by most kinds of poultry to all grains except corn. It contains a high percentage of protein, which is necessary for the production of muscle, blood and white of egg. Hard, plump winter wheat tests from 11% to 14% protein. Whole wheat may be fed exclusively to poultry longer than any other grain without detriment. The grains are small, palatable, easily digested and give a good, rich color to the egg yolk.

Corn does not differ in composition from wheat greatly, except that it contains a higher percent of carbohydrates or fattening and heating qualities. The kernels are from four to six times the size of wheat, which makes it necessary to crack them to get the quickest results. The fowls will eat it in preference to any other grain, and corn is the most general and abundant crop grown. Corn is probably fed more than any other grain in Oklahoma and it is an excellent winter feed, but should not be given alone during the summer, and it is better if not used at all because of its heating properties. Oats are rarely fed alone unless hulled because of the large amount of crude fiber, which is detrimental to poultry. It gives good results when mixed with wheat and corn.

Kafir, milo, feterita and sorghum have about the same food value as corn, and rank in the order named for preference. Experiments have proved that there was not a great difference in the value of the various grains so long as supplied in the right proportions.

Ground Food

Since poultry does not possess teeth and their only means of grinding food takes place in the gizzard, where it must be broken up by rubbing against sharp stones, we find it necessary to assist nature in order to get

the quickest results. In the first place, it is impossible to feed a balanced ration to any degree of certainty when supplied in the form of whole grains. One bird may grab all wheat, another corn, and the other kafir. The grains may be mixed correctly, but they will not be eaten in the same order. The grains cannot be digested fast enough to supply the needs of a hen for the highest production. It requires several hours to grind the food alone, by nature's methods, and it must be broken up and digested before assimilation can take place. For the hen that is manufacturing an egg every day, or one in two days, it is impossible to get the required nourishment fast enough unless it is taken into the body already ground. The best system of feeding, then, as recognized the country over, is to give one or more of the varieties of whole grains as a means of exercise; that is, fed in a deep litter so the fowls will have to work for it. Then use a variety of ground foods to supply the nourishment, heat and energy of the birds.

Essential Elements in Feeding

The four "g's" give us a cue as to what is necessary in the chicken diet—grain, green food, grubs, grit and shell. Whole grain gives the best results when two or more forms are mixed and fed twice daily in a deep litter. Three parts wheat, three parts cracked corn and one part oats, or equal parts wheat and cracked corn or kafir, makes a good combination. One pint to ten fowls is about the right amount, with the heaviest feed at night.

Ground food may be fed in either a dry or wet form, but for breeders and layers, dry mash is best, while for fattening poultry it is better to use wet mash. The dry form may be supplied in self-feeding hoppers. A good mixture would be:

7 pounds mill run
7 pounds corn meal
3 pounds beef scrap
2 pounds alfalfa leaves
½ pound charcoal

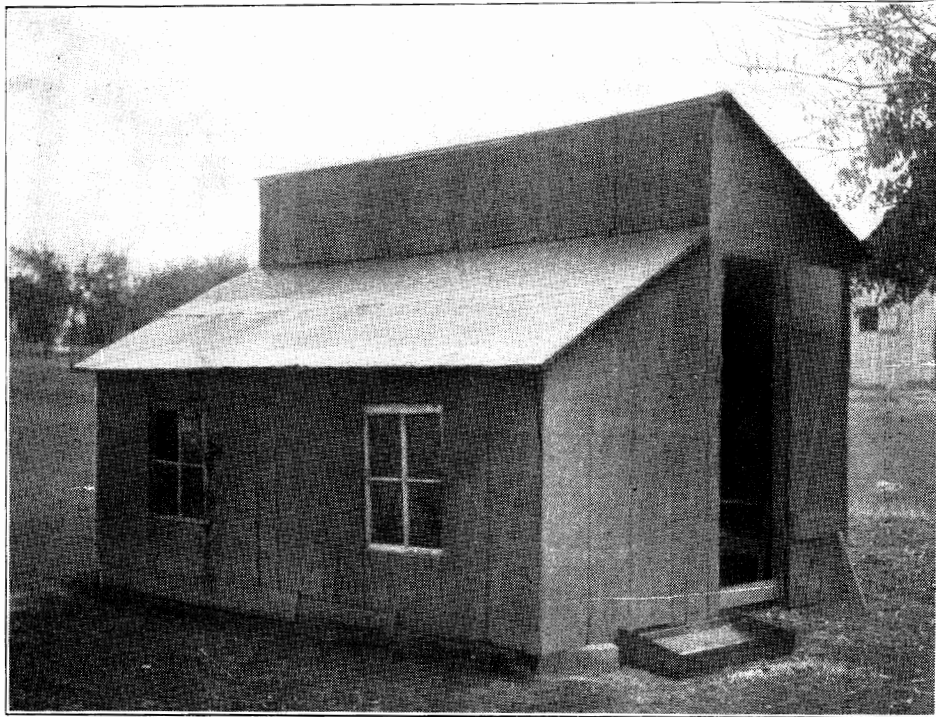
Fresh rabbit, skimmed milk or buttermilk may be used to advantage in place of beef scrap. Green food is given to stimulate the digestive organs. Winter wheat, sprouted oats, mangels, beets, cabbage or steamed alfalfa leaves are excellent. Grit serves the purpose of teeth by grinding the food. It should be hard, such as sand, small gravel or finely cracked rock. Oyster shell supplies the lime which figures largely in constructing the egg shell, but it is not hard enough to grind the food and should never be substituted for grit. Charcoal is also used. It does not furnish any nourishment, but it aids digestion and acts as a bowel corrective.

Profitable feeding is something every farmer and poultryman must learn. Without it the most vigorous chicks that were ever hatched could not develop into standard, mature birds. The most difficult period in feeding starts with the baby chicks. If stunted when small, it is "runty" forever; if fed and cared for properly when young it can rustle for itself to a limited extent later.

The baby chick should never be fed until forty-eight hours old, and then a mash of coarse bran and charcoal mixed with hard-boiled eggs is all it will need for two or three days. After the first few days it may be fed mixed grain five times daily, and the mash of bran and eggs three times daily. A good chick ration may be had by mixing 10 pounds cracked wheat, 10 pounds cracked corn (sifted) and 10 pounds "steel cut" oats. The dry mash is made up of 10 pounds bran, 10 pounds shorts, 5 pounds corn meal, 5 pounds meat scraps and $2\frac{1}{2}$ pounds of charcoal. Feed sour milk if available, giving chicks all they will consume.

After the chicks have developed sufficiently to weigh a pound or more they should be kept on a growing ration with plenty of exercise. Those intended for fattening should be separated from the ones selected for breeding at an early age. Two weeks before marketing they should be confined in small quarters and fattened. One of the best fattening rations for any kind of poultry in this State is 3 pounds corn meal, $1\frac{1}{2}$ pounds shorts, 1 pound cottonseed meal. To every pound of this add $2\frac{1}{2}$ pounds of buttermilk, skimmed milk or sour milk. If it is not possible to get milk in any form, substitute 1 pound of beef scraps for the cottonseed meal and mix with water to the consistency of thick cream. Feed twice daily all the fowls will clean up in fifteen minutes.

Lastly, remember that the common grains are too fattening if fed alone and will not give the highest egg production. The mill feeds, such as bran, shorts and middlings, are richer in protein and help to balance the fattening qualities of the grain. They also add variety to the ration. The animal by-products are absolutely necessary to furnish the bulk of the protein, for they are the easiest sources through which this element can be obtained in large amounts. The greatest trouble with the average farm ration lies in the fact that it consists of too much grain.



HE MEANT WELL—BUT!

The owner of the house shown here intended to build a first class poultry house. He copied after the Semi-Monitor house as shown in this bulletin, but failed to grasp the essential points necessary to make a satisfactory house. This house could be improved by putting some windows in the peak so as to get the sunlight into the rear part of the house, by removing the windows in the south or low side so as to secure proper ventilation, and by closing up the cracks in the walls, thus avoiding drafts. As it now stands, this house is dark, drafty, and has insufficient ventilation, and the birds frequently suffer from colds and other diseases