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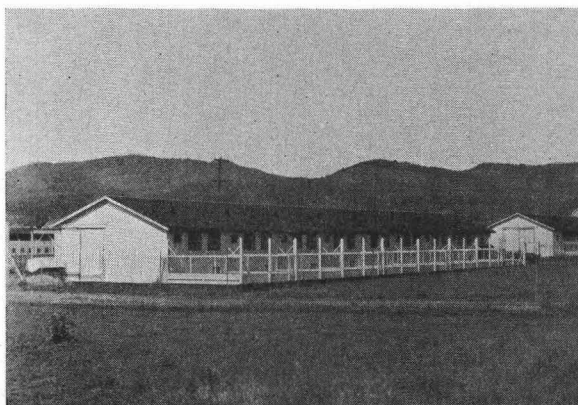
# Oregon State Agricultural College Extension Service

Corvallis, Oregon

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## Chick Brooding

(Revision of Bulletin 435)



O. S. C. Brooder House

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Cooperative Extension Work in Agriculture and Home Economics

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# Chick Brooding

By

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**B**ROODING involves many details that may determine the success of growing chicks. These details with varying degrees of success in rearing are often reflected in the pullets in the egg production.

Good brooding is helpful but not a substitute for the proper inheritance and quality of chicks.

That brooding seems likely to continue to be one of the poultryman's problems is quite evident and a greater uniformity of brooding practice seems desirable.

Types of brooders and brooding systems should be studied carefully to see which is best adapted to local conditions.

## BROODER MANAGEMENT

**Start the brooder a week ahead of time.** A trial run a week ahead of time may call attention to needed repairs. Brooders should be in operation a day or two before the chicks are ready to be put under them. This gives an opportunity for the necessary regulation and adjustment and for drying out of the sand or litter.

**Equipment should be ready.** Drinking vessels, feed troughs, fences, material for darkening the room, and record blanks should be provided before the chicks arrive. Previously used equipment should be thoroughly disinfected. A good solution of cresol or any coal-tar product such as sheep dip is satisfactory for this purpose.

**Feed and fuel on hand.** A satisfactory supply of both feed and fuel should be on hand as a lack of either must be avoided if the chicks are to receive the best of care and a good start in life.

**Culling of the chicks.** A careful culling of the chicks when they are placed under the brooder saves time, labor, feed, and money. Weak or crippled chicks readily contract disease and seldom survive the brooding period. It is good management to kill such chicks and devote the time and attention to the strong and vigorous chicks. The best quality chicks usually come from those brooded in small units. For example, it is better to brood in units of 350 to 500 chicks rather than in units of 1,000 or more. Do not overcrowd. A pen 12 feet by 14 feet is satisfactory in size for a unit of 500 chicks provided the cockerels are removed as soon as the sex can be determined.

**Starting chicks near hover.** For the first few days it is well to confine the chicks within two feet of the hover. This may be done by using a 12-inch strip of hardware cloth to form a circle about the hover. The strip

should be covered with muslin or gunny sacks to avoid floor drafts. Twelve-inch boards, 4 feet long, hinged together in pairs may be used in place of the wire. Care must be taken not to confine the chicks too close to a stove or other brooder that furnishes a large amount of heat, for if chicks cannot get away from the heat they may suffocate. Improperly trained chicks are apt to pile in the corners of the brooder house if too cold or too hot.

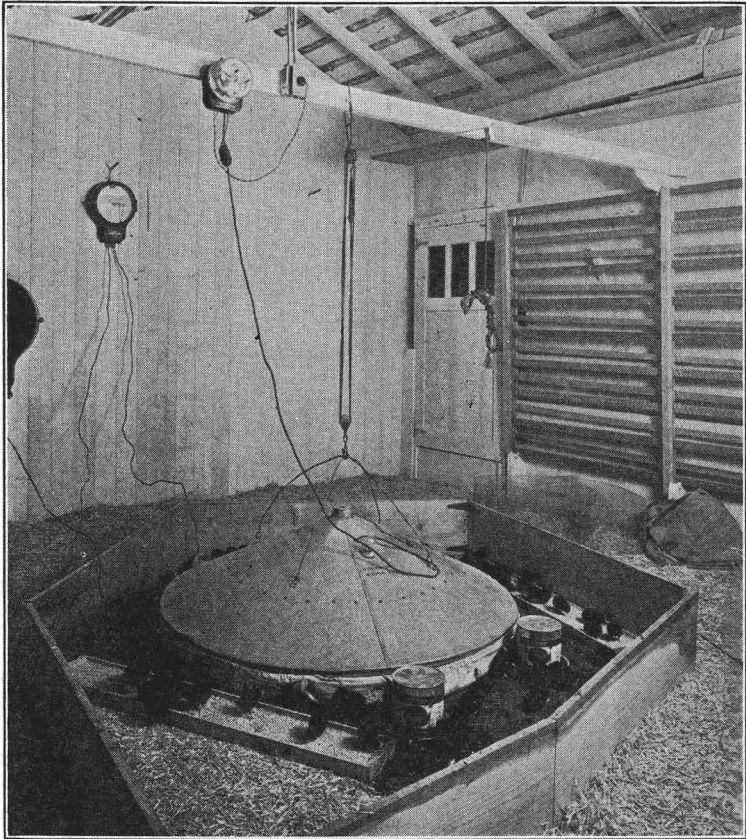


Figure 2. Chicks confined near brooder.

**Temperature.** If the brooder does not maintain sufficient heat the chicks will chill. This generally results in digestive disorders and failure to grow normally. On the other hand, too much heat with no opportunity to get away from it is devitalizing, saps the strength, and lowers the resistance and vigor of the chicks. A temperature at the level of the chick's back of 95° to 98° F. is satisfactory at first. In the case of a coal stove this temperature should be maintained at the outer edge of the hover. If the outside temperature permits, the brooder temperature may be gradually reduced until heat is no longer needed.

**Ventilation.** Fresh air is necessary and lack of it results in unthrifty chicks. The air of the brooder house should smell fresh at all times. Floor drafts, however, are to be avoided. Windows or ventilators should not be near the floor as they allow cold air to pass over the chicks.

**Litter.** If sand is to be used on the floor it should be in place early that it may be dried out before the chicks are placed upon it. Generally sand is placed only near the stove in the case of coal-stove brooding. Chopped straw or cut alfalfa may be used for litter on the rest of the brooder floor.

Peat moss litter, while safe from the fire-hazard standpoint and capable of taking up a lot of moisture, makes a dusty, dirty house. Because of the high first cost it is generally left in the brooder house for a rather long period and the accumulation of dust and droppings produces an unsanitary condition. Peat moss has a high fertilizing value when mixed with the droppings.

Alfalfa as litter has the disadvantage that it tends to ball up on the toes of the chicks.

Cut straw has the most general use and has been found satisfactory at the Oregon Agricultural Experiment Station. It is well in the case of any kind of litter to cover it with clean burlap the first day or two to prevent the chicks from filling up on indigestible material.

**Darkening the room.** Darkening the room, except at feeding time, may be necessary the first few days until the chicks learn to eat normally. Sunlight or sun stripes shining through a window on to the floor prove a greater attraction than the brooder stove and may result in a piling up and loss of chicks. Cannibalism and toe picking are sometimes prevented by darkening the room the first week.

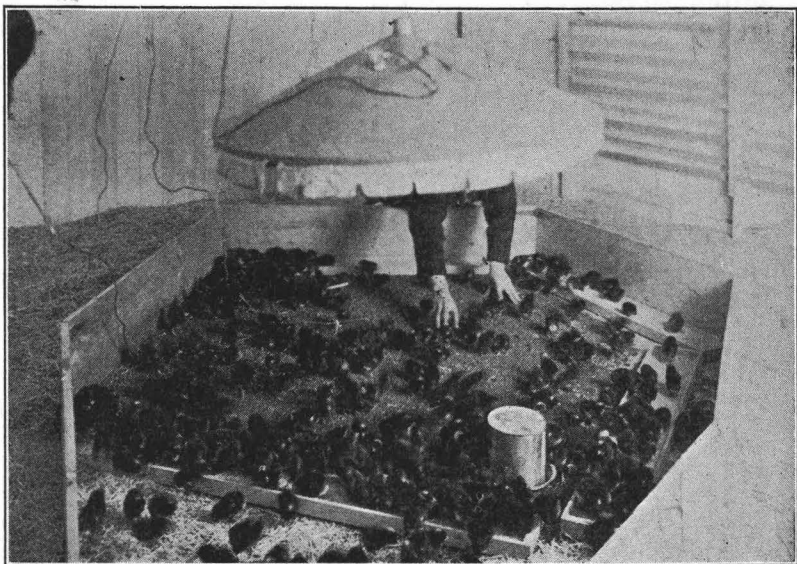


Figure 3. Raising the hover. Last call to breakfast.

**Attention needed at first.** Detailed attention given the chicks at the beginning will mean a better start and less trouble later. The action of the chicks is the best indication of the proper conditions. Size and weight may be indicative, but health and vigor are essential attributes of a good chick. Indications are that growth is closely related to feed consumption, and normal feed consumption only prevails where the chicks are satisfied and contented.

A beginner should use a thermometer to tell whether the temperature is right. The experienced poultryman can tell by observation whether the chicks are comfortable. It is well to watch the chicks carefully just at dark to see that they spread out and that all do not attempt to roost in the same spot. One should also visit the brooder again after the chicks have settled down for the night.

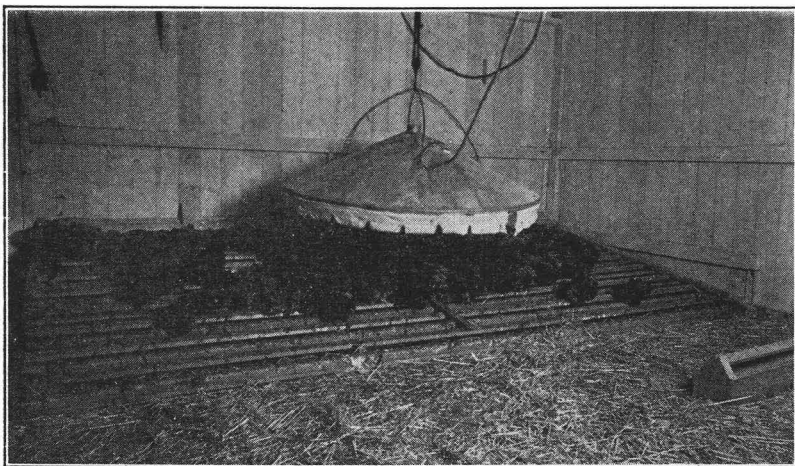


Figure 4. Teaching the chicks to roost.

If the chicks are taught to roost at from four to five weeks of age, better development is obtained. They are less apt to crowd and they have better ventilation. Perches are placed upon the floor for a day or two and then gradually raised. Fence from outside entrance making a narrow lane to the perches may be necessary to force them on to the roosts at first. One-inch mesh wire netting beneath the perches protects the chicks from falling through and piling up underneath.

From the time the chicks are put into the brooder the successful operator must do everything he can to stimulate constant, steady growth and unbroken development. The final test of successful brooding is the quality of the chicks which survive and not the mere number.

### FEEDING BABY CHICKS

Successful feeding is a very important step in the progress of successful brooding. There are a number of successful feeding plans in use today, but they all combine the same fundamental principles of nutrition. Close



confinement and successful brooding were not possible with the old chick rations, largely because of certain deficiencies in the ration. The chick grows rapidly and doubles in weight very quickly as compared to other animals. An analysis of the food of rapidly growing animals shows a high protein and mineral composition. This extremely rapid rate of growth requires a ration liberal in quantity, easily digestible, and rich in materials necessary for building up the body.

To insure normal growth the ration should include proteins, carbohydrates, fats, minerals, and vitamins. The most desirable sources of protein are milk, meat, and fish-meal. Some vegetable proteins with minerals added have given very good results, but generally are not used in very large quantities until later in the rearing stage. Milk contains readily assimilated nutrients and rather complete protein; therefore it plays a very important part in the average chick ration. If liquid milk is not available, dried skim milk or buttermilk should be added to the mash. Commercial feeds frequently contain dried milk, and if this is the case, liquid milk need not be added to the ration. Many have discontinued the practice of feeding liquid milk because of the labor involved and are substituting dried milk in the mash. Good chicks may be raised with either form.

While proteins are very necessary, it is possible to overfeed them. The tendency is to supply a larger amount of protein in the early brooding stage than in the past, but an excess is possible, with the result that the pullets do not stand up under heavy egg production later.

**Carbohydrates and fats.** Carbohydrates and fats are supplied in most of the grains. The grains are probably the most economical source of these nutrients. This type of feed is needed for energy and is generally well taken care of in most chick rations. The tendency is to make the scratch grain rather simple, of only two or three common grains—corn, wheat or oats—using the same grains for the mash with very little of the grain by-products, thus producing a feed of high nutritive value and relatively low in fiber.

**Minerals.** Proper frame development is aided by the mineral part of the ration. Bone formation will not be possible unless suitable minerals are available. Calcium and phosphorus particularly are needed, as found in meat scraps, bone-meal, and milk. Oyster shell and limestone carry an abundance of calcium. Generally a mineral mixture is included in the mash, or frequently a hopper of oyster shell and sometimes limestone grit is given in addition to the mash and grain. Often a little bone and grit are sprinkled over the feed trays the first few days. In the mash feeding, or the all-mash feeding plan, the mineral mixture is generally included as a part of the mash. A small amount of salt, not to exceed 1 per cent of the mash, is frequently used in a mineral mixture. In the absence of Vitamin D a supply of minerals may actually be harmful to growth.

Not only is it desirable to have the proper balance between calcium and phosphorus but it is also important that the correct amount of these minerals be fed.

A suitable mineral mixture for growth which is recommended, provided there is no other mineral provision and Vitamin D is provided, is steamed bone-meal 30 pounds, oyster-shell flour 30 pounds, and salt 10 pounds, to be added to each ton of mash.

**Vitamins.** Vitamins may be a limiting factor of an otherwise satisfactory ration. Nutritional trouble may develop through the lack of vitamins. For example, Vitamin A, if absent, causes eye trouble, or nutritional roup. The absence of Vitamin B causes nervous disorders and paralysis of the legs, wings, and in the later stages even of the digestive tract. The individual loses the ability to swallow and digest its food. Recent investigations seem to indicate that Vitamin B is possibly a combination of several vitamins. Vitamin C, the lack of which causes the disease of humans called scurvy, does not seem to be a limiting factor in the ration of chickens. Vitamin D is often lacking in ordinary farm poultry rations and its absence causes a ricket-like disease commonly known as leg weakness. Vitamin D is necessary for the proper utilization of the calcium and phosphorus contained in the ration. Vitamin E occurs widely in natural products. It has been shown to be necessary for normal reproduction in rats but its function for other species has not been clearly demonstrated.

**Sources of vitamins.** Yellow corn, alfalfa leaf meal, and succulent green feed are good sources of many of the vitamins. Alfalfa and corn are high in Vitamin A. The outer coating of practically all grains furnishes a good supply of Vitamin B.

Direct sunshine lowers the amount of Vitamin D that must be added to the ration although sunshine that is filtered through ordinary window glass loses its vitamin potency. Cod-liver oil and other fish oil, if of a good grade, preferably biologically tested, will take the place of sunshine in supplying this vitamin. One per cent of the ration should give adequate protection. It is best to discontinue this two weeks before marketing broilers.

During the past decade it has been common practice to add Vitamin D to poultry rations in the form of cod-liver oil. During recent years other fish oils, such as sardine oil and fish-oil concentrates have also come into wide use.

The amount of cod-liver oil or other fish oils to be added to poultry rations is subject to considerable difference of opinion or even controversy. It is generally recognized that under the most favorable conditions of calcium and phosphorus nutrition as little as  $\frac{1}{2}$  per cent or  $\frac{1}{4}$  per cent of a very good cod-liver oil or its equivalent may be adequate when added to a good ration. It is more common, however, to recommend the use of from  $\frac{1}{2}$  to 1 per cent of a standard oil in order to allow a liberal margin of safety. Cod-liver oil and sardine oil may be used in the same manner. Vitamin D concentrates may be used in quantities depending on their Vitamin D potency. In any case only products biologically tested, guaranteed by reputable manufacturers should be used.

**Green feed.** A supply of succulent greens is desirable but may be supplied by alfalfa leaf meal; about 3 to 5 per cent of the mash is advised. Early wheat or oats run through a green-feed cutter or finely chopped kale makes excellent green feed for chicks. Lawn clippings and chopped green alfalfa are excellent.

**Two methods of feeding are practiced today:**

1. Mash the first week, starting with grain the second, and both thereafter.
2. All mash for the entire brooding period or all mash compressed into pellet form with a little scratch grain.



Regardless of the plan used the ration should provide the essential elements outlined and these in the right amounts and of the best quality. We cannot afford to skimp on the cost of chick rations. Of course that does not necessarily mean that the most expensive is the best. The choice of methods is largely one of personal preference, each having its advantages and disadvantages.

There is a tendency to feed all grain rations—that is, very little, if any, of the grain by-products. Coarsely ground mashers are more desirable than the finely ground powdery mashers.

A good commercial mash or the following home-made mixtures are recommended.

**O. S. C. chick feeds.** Where a sufficient liquid milk supply is available so that it may be kept before the chicks all the time, ration No. 2 is recommended. In this case milk should replace water the first three weeks and both allowed after this to maturity.

No. 1		No. 2	
<i>Milk Mash</i>		<i>To be Fed with Liquid Milk</i>	
800 pounds ground yellow corn		800 pounds ground yellow corn	
200 pounds ground wheat		200 pounds ground wheat	
200 pounds finely ground oats		200 pounds finely ground oats	
240 pounds mill-run		240 pounds mill-run	
100 pounds meat meal		50 pounds meat meal	
100 pounds fish-meal		80 pounds alfalfa leaf meal	
150 pounds dried milk		30 pounds steamed bone meal	
80 pounds alfalfa leaf meal		30 pounds oyster-shell flour	
30 pounds steamed bone meal		10 pounds salt	
30 pounds oyster-shell flour		*40 pounds cod-liver oil	
10 pounds salt			
*40 pounds cod-liver oil			
<i>Chick Scratch</i>		<i>Chick Scratch</i>	
1,000 pounds wheat (whole or cracked)		1,000 pounds wheat (whole or cracked)	
1,000 pounds cracked corn		1,000 pounds cracked corn	
Developing Feeds			
<i>Milk Mash.</i>		<i>To be Fed with Liquid Milk</i>	
700 pounds ground yellow corn		700 pounds ground yellow corn	
200 pounds ground wheat		200 pounds ground wheat	
300 pounds finely ground oats		300 pounds finely ground oats	
240 pounds mill-run		100 pounds ground barley	
100 pounds ground barley		240 pounds mill-run	
100 pounds meat meal		100 pounds alfalfa leaf meal	
100 pounds fish-meal		25 pounds steamed bone meal	
100 pounds dried milk		25 pounds oyster-shell flour	
100 pounds alfalfa leaf meal		10 pounds salt	
25 pounds steamed bone meal			
25 pounds oyster-shell flour			
10 pounds salt			
<i>Developer Scratch</i>		<i>Developer Scratch</i>	
1,200 pounds wheat		1,200 pounds wheat	
400 pounds cracked corn		400 pounds cracked corn	
400 pounds heavy gray oats		400 pounds heavy gray oats	

At least one drinking vessel of two quarts to a gallon in size should be provided for each 100 chicks. A square frame of 1-by-4-inch material covered with hardware cloth makes a desirable stand on which to place drinking vessels after the third day.

A shallow tray about 1½ inches in depth and 4 inches to 6 inches wide and 4 feet long is sufficient for each 100 chicks for mash feeding the first two weeks. Later a trough hopper about 4 inches deep and of the same length as the tray should be provided for each 100 chicks.

Experimental evidence indicates chicks may safely be fed within 24 hours after hatching. Likewise, they may be fed as well at 48 to 72 hours of age.

Wash out the drinking vessels daily and keep the feed troughs clean. This, with frequent changing of the litter, will help considerably in the prevention of chick diseases. It is desirable and entirely possible to keep the mortality below 10 per cent for the brooding period.

Your observations will soon tell you whether the chicks are growing normally. Weighing the chicks at frequent intervals and comparing with the table below will tell the story of their development as compared with the normal rate of growth.

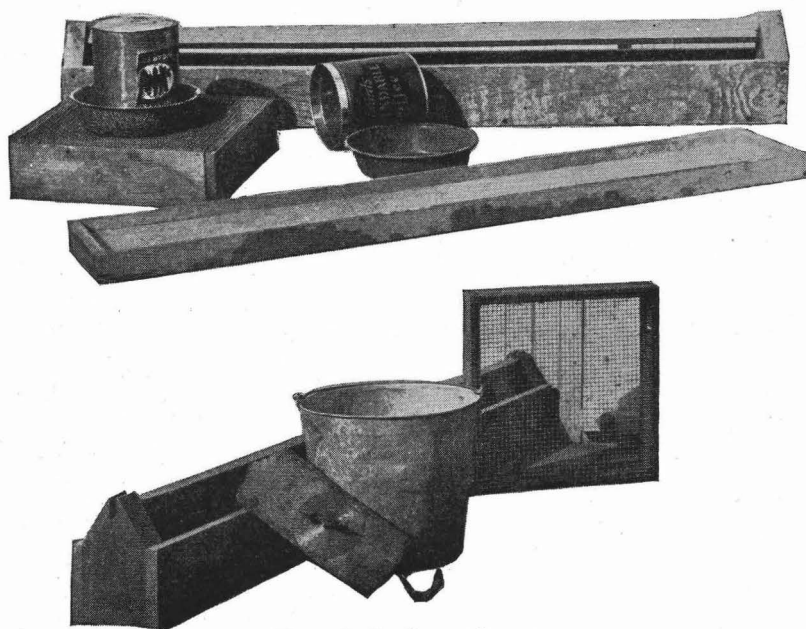


Figure 5. Feeding equipment.

AVERAGE WEIGHT IN OUNCES OF CHICKS AT OREGON AGRICULTURAL  
EXPERIMENT STATION

Week	Barred Rock	Leghorns
	<i>Ounces</i>	<i>Ounces</i>
0	1.20	1.21
1	2.01	1.91
2	3.36	2.98
3	4.88	4.39
4	6.80	6.60
5	8.90	7.89
8	18.40	17.60

## OREGON STATE AGRICULTURAL COLLEGE

## Chick Feeding Schedule

Age of chick	Morning	Noon	Night
First week..	Clean water warmed to 100 degrees kept before the chicks at all times. Mash kept before chicks at all times—in trays. One tray 6 inches wide by 4 feet long for each 100 chicks. Raise the hover and see that all chicks eat.		
		Third day start feeding chopped greens.	See that all chicks eat.
Second week .....	Clean water at all times.—Need not be warmed.—Keep mash trays filled at all times. Continue raising the hover each morning.		
		Get chicks out of doors. Feed green feed daily. Sprinkle a small handful of chick scratch per 100 chicks over mash.	Sprinkle a small handful of chick scratch per 100 chicks over mash.
	By end of this week have a trough of chick scratch before the chicks at night.		
Third week	Clean water at all times..... Keep mash trays filled at all times..... Get chicks out of doors. Feed green feed daily..... Feed at least three times as much mash as scratch..... Place scratch in hoppers each night.....		
Fourth week to eighth week .....	Clean water at all times. A trough with a drip system of watering can be used at this time to good advantage. Mash available at all times..... Increase mash hopper space..... Mash hopper 4" x 4" x 6' with reel on top can be used to advantage at this age. Place scratch in hoppers each night..... They should eat at least twice as much mash as scratch..... Feed all the greens chicks will consume..... Remove cockerels..... Have all chicks roosting by the end of this period.....		
Eighth to twelfth week .....	Water, mash, scratch at all times..... Developing scratch replaces the smaller size..... They should eat more mash than grain, if necessary limit the grain.		
Twelfth week to maturity..	Developing mash and developing scratch in hoppers so regulated gradually that the consumption is about two parts scratch to one part mash. Green feed at all times..... Oyster shell and grit in hoppers..... Cool water..... Avoid crowding on roosts..... Keep the house and the ground in front of the house clean.		

## A Grow-Healthy-Chicks Plan:

1. Well bred, quality chicks carefully culled.
2. No overcrowding—a pen 10 feet by 12 feet for 300 chicks or a pen 12 feet by 14 feet for 500 chicks. Remove cockerels as soon as distinguishable.
3. Clean drinking and feeding utensils.
4. Preferably chicks from flocks tested for B.W.D.
5. Sanitary brooder room. Clean out often, at least once each week.
6. Brood on clean ground, wire-floored perches, board or concrete runs.
7. Segregate into small flocks on range.
8. Use a good growing ration.