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Circular No. 50 - Brooding and Feeding Chicks

Byron Alder

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BROODING AND FEEDING CHICKS

BYRON ALDER

UTAH AGRICULTURAL EXPERIMENT STATION

Logan, Utah
UTAH AGRICULTURAL EXPERIMENT STATION

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BROODING AND FEEDING CHICKS

By

BYRON ALDER

Raising baby chicks seems a comparatively simple matter to some, yet there are more failures in poultry-keeping due to inability to raise good, vigorous pullets than to any other one cause. The number of eggs produced, the size of the eggs (within certain limits), and the profit made from a flock of hens is often determined very largely by the success in brooding the chicks and developing the pullets into strong, vigorous hens. Many who try to raise chicks are not successful because they fail to realize that a baby chick is a "real baby". They cannot survive with careless treatment and neglect but must be kept warm and dry in clean, sanitary, well-ventilated brooders. They are weak, delicate orphans, but are easy to raise if a little motherly common sense is used.

The total loss of chicks each year is appalling, varying from 5 per cent in some flocks to as high as 100 per cent in others. This is a serious blight on the poultry business in view of the fact that the various causes of this loss are largely preventable. Some of the more important causes are:

1. Chicks lacking in vigor due to poor breeding stock of low vitality, to the use of immature pullets as breeders and small eggs for hatching, and to faulty incubation.

2. Poor methods of brooding caused by over-crowding, chilling, over-heating, unsanitary conditions, and poor ventilation.

3. Improper feeding which is usually the cause of greatest loss. This is often the most difficult problem for the poultry raiser to handle.

BETTER CHICKS

The present practice of buying day-old chicks from the hatchery has completely replaced, in many sections, the old-time mongrel hen so common on the farm in the past with uniform flocks of fairly well-bred fowls. It has also helped the poultry raisers to realize the value of getting chicks of good quality. Many are trying to buy chicks only from those hatcheries which are paying particular attention to the selection of the breeding flocks and the improvement in quality of the chicks hatched. The poultry raisers of Utah have a great opportunity for developing the breeding and hatching business, especially along the
lines of a community hatchery. The local hatchery properly managed will aid in the development of fowls of higher production, furnish a better market for eggs during the season of low prices, and supply better quality chicks to the poultry raisers.

**TIME TO HATCH CHICKS**

There is no "best time" to hatch chicks for all poultry raisers. The time of hatching and rate of development determine the time of year that the pullets start laying. With good care Leghorn pullets can be well developed and brought into laying condition in five and a half to six months from hatching. Some poultry raisers take a little longer than this, while others may have their pullets laying in less than five and a half months. In some cases it is desired that the pullets begin laying in August or September and in others not until October. In case of too early fall-laying (August or early September) the pullets often produce well for a few weeks and then go into a complete molt which may take five to ten weeks when the price of eggs is highest. With extra care this may sometimes be prevented, but not often. When the pullets begin laying in late September or later, with good care and comfortable housing they can usually be kept in steady laying condition all winter. These too may go into a winter molt if production is checked by poor care, poor housing in severe weather, change of feed, or any other cause.

**BROODING EQUIPMENT**

To be successful a brooder must be clean, dry, well-ventilated, roomy, and maintained at uniform temperature. There are several types of brooder houses and brooder stoves that are being used successfully at present. The most expensive equipment is not always the best, and cheap, makeshift equipment often proves very expensive due to heavy losses. Well-planned brooder houses and good, dependable equipment are the first requisites for success.

**THE BROODER HOUSE**

For best results the brooder house should have two rooms—one which is heated and kept at a uniform temperature; the other unheated, light, dry, and well-ventilated with an open south front to admit sunlight. A thin muslin curtain should be used over the open front on cold, stormy days. There should be a large runway (preferably about six inches high and two or three feet long) thru the partition from the cool to the heated room.
The chicks should be kept in the heated room near the stove the first two or three days. After the third day they should be let into the cool room and the feed and drinking vessels placed here for them. After the fourth or fifth day all feeding should be done in this cool room, and a clean dry straw litter put on the floor to keep the chicks busy. This litter should be changed as often as necessary to keep it clean and dry. The opening between the cool and heated room should always be left open (except at night) to allow the chicks free passage in and out. As the nights get warmer (when the chicks are protected by a good coat of feathers) it may be left open day and night. This will aid in the ventilation of the brooder room. The ventilation in this room should be carefully watched at all times. It must be kept in mind that the requirements of the chicks for fresh air are constantly increasing due to rapid growth. The windows or ventilators should not be left open so that a draft will strike the young chicks.

When the chicks are ten to fourteen days old they should be let out of the brooder whenever the weather is favorable. The outside run should be limited for a few days. After the chicks become accustomed to their surroundings they may be given as much range as is available. An orchard with plenty of shade and growing green feed makes an ideal range for growing pullets. The chicks should be allowed to run in and out of the brooder at will. In case of sudden showers the chicks may pile up in partially sheltered corners. There might be considerable loss in this way, especially if the chicks were locked out of the brooder house.

**SEPARATE COCKERELS AND PULLETS**

When the chicks are six weeks old the cockerels should be separated from the pullets and put in a pen by themselves and crowded for market by extra feeding. If the weather is warm and pleasant they should not need a heated place. The cockerels develop more rapidly than the pullets, and both will grow better when kept in separate pens. The pullets (unless late-hatched) should not be crowded for rapid growth but should be kept growing steadily.

**THE BROODER STOVE**

There are several well-made brooder stoves on the market. A good colony brooder stove will keep a uniform temperature by means of a reliable automatic control. It should hold a uniform heat without any particular attention for from six to ten hours. Where these requirements are provided it makes little difference
whether they burn oil, gas, or coal except for cost of fuel. Electric heaters might be cheapest and best in many cases if the supply of electricity could always be assured. In case of severe storms when the heat is needed most, the power may be off for several hours with disastrous results.

In the operation of the heater the instructions of the manufacturers should be carefully followed. When a heater is used that is new to the poultry raiser it should be run for three or four days before the chicks arrive so that every detail of its operation may be studied and tested. Where anthracite coal is recommended, this kind of coal is the safest to use.

**PROPER TEMPERATURE**

When the chicks are placed in the brooder the temperature should be from 95° to 100° F. and should be held near this point during the first week. The thermometer should be placed at or near the place where the chicks are expected to hover. In the case of the large coal or oil burning colony brooder stoves this would be near the floor and about one foot out from the edge of the large galvanized iron heat deflector. By the end of the fourth week the temperature should be gradually reduced to about 80° to 85° F. The temperature should be maintained as uniformly as possible. Sudden changes either up or down are injurious to the chicks. If they become chilled they are greatly weakened. This is usually followed by diarrhea and consequent loss. Over-heating is often equally disastrous.

Artificial heat should be continued in the brooder for five to ten weeks, depending on the time of the year and weather conditions. Early-hatched chicks require a longer heated period than late-hatched. The temperature should be gradually reduced so as not to make too sudden a change. After the heat is stopped it is advisable to leave the stove in place for a short time. During the next week or two, if a cold stormy period develops, a little heat at night may prevent some loss.

**PLAN OF BROODER**

The plan shown in Fig. 1 gives the arrangement of the stove, perches, feed hoppers, etc. in the heated and cool room of a well-arranged brooder. The runway for the chicks from one room to the other is under the door at “A” and is the full width of the door and about six inches high. This door should be kept closed to hold the heat in the brooding room. The opening at “C” in front of the cool room should be closed in cold, stormy weather by the use of a thin muslin curtain. In pleasant weather it should be left open to admit as much sunlight and fresh air as
possible. The windows at “D” should be made to open and close, for ventilation in the brooder room. A wood or cement floor is desirable. Either would be much easier to keep clean and sanitary than a dirt floor.

After the first few days there is usually considerable trouble in preventing the chicks from piling up in some corner. They usually try to get in a mass as they settle down for the night which may result in serious loss. The arrangement of the perches on three sides, as shown, will aid materially in handling this problem and will keep the chicks out of the corners. The perches are made in removable sections so they can be taken out at cleaning time. The perches are of 1”x2” material supported on a frame of 2”x2”. One-inch mesh poultry wire is tacked on to the frame under the perches to keep the chicks from getting underneath. The perches extend out on the floor about two feet from the wall and up the wall about a foot and a half. There should be room enough between the lower edge of the perches and the edge of the deflector on the stove to permit a person to walk around freely. This will allow room for the chicks to settle in a circle on the floor around the stove. They will not bunch around the stove if the temperature is correct, and if they try to bunch out away from the stove they are forced up on to the perches as shown in Fig. 2. With this arrangement there is little if any trouble in teaching the pullets to perch, as they naturally take to the perches.

A section of a semi-monitor house may be made into an excellent brooder house. This section should be from twelve to twenty feet, from the east to the west and from twenty to twenty-six feet from front to back. A temporary partition
should be made from the windows in the top to the floor, with a door as shown in Fig. 1 at "A". The stove should be placed in the back or high part of the house. The windows in the top give a good distribution of light, and if one or two of them are made to open with transom lifts the ventilation in the brooder room can be controlled for any kind of weather condition. The low section in front would make a good open, sunny feeding room. A shed roof house or other type may also be used to provide suitable conditions.

OVERCROWDING

It is false economy to attempt to save expense in brooder equipment by crowding a large number of chicks into one brooder. Losses are often heavy, and the chicks that are raised are so weakened that they seldom make profitable producers. This practice is usually accompanied by poor ventilation, unsanitary brooder houses, and a contamination of soil—all of which are difficult to control. For best results in raising good, vigorous pullets not more than 600 or 700 chicks should ever be started in one lot, even under the large type of coal or oil burning colony brooder stoves, and in some cases more and better pullets would be raised with but 400 or 500 in one lot. It is excellent practice to use movable brooder houses and raise the chicks each year on a new piece of ground, or at least on ground where there have been no chicks for two or three years. Other conditions being equal, this will reduce the danger of disease and produce better pullets.
DISINFECT OLD BROODER

Before the chicks are put into a brooder house that has been used the house and all equipment should be well cleaned and thoroughly disinfected. Any reliable disinfectant may be used, provided the instructions of the manufacturer are carefully followed. Where small runs are used the ground should be raked and all litter and filth removed. The ground should then be plowed or spaded deep and the soil well turned. One cannot be too careful about the sanitary conditions in and around the brooder.

FEEDING CHICKS

Baby chicks should not be given feed of any kind until forty-eight to sixty hours after hatching. When the chicks are hatched they are provided with feed which lasts over this period, and too early feeding is very injurious. When they are received from distant hatcheries they should be put in the brooder and given a light feeding as soon as received. The first two or three days the feed should be limited as over-feeding is considerably more injurious than under-feeding during this period.

SOUR MILK FIRST FEED

As the chicks are put in the brooder they should be placed near the drinking fountains which should be filled with sour skim milk or buttermilk. The beaks of a few of the chicks should be dipped in the milk to start them drinking. Extensive experiments have shown that milk has a favorable influence in the control of digestive disorders and reducing mortality, in addition to being quickly and easily digested. No water should be given to the chicks the first two or three weeks unless the milk is not available.

The chicks seem to like the thick sour milk best and will consume more of it than if fed in any other condition. Care should be taken to keep the drinking vessels clean and sanitary. Rancid or dirty milk or dirty drinking fountains may be injurious and cause digestive disorders. Where the milk is produced by the poultry raiser he may be governed by his own particular conditions whether the milk is fed sweet from the separator or allowed to sour first. There seems to be little difference in the feed value. However, it is advisable to always feed it in the same condition.

FIRST GRAIN FEED

After the chicks have been given a chance to drink what
milk they desire, a light feeding of the following mixture may be given and fed five times daily for the first three days:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oatmeal</td>
<td>10 lbs</td>
</tr>
<tr>
<td>Bran</td>
<td>10 lbs</td>
</tr>
<tr>
<td>Bone grit (chick size)</td>
<td>10 lbs</td>
</tr>
</tbody>
</table>

Only as much feed as the chicks will clean up readily should be given. Overfeeding should be avoided, altho the feed must be given frequently and regularly. A light covering of well-cured alfalfa hay leaves may be spread over the floor after the first feeding and the floor kept covered with these leaves for the first four or five days. The leaves should then always be kept before the chicks in feed racks or troughs and floor covered with fine, clean, dry straw. When bone grit is not available coarse sand may be used, but the bone is preferable.

Beginning with the fourth day bran should be kept before the chicks constantly in feed troughs. Bran has a mild laxative effect and is bulky, which aids digestion and helps to satisfy the chicks’ craving for feed. It is also fairly rich in ash and protein, the bone- and tissue-building nutrients. Cracked corn and wheat should then be added to the oatmeal and fed in the straw litter four or five times daily. They should be given only what they will clean up readily. The grit should be placed in feed hoppers and kept before the chicks all the time. The proportion of corn and wheat may be gradually increased and the oatmeal decreased until in about two weeks the oatmeal may be omitted entirely. After two weeks cracked corn and wheat should be fed two or three times a day in the litter. The amount should be limited to that which they will work for industriously and clean up in the litter.

**DRY MASH**

Beginning about the eighth or ninth day a dry mash to take the place of bran should be placed in the feed hoppers; it should be constantly before the chicks. The following mixture is recommended:

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bran</td>
<td>300 lbs</td>
</tr>
<tr>
<td>Shorts</td>
<td>100 lbs</td>
</tr>
<tr>
<td>Ground corn</td>
<td>100 lbs</td>
</tr>
<tr>
<td>Meat meal</td>
<td>50 lbs</td>
</tr>
<tr>
<td>Charcoal</td>
<td>18 lbs</td>
</tr>
<tr>
<td>Bone meal</td>
<td>18 lbs</td>
</tr>
<tr>
<td>Fine salt</td>
<td>5 lbs</td>
</tr>
</tbody>
</table>

Where milk is not available in sufficient quantity water should be provided and the amount of meat meal increased in proportion to the amount of milk which is lacking. Where no
Brooding and Feeding Chicks

Milk is given the meat meal should be increased to 125 pounds or 100 pounds of meat meal and 25 pounds of powdered milk.

FATTENING COCKERELS

When the cockerels are separated from the pullets (when about seven weeks old) they may be given a small run or kept in a roomy, dry pen and crowded for market. They should be given a scratch feed of cracked corn and wheat (all they will clean up) in a straw litter twice daily for about two weeks and once a day thereafter. The litter should be kept clean and dry. They should also be given a moist mash in shallow troughs daily for about two weeks, then twice each day until sent to market. One of these feeds of moist mash may replace the morning scratch feed. A daily supply of fresh-cut green feed, milk, water, grit, and dry mash should be kept constantly before them. Over-feeding the moist mash is often disastrous. It should all be cleaned up in about thirty minutes after being fed. Sour milk is preferable to water in making the moist mash.

FEEDING PULLETS

When the pullets are eight weeks old and until mature they can be fed the same mash that is fed to laying hens. The following mashes are used with good results in the Utah Station flocks:

<table>
<thead>
<tr>
<th>Mash with Corn</th>
<th>Mash without Corn</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bran ................</td>
<td>200 lbs.</td>
</tr>
<tr>
<td>Shorts .............</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>Ground corn ........</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>Meat meal ..........</td>
<td>50 lbs.</td>
</tr>
<tr>
<td>Charcoal ..........</td>
<td>15 lbs.</td>
</tr>
<tr>
<td>Bone meal ..........</td>
<td>10 lbs.</td>
</tr>
<tr>
<td>Fine salt ..........</td>
<td>4 lbs.</td>
</tr>
<tr>
<td>Ground wheat or mill-run bran and shorts</td>
<td>300 lbs.</td>
</tr>
<tr>
<td>Ground barley ......</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>Ground oats ........</td>
<td>100 lbs.</td>
</tr>
<tr>
<td>Meat meal ..........</td>
<td>50 lbs.</td>
</tr>
<tr>
<td>Charcoal ..........</td>
<td>15 lbs.</td>
</tr>
<tr>
<td>Bone meal ..........</td>
<td>10 lbs.</td>
</tr>
<tr>
<td>Fine salt ..........</td>
<td>4 lbs.</td>
</tr>
</tbody>
</table>

One of these mashes should always be available in feed hoppers. Grit, water, and milk should also be kept constantly before the pullets. Where milk is unavailable semi-solid buttermilk may be used with good results. Without either of these the meat meal should be increased to 100 pounds or 80 pounds of meat meal and 20 pounds of dried or powdered milk. It is not advisable to crowd pullets with wet mash unless they are slow in coming into laying condition in the fall. At this time a moist mash will often aid in getting the pullets in good laying condition.

The scratch feed should be fed in a straw litter morning and evening. The amount fed in the evening should be all the pullets will clean up, while the morning feed should be limited. This
method of feeding should include a good range with an abundance of growing green feed. Where range is limited it may be necessary to close the dry mash hoppers a part of each day and keep a very heavy supply of dry litter on the floor where the scratch feed is given. Ready-mixed or commercial chick feeds put out by reliable feed companies may be used, but these are usually more expensive than locally produced and home-mixed feeds.

GREEN FEED AND SHADE

Where the pullets are kept in small runs without shade or green feed, growth is slow and the birds are usually stunted. If shade is provided during the hot summer days, a liberal supply of fresh green feed given daily, and the runs kept clean, dry, and sanitary good vigorous pullets can be produced in small runs. Fresh lawn-clippings and freshly chopped alfalfa, lettuce, or cabbage are excellent green feeds if given regularly and in liberal amounts. The pullets should be given daily all they will eat. Healthy, vigorous pullets cannot be grown without green feed. The size of the house and runs may have a direct relation to the rate of growth. Fresh air, mites, or lice may also be limiting factors.

CANNIBALISM

Toe-picking and feather-eating may develop into vicious habits in brooder chicks and result in serious loss. When these vices are first noticed they should be watched carefully. Chicks with bleeding toes or feathers should be removed from the flock. This trouble usually starts early in the brooding period but may not develop until later. It may be caused by poor feeding and a craving for something the birds are not getting in their feed. The most common causes are over-crowding, lack of exercise, and not keeping the chicks busy. The remedy is to remove the cause. As soon as this trouble is noticed the litter on the floor should be increased and the chicks turned out into the runs whenever the weather is at all favorable. Feeding shredded cabbage or onions may also help and will usually keep young chicks busy for hours.

LEG WEAKNESS

This trouble is often caused by the lack of sufficient green feed or a shortage of ash (bone-building material) in the ration. It may be caused by lack of exercise or too heavy feeding of rich protein feeds where chicks are closely confined, or by too much heat in the brooder. This may result in serious loss, and the best remedy is to remove the cause by proper care and feeding.
CLEANLINESS IMPORTANT

Too great emphasis cannot be placed on the importance of cleanliness and sanitation in and around the brooder. Not only the building but all equipment should be thoroly cleaned and disinfected before the chicks are placed in the brooder. The drinking vessels, especially those in which milk is fed, should be cleaned regularly and sterilized by boiling about once a week. Where this is not done and thick, rancid milk is allowed to accumulate in the seams and corners of the feeding vessels there may be losses due to bacterial decomposition of these food residues.

Where drinking vessels are cleaned regularly, as above described, it is very doubtful if there would ever be enough zinc dissolve by the lactic acid of the sour milk from a galvanized iron drinking vessel to cause any trouble. No trouble of this kind has been apparent where galvanized vessels are used in the Station flocks or commercial flocks known to the writer.

Moldy feeds or sour, wet feeds should never be fed to young chicks. Wet feeds may sour and spoil in a short time in the brooder due to the high temperature. For this reason it is better to feed nothing but dry feeds during the first four or five weeks.

A small continuous stream of water coming into the runs or other wet places for the chicks to scratch and feed in is often a source of considerable trouble and makes an ideal place for the spread of coccidiosis, a protozoan infection of the intestinal tract which may cause serious loss in a flock of young chicks, while the danger of infection on dry, well-drained soil is not nearly as great.

MITES AND LICE

Where the brooder is kept clean and the older fowls are kept away from it there is little danger from mites and lice early in the brooding period. These pests are often introduced later and are a serious handicap to the developing pullets.

Where the flock is unthrifty or developing slowly, it is advisable to look closely for these pests and especially for mites. They are usually found on the underside of the perches or in protected places near where the pullets are roosting. A mixture of equal parts of kerosene and old oil from the crank case of an automobile, used freely wherever the mites are found, is an excellent remedy. This oil may be sprayed on or applied with a brush, but should be worked into all cracks and corners. Spraying the walls and ceiling of the brooder house with a good lime white-wash will aid in controlling this pest.
Lice stay on the bodies of the fowls, and it is necessary to treat the pullets for this pest when they are found. Treating each pullet with sodium fluoride or by working a small amount of blue ointment well into the feathers on the abdomen just below the vent are very effective in controlling this pest. With proper care there is little danger of this pest getting started in brooder chicks until the pullets mix with the older fowls.

Where chicks are brooded with hens they are usually infected with lice very early. Where lice are found on young chicks, smearing a small amount of lard over the back of the head and neck and under the wings is perhaps the safest and best means of control. The hen should be thoroughly treated for lice before the chicks are put with her.

**LEGHORNS EASILY CONFINED**

If small, active, nervous fowls are permitted to develop the habit of flying while young, it is almost impossible to keep them in any kind of yards. They can fly over fences eight or ten feet high and can do so readily. If this habit is prevented from the start a fence five or six feet high will keep them in the yards. The writer has handled this in his home flock in the following manner:

When the chicks first begin to fly (about six to eight weeks old) or when the cockerels and pullets are separated, they are run thru a catching crate and the flight feathers on one wing clipped. Care should be taken not to clip the feathers too short and thus cause bleeding. The pullets molt and develop a new coat of feathers, and the flight feathers of one wing are clipped again when about four and a half months old. With this practice the pullets grow and develop with the idea that they cannot fly, and the habit of flying over fences does not develop later. The hens show no desire to fly out of the run which is enclosed on two sides by a board fence but five feet high without wire or any obstruction on top. Some of the hens have been kept until four years old. Their wing feathers have not been clipped since they were pullets. Unless the gates are left open there is no trouble whatever in keeping them in the run.
SUMMARY

1. The heavy loss during the brooding period is usually due to poor care or improper feeding.

2. More attention should be paid in the selection of the breeding stock so as to get the right kind of chicks.

3. With proper care Leghorns can be well developed and brought into laying condition in five and a half to six months from hatching. The larger breeds usually take from four to eight weeks longer.

4. To make good winter layers pullets should be brought into laying condition in the latter part of September or October.

5. Pullets laying in August or early September usually molt during November and December.

6. Overcrowding or trying to raise too many chicks in a brooder is poor economy. There should be about one square foot of floor space for each three chicks in the brooder.

7. Chicks of different ages should not be mixed.

8. A brooder temperature of 95° to 100° F. the first week gradually reduced to about 80° F. at the end of the fourth week usually gives best results.

9. The temperature should be uniform; over-heating and chilling are equally harmful.

10. Chicks should never be put into a brooder which has been used until it has been thoroughly cleaned and disinfected.

11. Chicks should not receive feed of any kind until forty-eight to sixty hours after hatching.

12. Chicks received from distant hatcheries should be fed as soon as received.

13. Milk has a favorable influence on the control of digestive disorders and in reducing mortality; furthermore, it is readily digested by the chicks.

14. Where milk is available it should be kept before the chicks constantly in clean, sanitary drinking vessels. No water should be given for at least the first two weeks.

15. Where milk is unavailable fresh clean water should always be kept before the chicks.

16. Hard-boiled eggs should be fed when milk cannot be
obtained. Two eggs a day for each one hundred chicks for the first few days is recommended.

17. Chicks should be kept busy. A clean dry straw litter should be kept on the feeding floor.

18. There is no substitute for green feed in growing healthy, vigorous pullets.

19. Where fresh green feed is not available, well-cured alfalfa leaves make a good substitute and should always be kept before the chicks.

20. Chicks grow best on range where there is an abundance of fresh growing green feed. If kept in small runs fresh green feed should be supplied each day.

21. During hot, sunny days artificial shade should be provided when there is no natural shade in the runs.

22. Fresh cool water or milk and chick-size grit should always be kept before the chicks.

23. Drinking vessels and brooders should be kept clean and sanitary.

24. The type of drinking vessel recommended for chicks is one which does not permit them to tramp in it.

25. Mites and lice are especially bad during warm weather. During this period perches and chicks should be examined at frequent intervals.

26. Cockerels and pullets grow better when kept in separate pens after the first six weeks.

27. Leg weakness in young chicks is usually caused by poor feeding but may be a symptom of some disease.

28. Leghorns or other small, nervous fowls are easily kept in small pens if properly handled.

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