

of ammonia, 100 pounds of high-grade acid phosphate, and 60 pounds of kainit.—[U. S. Farmers' Bulletin, 384.]

Raising Chickens.

With the usual spring crop of chickens there comes the usual difficulties attached to the raising of them. It is not so hard to hatch them, but it is a problem, sometimes, to keep them growing afterwards. Chicks, like all other young things, have to face the strain of getting a start, and, to prevent diarrhea getting them before they get the start, they need constant care.

CARE OF THE SITTING HEN.

With eggs placed under hens, it is always wise to have a low nest where the hen will not have to jump down onto the eggs, for fear she might break them. The best nest is a box turned on its side, that will give about 24 inches of a bottom for the nest. The hen should be dusted with insect powder or sulphur (sulphur is rather severe) the day she is set, and again two days before the eggs are due to hatch.

The day before the eggs are to hatch, take the hen off the nest and see that she is well fed and watered. Never give a hatcher soft mash. Feed on hard grain (wheat and whole grain), with an occasional feed of dry, chopped oats.

DATES TO HATCH.

For Orpingtons and other English breeds, eggs should be out by May 1st to get the best winter layers, and they may be hatched with safety in April. For Wyandottes, Rocks and other American breeds, eggs should be hatched by May 10th to get the best winter layers. If American breeds are hatched earlier than April, there is a tendency for the chicks to molt with the old hens; and then, if they should molt, they will cost more to keep than the returns from their eggs will warrant.

COOPS.

When the chickens are hatched by hens, have a coop with a slatted front ready for them. It never pays to let the hen go free with them when they are young; she will invariably make them walk more than they can stand. It is best to have the coop so made that you can lift it right off its floor, and then, by simply sweeping this floor once or twice a week, and sprinkling coal-oil, etc., on it occasionally, there will be little danger of mites getting a hold. The best coop, or the one which seems to give the best results, has a floor 24 x 28 in., the coop itself being 24 in. high in front, and 16 in. high at the back. To clean this coop, all that is necessary is to shove the coop forward, raising it a little off the floor while the back is being cleaned. When cleaned, coop may then be moved back again. With this coop, it is not necessary to let the hen out while cleaning, which is an advantage with a fussy or frightened mother. A strip of wood at the back and sides of the coop keep it from slipping off the floor, and the extra length of the floor will be quite an advantage when feeding in bad weather.

The best litter for chicken coop or brooder is gravel. Never use long straw nor deep litter. The chicks are not strong enough to walk through it or untangle themselves. If chaff is used, they sometimes take to eating it too freely when first taken from the nest.

The first feed need not be hurried, as 48 hours after the first chick is out is soon enough. For the first feed, dry breadcrumbs and hard-boiled eggs, mixed half and half, and fed about every three hours, is as good as can be given. They should have plenty of clean water always handy, and in vessels shallow enough to prevent chickens drowning. A good fountain is made by melting one end off a tomato can and cutting a V-shaped notch in the side. Fill the can with water, and place flower-pot saucer or any shallow dish over it, then turn the outfit upside down, and the water will keep up to the top of the notch. This will serve quite a number of small chickens.

When chickens are a week old, add a little oatmeal to the egg and breadcrumbs; they will relish the change, but they will not do well on oatmeal alone, as is often advocated. They tire of oatmeal quicker than anything else. After four weeks of age they can use the commercial chick feeds or cracked wheat, and then they may be started on hopper-feeding, which is simply filling a box with ground grains and letting them help themselves at will. When hopper-feeding is used, give the chicks at least one feed a day of grain, and twice a day will not be wasting good food. The hopper mixture that gives as good results as any is made by using three parts ground oats, two parts shorts, one part corn meal, one part blood meal. A convenient hopper is quickly made by using a box about eight inches deep. Half fill this with the mixture, and place a wooden screen on top of the mixture. The screen is made of narrow strips of wood, nailed together

in such a way as to make squares about four inches to a side. Make the screen small enough so that it will fit quite loosely in the box. This screen will keep the chickens from scratching the food out on the ground. A box fitted this way is better than a hopper, as less of the food is wasted, and it is not a task to make one.

Chicks that are kept growing are the ones that will lay earliest in the fall, and the ones that are kept growing the steadiest are hopper-fed. Try hopper-feeding one season, and see if it is not a good method.

WALTER M. WRIGHT.

B. C.

Artificial Incubation and Rearing

Since I have succeeded in incubating and rearing, artificially, a satisfactory number of chicks from the number of eggs used, the few observations I have made in operating my incubator and in handling the young chicks later in the brooder, may be of value to others interested in poultry. I have been obliged to make some departure from the printed directions accompanying my incubator, which directions we are advised to follow most carefully.

The first requisite towards success is a reliable incubator; this, I believe, will be found in any of the machines placed on the market by reliable manufacturers, the principal of incubation employed being the same in all, and do not know that any one machine possesses any outstanding features over another.

A good machine would embody these features: Substantially built; one that will maintain a uniform temperature (not being very susceptible to changes of outside temperature); convenient to operate, and with the danger of fire from the heating appliance reduced to a minimum; and last, but by no means least, equipped with a thoroughly reliable thermometer.

As regards the questions of ventilation and moisture, over which there still hangs divided opinion, I will give my experience, and then operators can do as I have done, use their judgment, substantiating this by results.

No system of incubation can produce strong chicks from weak germs. This cannot be too strongly emphasized, as a great deal of the trouble in incubating and rearing artificially (in the brooder, particularly) comes from this cause, and even with the breeding stock properly cared for, thereby correcting this trouble, all the eggs gathered should not be used, but rather careful selection practiced towards uniformity of shape, size, shell, etc., of all eggs used in the machine.

As before stated, I was not wholly successful at first—so much so that I abandoned the machine entirely for a few seasons, while all the time I had a good incubator, and had followed printed directions specifically.

First, I have changed the location of the machine to a large room where there is abundance of pure air, no dampness, and in which the temperature remains about the same throughout the day, no artificial heat reaching it, and with no windows towards the afternoon sun. The next point that I have observed is that disinfecting the incubator thoroughly before every hatch, by washing the inside of the machine, the egg trays, and soaking the canvas underneath the egg trays (which I replace with new every season) with a disinfectant. This done, I warm the machine up to the desired temperature and hold it there for twenty-four hours before placing the eggs. I am particular to have the temperature for the first three or four days slightly higher, rather than slightly lower, than the temperature held for the remaining days of the hatch, which is 102½ degrees. This, however, may vary in machines of different makes, it being determined by the position of the thermometer in relation to the egg-trays.

During these early days, I might almost say, little attention is paid to airing, cooling, moisture or ventilation. At about the 5th day I add moisture, by placing the canvass under the egg trays, on the floor of the machine, a couple of shallow pans of sand, which is kept well moistened throughout the hatch, there being no provision made for moisture, or any mention made of this in the directions accompanying the machine. At about this time, I open the ventilators gradually for two or three days, until they are wide open. I cannot see that this small amount of pure, fresh air, entering the machine at this time, with a higher temperature than before during the hatch, can do the young chicks, crowded as they usually are, any harm.

After the first week, I observe airing the eggs, gradually cooling more each day as the hatch progresses, until the nineteenth day. When the atmosphere is mild, as it is in April, May and June, I cool the eggs outside of the machine, closing the machine up while the eggs are out. If we observe eggs hatching in the natural way, we will note that the hen leaves the nest quite often, until the eggs are quite cool. Why, then, should not the eggs in an incubator be aired and cooled likewise, and then placed in the warm machine?

In warm weather, I cool the eggs every evening until they are quite cool. If the weather is severe, less cooling would be given, as the eggs would be found quite cool with turning and reversing the trays.

As regards variations of temperature, I find that the eggs will withstand a great deal of low temperature, when promptly brought up to normal again, but extremes of high temperature are dangerous, and more and more to be avoided as the hatch progresses.

I allow the hatch to finish up well before removing any chicks to the brooder, the earliest chicks being from 36 to 48 hours old before being removed.

The brooder is as thoroughly disinfected as the incubator before placing the chicks in it, and disinfectant is used at least twice a week afterwards. The brooder is taken to the barnyard, which is well protected, and where the young chicks find abundance of insect life, an imperative need to their welfare, and where they are spared the wettings from the wet grass that so often surrounds the brooder.

The feed at all times, while in the brooder, is fed dry, consisting of breadcrumbs, crumbled corn cake, pin-head oatmeal, and chick feed, being a mixture of several kinds of grain, coarse and fine, with the coarse cracked, so that the small chicks can use it. This preparation can be obtained from any dealer in poultry supplies. As soon as small wheat and cracked corn can be substituted for this, it is used, while the other parts of the ration are substituted with a cheaper and more bulky mixture of bran, shorts and cornmeal, or buckwheat flour.

Abundance of pure water and coarse sand for grit is always supplied.

As soon as artificial heat in the brooder can be dispensed with, it is well to do so.

Following these methods, I have not made any phenomenal hatches, or succeeded in rearing 100 per cent. of the chicks hatched, but have succeeded in hatching as large a percentage of the hatchable eggs as could have been hatched with hens, and in rearing, on an average, upwards of 85 per cent. of these.

Dundas Co., Ont.

GARDEN & ORCHARD.

Laying Out the Ground for Setting Trees.

Address delivered at O. A. C. Short Course in Fruit-growing, by P. E. Angle.

The problem to be solved is to set the trees straight and in their exact position in the cheapest possible manner, and do it in such a way that the men doing the work cannot go wrong. There are several systems which may be followed:

System 1.—Mark out the field with a plow by plowing furrows both ways and planting the trees at the intersections. This is a good plan for one man to work, but where a number of men are depended upon, there is enough chance for error that the trees in all probability will be very uneven in the rows, because there is a space about six inches square at each intersection in which the tree may be planted. It is also difficult to plow a perfectly straight line through the field. This system is not recommended on a large scale.

System 2.—The stake system and planting board. By a system of sighting and measuring, a stake is placed in the position that each tree will occupy, and the planting board is used in order to have the tree in the position occupied by the stake. The system is subject to inaccuracies, owing to the placing and replacing of so many stakes, and also entails a good deal of extra labor.

System 3.—Sighting system. By which a row of stakes, properly measured, is placed around the field, and two rows at right angles to each other across the field. The position of the tree is then obtained by sighting in line with two stakes on at least two sides of each tree; that is, the two lines will meet at right-angles where the tree is to be planted. This is a difficult method to get absolutely correct, and may require extra men to sight if those doing the planting are incompetent.

System 4.—Wire system. The wire should be unstretchable, or as near as it is possible to obtain that quality. A woven wire, composed of several strands of 17-19 steel wire, made in Hamilton, is recommended. It is also easy to attach the marks to this wire. A wire five hundred feet long is used, and is marked by attaching a small piece of copper wire through the strands to mark the location of the trees. The wire is first stretched parallel to the fence, and the stakes are placed along it where the outside row is to go. The same is done parallel to the fence at right-angles to the first, and so on around the field, providing the ends and side pieces of the field are parallel to each other. A row is then staked across the center of the field in the same manner,