in artificial hatching, a thorough knowledge of how to mate and manage the parent stock so as to insure to the young chick constitutional stamina. And this means that the poultry-keeper should have a good head, as well as a good brooder.

A RADICAL CHANGE COMING.

But a panacea for all the doleful conditions and experiences enumerated is at hand. Electricity is doubtless the coming factor in artificial hatching and rearing. Already the apparatus is perfected. It is only a matter of a few days when the wizard agency will be attached to one of our incubators and several brooders. No more kneeling or lying prone in two inches of water or mud. No more nervous dread as to the lamp going out, or being blown out. No more smoky lamps; no more unwholesome fumes. You touch or turn a button, and the requisite temperature is quickly secured and kept. Welcome panacea!

I can do no better than conclude in the words of the president of a leading incubator and brooder manufacturing company, who says: "It is our belief that electricity will be quite generally adopted as the heating element for the artificial hatching and brooding of chicks." And beyond all question he is correct.

THE EARLY EGGS INFERTILE.

Editor "The Farmer's Advocate":

One of the best departments of your paper is the poultry section, where a person can get valuable pointers in the raising and management of poultry. I keep about fifty hens during the winter months, and they have been laying from the first of December up till the present time. In the morning I feed a warm mash, and about ten o'clock throw a quart of oats in their litter of straw and chaff, so as to keep them busy, and about one o'clock or so they get a good feed of oats, and the third meal comes a short time before they go to roost, consisting of oats also. A mixed ration of grain would be better, but having a quantity of oats on hand, I didn't buy any other feed. My hens are kept well supplied with green food, such as cabbages, turnips, etc., and fresh water is kept before them, and grit, in the shape of coarse gravel, while sifted ashes serve as a dust bath, situated in one corner, boarded off. My henhouse has a large window on the south, which I open every warm, sunny day; the nests are raised about four feet, and only one hen can enter at a time. The breed I keep is Rhode Island Red. In the matter of hatching, the last year I used an incubator for early hatching, but did not have very good luck, the eggs being very poorly fertilized, but by hen hatching I was very successful, the season being later.

This season I tried moisture in the incubator up to the time of hatching, and washed the machine before setting the eggs in with a 10-per-cent. solution of Jay's fluid; but did not have a good hatch at all, the fault being with the eggs, they being very poorly fertilized, due to my hens being shut in, and a very cold, late spring. I keep about twenty hens with each male. Do you think this is rather too many?

Antigonishe Co., N. S. H. H. MACPHIE.

[Note.—A cock in hearty condition, with plenty of exercise on a large range, will usually take care of 25 to 30 hens, but in confinement during winter and early spring, half this number may be insufficiently attended to. In the case above related it is likely that two males, or else the reduction of the number of females, would have given better results. No matter how many male birds there are, however, results in fertility are not likely to be so good in the early hatches.—Editor.]

EARLY-HATCHED PULLETS BEST.

Editor "The Farmer's Advocate":

With your permission, I wish to say a few words in reply to an article entitled, "A setting coop for twelve hens," which appeared in the issue of April 16th.

I presume that the writer of the article does not have very early hatched chicks, as the coop shown and described by him would not be warm enough to set hens in very early, and I think that early-hatched chicks are a great advantage to the poultry-yard the coming winter, as the pullets begin to lay earlier. Last season (1907) we had a brood of nine chicks hatched out on March 13th, of which seven proved to be pullets, two of the pullets each laying a setting of eggs in October-November, and the others started laying at New Year's.

On account of having nothing but pullets this season, a broody hen was not so easily obtained, and our first brood hatched out on April 1st, and up to date of writing, April 22nd, we have 31 chicks out, and five more hens sitting, but I would not like to set hens in the orchard, as there are frosts at night yet.

Our broody hens are all confined to the nests, by trap doors, each morning and afternoon; feed and fresh water are placed in the room and the trap doors opened and every hen put off the nest and left off for 15 or 20 minutes, and then they are all shut on again. Each hen is dusted with insect powder when she is set, and once or twice during her period of confinement. As for results, our first brood this season hatched 12 chicks from 12 fertile eggs. GEO. S. HAMMOND.

Perth Co., Ont.

PREPARING FOR NEXT WINTER'S EGGS.—I.

The strength of a chain is only as the strength of its weakest link. So it is with chickens. To get winter eggs is a matter of having all the factors right; not merely one or two of them. Some say winter laying depends on the way birds are fed; some say it is simply a question of comfortable housing; others claim that everything depends upon the strain. My experience tends to show that all these details have to be attended to, in order to obtain success, and that the omission of any one of them, even if the others be attended to, is likely to spoil the result. The best feeding in the world, in a house where the fowl are waging ceaseless protest against drafts, or (what is even worse) an overheated, damp atmosphere, will be of little avail; while even the two things combined, viz., comfortable quarters and good feeding, may give poor results if the other link in the chain—good breeding, from the standpoint of a hardy constitution, calculated to give its possessor sufficient surplus vigor to lay eggs in the cold of a Canadian winter—is not as pronounced as it should be. I would not say, however, that there is any one royal road to success in winter-egg production. There are many right roads, and probably several dozen wrong roads.

With no intention, therefore, of laying down the law, but merely to recapitulate the steps which brought one person success in obtaining plenty of winter eggs, I will relate my experience of the past year. Bearing in mind the first link in the chain—that is, that the eggs to be hatched should come from a strain of birds with good, hardy constitution, bred for winter-egg production—early last April I selected an incubator lot of eggs, laid by birds which had been producing particularly well all through the winter of 1906-'07. These birds, I may say here, were pullets, though it is probably better to breed only from yearling or older hens, a plan which I am myself adopting this season. The rooster which I had purchased and put in the pen about a month previously, was the best-looking bird I could obtain—pure-bred, of course—and, so far as I could learn, came from a good winter-egg-laying strain. The 116 eggs were selected from the laying of about twelve days—that is to say, those which did not come up to a fair standard in size, texture and general conformation, were thrown out.

In selecting eggs for the incubator, great care should be taken to ensure vigorous fertility. Not only should they be fertile eggs, but they should possess strong germs. I find that good results may be obtained by having one rooster to each pen of 15 to 20 hens, provided they have a good run. The chief trouble with getting hatches very early is that the ground being frozen or covered with snow, it does not allow the birds to recuperate and to return to natural conditions after their long confinement, and under these conditions strong germs are hard to get. By delaying beginning the incubation until the first week in April—which for winter-egg purposes I believe is best—one can generally reap the benefit of the hens having had a few days of outdoor exercise, picking up worms, blades of new grass, etc. To make sure of them getting enough meat, however, at the earliest part of the season, I usually give them a few rations of some form of meat. Another point worth mentioning, is that before putting eggs in incubator, I test them through the ordinary tester to see that the shells are of good material. Looking through them towards a strong light, many will be found to have thin, mottled shells. My idea is that these eggs dry out too much during the course of the hatch, and thus either fail to come out, or do not produce good strong chicks. It is best to discard them, therefore.

The hatch above referred to, which was completed about May 1st, was not a particularly good one in point of numbers, but, what is of greater importance, every chick lived and throve. I was careful not to give them any food for the first 48 hours—the only thing set before them being small grit. After this, the first meal or two consisted of dry bread crumbs, or bread mixed with yolk of hard-boiled egg. Occasionally they were given a little moist food—such as shorts or bread and milk squeezed dry—but mainly they subsisted on dry grains, as I find small chicks, especially those which are brooder-raised, are not so liable to derangement of the digestive organs and bowels, as when brought up on wet mashes. This applies also to larger chickens as well, according to my experience, though when rapid flesh-forming, rather than egg-laying, is the objective point, the latter has its advantages.

Always get the flock into contact with mother earth as soon as possible, providing the weather conditions are not too unfavorable. For the first few days, I adopt a plan whereby the chicks can easily gain shelter; or, in the event of squally days, such as we often have in May, can be shut in and yet enjoy the benefit of fresh air. It is simply a small run, about three feet wide and the length of the brooder, into which it opens. This is edged and roofed with wire screen, and can be covered with a piece of carpet or other material in an instant, if necessary. From this protected exercise ground, which practically doubles the floor area of an ordinary brooder, there is a runway down to a small piece of grass ground, surrounded by one-inch-mesh netting. Be very careful to change to fresh soil every day, as it soon becomes contaminated, and nothing is worse for a growing flock than a befouled range. Once or twice, I have forgotten, or not had time, to move the brooder and its inmates to fresh quarters, with the result that several of the chicks have soon become droopy, which would have ended fatally if not immediately rectified.

As soon as the birds have grown so that they cannot get through one-inch wire, I let them have the run of the orchard, where they can obtain plenty of grass, weed seeds and worms; and sunshine or shade, just as they desire. It is important to let a growing flock have as much free range as can possibly be managed. In fact, if it could be so arranged, without danger of the chicks getting out of bounds, or destroying flower and vegetable gardens, it would be better to let them have free run almost from the first, remembering, however, that as incubator chicks have no mother to keep them out of danger and to call them home, they have to be partially confined for a few days to teach them where they live, and how to take care of themselves in case of sudden storm.

My plan is to feed them at first five times a day, giving as much variety in their feed as possible, and not forgetting to give them (when confined) meat and grit, and lettuce or other green stuff. Don't overfeed at any time; give them enough to keep them growing, but not enough to stop them having a good appetite at all times. Gradually reduce meals to three a day, and bring them to grain as rapidly as possible. For the meat part of the ration, beef scraps is good; or milk to drink. There are several good points about dry-hopper feeding, and I adopt it as an auxiliary, though, so far, I have never had the courage to use that method without compromise, as the man down in Rhode Island who only feeds his hens once every week or so. About the time they are getting their feathers, six or eight weeks old, give extra meat, and take extra care they do not become exposed to wet or cold. But if they have a good run, and have done well up to this point, they will probably be able to look after themselves pretty well. W. P. F.

York Co., Ont.

GARDEN & ORCHARD

THE POTATO AND ITS CULTURE.

Address by T. G. Raynor, before the Ontario Provincial Winter Fair, Guelph, 1907.

They are planning, in one of the States of the Union, to have a five-day course in discussing the potato alone, so that we have abundant material to supply us for at least a half-hour discussion. I did not know that there was so much in the potato question until I began to read it and discuss it. The potato crop is bringing a large amount of revenue to the country. The question I am to discuss with you is the production of potatoes for the purpose of food.

Sometimes our potatoes are left in the cellar, and not brought out into the light, and allowed to sprout a little. It is then they make a strong, thick sprout, and there is a supply to select from when we get ready to plant. Some people save only the small potatoes for seed, and that is not a good practice, unless the tubers are small from abnormal climatic conditions. Of course, some seasons the potatoes do not get a chance to develop. There are some thirteen points with regard to the potato that are worthy of consideration. Mr. Zavitz is the authority for the statement that the largest yield comes from planting the seed from large potatoes. He does not say that it is the most economical kind to plant; he rather favors the medium-sized potatoes, and cutting to one or two eyes. Whatever our selection of seed may be, we ought to have some definite plan. When potatoes are a high price, it might not pay to use large potatoes for seed.

In the season when potatoes are low in price, it would certainly be a great advantage to take the larger-sized tubers for seed purposes. The system we have in the Canadian Seed-growers' Association, is to make the selection as uniform as possible. When going into the field, you see a strong, rank-growing hill, with strong stocks, and it in every way shows vigor and vitality, plant a stake beside that hill. I would plant about 150 stakes in order to make my selection. When you come to dig these potatoes, take out these 150 or 200 hills you have staked, and select the best hills, those that have got the largest number of tubers, and of uniform size for seed. Those that have a lot of smaller tubers should be discarded. Uniformity is what we are aiming at, not only in the quantity in the hill, but also uniformity in the size of the potatoes, so long as they are of a marketable size. Select 25 of the best hills out of the 150, and keep the product of each hill in a sack by itself. Next spring, when you get your ground ready to plant, we ask you to take eight potatoes out of each hill; therefore, you would not select any hills for your purpose that had less than eight potatoes in it; it would be better to have 10, so as to have one or two potatoes to play on. We ask you to plant the product of each hill in a row, so that you can follow up the history of each individual hill, if you choose. If one potato in that hill seems to give perfection, you can take that individual potato and follow it up.

It is the law in nature "that like breeds like," and the same laws are in operation in connection with our crops as obtain in stock improvement, and we can expect to continue to im-