F 495
T9
copy 1

Brooding and Caring for Baby Chicks

Brooding and Caring
for
Baby Chicks

BY
JOSEPH H. TUMBACH

SF495
.T9

Copyright, 1920,
By JOSEPH TUMBACH
All Rights Reserved

FEB 24 1920

©CL.A561985

no 1

BROODING AND CARING FOR BABY CHICKS.

by

Joseph H. Tumbach.

The care of baby chicks as herein related is the method followed on The Tumbach Egg Farm. These pages are an extract from a 180-page volume entitled "**How I Made \$10,000 in One Year with 4200 Hens**".

This extract is published in response to requests for a low-priced version of this particular portion of the book, "something I can carry in my overalls or hang in the brooder house," as one man expressed it.

The complete volume, clothbound, is on sale at all principal poultry supply houses. It may also be had by addressing the author at Pasadena, California. The price is \$2.50, postpaid.

PART FOUR

A detailed description of the methods followed on The Tumbach Egg Farm.

And this is

“How I Made \$10,000 in One Year with 4200 Hens”

Hatching

All of our hatching is done at a commercial hatchery, the eggs being supplied by us from our own stock. This course was adopted after several years of experience in doing our own hatching. Much may be said in favor of either system but the arguments would leave us where we started; that is, that we leave the hatching to the man who makes hatching his business. When brooding time comes, bringing with it thousands of chicks, we have nothing on our minds but the care of those chicks.

The eggs are marked with a rubber-stamp to avoid any possible confusion. It then becomes a matter simply of the honesty of the hatcher as to whether or not we get the chicks from our own eggs.

We pay the hatcher so much per thousand eggs, regardless of the number of chicks hatched.

We usually provide 6 cases (2160 eggs) for each hatch and we count on about 1500 chicks from this number. In a year of poor hatches we are likely to fall short and in good years we run over that number. The long haul in a truck—our eggs are carried 25 miles—reduces the hatchability of the eggs of course; this has been taken into consideration. The hatcher calls for the eggs at our place and delivers the chicks. In both respects he is better equipped and more experienced as to the safest method of carrying than we are or could be.

Carrying Baby Chicks

To those who carry their own chicks a word of advice might be in order: The chicks must have air and warmth. If you are stacking up a lot of the familiar 100-chick carrying boxes in a motor car be sure the boxes are criss-crossed in such a way that each box will have air. The boxes should set level, otherwise the chicks will be jammed to the lower section of the box. If necessary place strips of wood between the boxes. As to warmth, the chicks will supply all they need for the trip, but this will not protect them against the draft made by the moving car. Excepting in hot weather it will be necessary to put a blanket over the load to keep off the draft, and even in hot weather a curtain of some kind should be hung in such a way as to stop the draft. It should be kept in mind that newly hatched chicks differ in no essential respect from a very young baby so far as susceptibility to draft is concerned, and the writer's observation is that a careful mother who carries the baby in a motor car quite generally has it completely covered.

Should you meet with an accident on the road or if it is necessary to stop for as long as 10 minutes you should remove the blanketing—the draft stops with the car. We heard of an instance where a poultryman carrying a load of one thousand or twelve hundred chicks was delayed half an hour. He forgot to remove his blankets; and he smothered more than half of the chicks. On the other hand we have known of many cases where chicks were chilled by the draft and a heavy mortality was the result, which was of course blamed on the hatcher and the stock he hatched from.

We are extremely careful with newly hatched chicks. If it becomes necessary to transfer some from one house to another we either use one of the cardboard chick boxes on which the lid can be set down tight, or else, if an open box is used, we put a gunny sack or a piece of flannel over the chicks before going outdoors. This may seem "fussy"; it must be remembered that your care of these chicks will make or mar your whole year.

If your chicks are shipped to you by express, learn the exact time when the train is due and be there to meet it. Do not chance a careless expressman setting them outdoors in the rain or snow and wind; or a careful one putting them next to the stove. Either course may cause you not only loss but a lot of misery and trouble.

Selecting Eggs for Hatching

We use no egg for hatching that weighs less than 2 ounces and we discard exceptionally large eggs also. The egg must be of normal shape, and must have a perfect shell. "Pimples" of lime in the shell; shells with ridges and water-marks; shells that clink like glass on being tapped with the fingernail—all these are discarded; likewise, of course, any that are checked—by which is meant a crack in the shell which may or may not be a complete fracture.

We take no chances of mixing hatching eggs with the general run—the buckets are marked with a card as they are brought to the eggroom, and the eggs discarded from the hatching eggs are never packed for market directly; they are put into a bucket and are graded and packed out of the bucket. With our years of experi-

ence in packing we still deem it unsafe to try making the double grading in one operation. Should the cases become mixed the cost would be too great—especially if the eggs are sold.

Time of Hatching

Our first brood of chicks is brought off the second or third week in January and we have either two or three lots in that month, one week apart. These are followed by three lots in the month of March, also one week apart. This arrangement allows for keeping the first hatches in the brooder house a maximum of 8 weeks should a streak of bad weather be encountered. This leeway of time has saved us a great many chicks that would otherwise have been forced out of the brooder houses to make way for another lot regardless of extremely adverse weather. It was to avoid being so forced that we used three brooder houses earlier in our poultry career when we brooded only three lots in one season. Most poultrymen would agree with us, we think, that the greatest single factor in chick mortality is lack of proper housing facilities. It has come to be a common thing to hear, "I lost a lot of young pullets in my early hatches; I had to put them in colony houses to make way for another hatch coming off."

Foreword on Brooding

The description of our brooding methods will be embellished to an extent which to those of experience may seem even absurd. It is the writer's purpose to give herewith a definite line of procedure for a novice to follow; as he expressed it in an outline, "I would have the chicks arrive and make him feel at home with them, not

like a hopeless idiot. I would take him along, day by day, morning, noon and night, knowing just what to do at each stage of the game." When this novice has graduated he can do his own eliminating of non-essential features and make such changes as will best fit his own particular case and habits. But at the start, assuming that he knows nothing whatever about handling the chicks, we purpose giving him something to go on.

Getting Ready for the Chicks

The chicks are delivered to us 36 to 48 hours out of the incubators at which time they are ready for their first feed and water.

About one week before the chicks are due the brooder house is in order. If it is a new one it has been thoroughly sprayed; if an old one it has been cleaned, washed out with a hose and nozzle, allowed to dry and then sprayed. If clean sand, reasonably free from dust and dirt, is available, the floor is covered with it to a depth of about one inch. A light scattering of clean, bright straw, preferably wheat straw, is put over this; if barley straw must be used it is put through the feed chopper and cut into one inch lengths. If clean sand is not to be had none is used and the straw is made about two inches deep.

The stove is started up and tested out thoroughly, running several days if necessary to get the proper adjustment and to be sure it is working properly. The automatic alarm system is gone over and put in working position, the thermostat hanging by its wires (from a rafter) 12 inches above the floor, 3 feet from the stove

and facing it. A thermometer, known to be registering accurately, is hung from the bottom of the alarm-thermostat, also facing the stove, the bulb hanging about 2 inches above the straw. The inlet air shaft is opened about one inch and the outlet shaft about three inches on the bottom slide, the upper slide being kept closed. The heat is run up to 95 degrees. The alarm is set to ring the bell if the heat drops to 90 degrees (this is brought about by shutting off the stove), or if the heat rises to 100 degrees. Under ordinary weather conditions the space between either the hot or the cold contact points will be about the thickness of a worn dime; but nothing short of experimenting will determine the exact setting.

The house is allowed to warm up gradually rather than by forcing the stove. As already said, it may be necessary to extend the warming-up and testing out experiments over a period of several days. When the proper adjustments have been reached the stove is shut off until the day before the chicks are due to arrive. On the morning of that day it is started up again; and it continues running from that time on. The burner is cleaned and scraped some time during the morning of the day the chicks are to arrive so that it will not need attention just after the chicks are in the room.

A ring of 1-inch mesh netting, 12 inches high, about 14 feet in diameter, covered with muslin, is set around the stove. This is to keep the chicks from straying. The muslin is fastened to the netting at the top by stitching thread, and is on the inside of the netting. It must be fastened in place with the netting set in the form of a circle; if the netting is laid flat the muslin will bulge and

the chicks will crawl under it and bunch up between it and the netting and many of them will squeeze through the wire. The ring should rest on the flooring, the straw being banked against it.

Tar paper is cut into strips 2x3 feet, about 8 being used for 1500 chicks. These strips are put down inside the circle. A light scattering of chick grit is thrown over them, likewise a light scattering of hulled oats, cracked wheat and fine cracked corn (equal parts by weight). About an hour before the chicks are due the little cup and saucer chick fountains are filled with water from which the chill has been taken. We use one fountain to 100 chicks. These are scattered promiscuously inside the circle, some of them very close to the stove, others on the tar paper. Tilt the "cup" slightly for an instant so the water will come up to the very edge of the "saucer."

Then we are ready for the little newcomers.

And if you purpose following our plan in caring for chicks, take this much advice: Work all night if you have to; but have that brooder house absolutely ready for your chicks at least 24 hours before they are due to arrive. We have heard of cases where the delivery-man from the hatchery had to assist in putting up the brooder stove intended to warm the chicks he brought in the month of January. From the writer's point of view this is little short of criminal; true enough, he views it from a prejudiced standpoint, the standpoint of one who really loves the birds and especially baby chicks. But almost any human being worthy the name would resent the idea of chucking a lot of helpless fluff balls, just out of a temperature of at least 103 into a damp,

cold house, and certainly no one has the right to expect them to do well in such hands.

Method of Brooding

All available help is called into action when a load of chicks arrives and they are unloaded as quickly as possible. The first boxes are carried to the farther side of the room. They are set on the outside of the wire circle, half of them on each end of the house. They are not piled up. On a hot day the lids are taken off the boxes as they are set down. If the sun is bright and strong the curtains are dropped over the windows to keep the chicks from crowding toward the strong light.

Set a box close to the circle, sidewise, kneel down by the side of it and lift the chicks over the wire in bunches of five. Dip right into them with both hands. Have a pencil handy, and when you have emptied a box, mark on the lid of it the number of chicks you counted out. If dead ones are found toss them aside into one pile and count the dead when the live ones are all out. Don't drop the little chaps if you can help it--some men can handle them in what appears a rough manner without hurting them but this comes from long experience.

Move as rapidly as you can and don't mind the chirping; you will grow accustomed to it. They will "chup" quite a bit for a day or two until they have settled down. Meantime you will be surprised to see many of them drinking and eating before you get the last box emptied. The idea of tilting the fountain is to bring the water to the very edge so that when a little bill is laid to it the moisture is found at once. You want to get them started

in the shortest possible time and you are doing everything you can to make it easy for them.

If you had things arranged as outlined you now have nothing to do but pile up the boxes and remove them. In doing this we always look through them carefully to be sure no chicks are overlooked. Next you should tack a large card on the wall of the brooder house, near the door, with a lead pencil hung over it by a string. On this card mark the date and number of chicks received, and as losses occur, mark them down. If you wish to learn the periods of heaviest mortality, mark off squares on the card and put each day's losses in a square. You will find such a record both interesting and instructive. We make no distinction between chicks found dead and those that we help out of the way.

And then you can sit down and "size them up." The chicks themselves will tell you in a short time whether or not your temperature and ventilation are right. Different lots require different degrees of heat and outside atmospheric conditions will necessitate a variation in the supply of air admitted. If it happens to be a very hot day you may have to lower your heat and increase the air supply immediately. In such case the chicks will pant for breath, some of them racing about, others "chupping" madly. If this continues for as much as say five minutes, open your inlet air slide to full capacity and open the upper outlet slide about half way; then turn down the regulating screw on the stove, giving it two or three full-round turns. This will reduce the heat and increase the fresh air in a very short time.

Give the chicks a chance to settle down in the new

atmosphere before making further radical changes. If they quiet down and begin to take an interest in water and feed, close the upper outlet shaft slide and increase the opening in the lower one. Then leave them to themselves.

On the other hand, if they crowd each other and pack together, even right under the hood of the stove, run up the temperature by turning up the regulator screw; but do this slowly. Turn it a quarter ways around, leave it for a few minutes, until you hear the buzzing of the flame, then turn it a little further, and so on, until you have raised the temperature two or three degrees. Then leave it at that for half an hour or so; and if, after that length of time they are still crowding the stove, repeat the operation, and continue doing so until they scatter and take to the water and feed.

Meantime some of them may show an inclination to peck one another's toes; this is not serious at this age. If you wish to take no chances of their getting started on a rampage of toe-picking, catch the chaps that do it and give them a drink. Hold the little fellow between your thumb and middle finger, leaving the index finger free. Take him to a fountain, and with the index finger "duck" his head to the water. Don't hold his head down very long—he must raise his head to get the water where he wants it. Then remove one fountain from the ring, tear off an edge of tar paper, put a little feed on it, and set your toe-pecking chap outside the ring with this feed and water to amuse him. Don't forget him, though, and step on him later on or leave him out all night.

Chances are that in an hour or so they will have

cleaned up your feed and are acting like old stagers. If so, give them another light scattering. You want to get them all to eating and drinking as fast as ever you can. Some of them will still stand around and "chup," and will go to sleep that way, without taking feed or water the first day. They will cry at intervals throughout the night. If you are patient and wish to bother with it, find the owner of the voice you hear and give him a drink. The writer has gotten out of bed many a time because he could not stand the crying voices and after making a few chaps happy with a drink has in all probability not only saved chicks from starvation but made his own night more comfortable. This is the "personal element" we hear so much about in connection with the conduct of any line of business, like the storekeeper who goes to the store especially to accommodate some good customer.

Should your chicks arrive in the morning, so that they have had their first feed and water before noon, leave them until about 2 o'clock; at that hour give them another light scattering of feed and tilt the water fountains again so that the water is up to the edge of the saucer. Keep the water at as high a level in the saucer as you can throughout the day. At 4 o'clock give them another feed and at this time replenish the fountains, using water from which the chill has been taken (by adding a little hot water). The easiest way to refill the fountains is to carry in two buckets, one filled with water, the other empty. Empty the fountain into the second bucket, then dip it into the fresh bucket, fit the saucer over it, reverse it, and set it down. You will have to move very cautiously, "feeling your way" amongst the chicks with your

foot and with your foot pushing aside any that happen to be in your way. You will learn this trick quickly. While in the ring, and later when you have turned them loose in the house, make it a practice to keep your feet as close to the floor as you can.

If you are just starting in the business you will very likely have someone coming in to see your new chicks. Put a sign on the outside of the door reading "Be quiet;" and if you take anyone into the brooder house, caution them to be quiet. When the chicks are just hatched noises will not bother them so much but when they are a few days old and thereafter it will be a very harmful influence to have someone come up to the house (or into it) and clap their hands and shout for joy at the sight. The little chaps will drop in their tracks or dash wildly for cover; and anything of the sort will cost you money because a sudden nervous shock hurts any tender, nervous organization. The more vigorous they are the more nervous they will be. This is not so noticeable when they are segregated into small lots, but where they are kept in swarms as we keep them it stands out boldly. You will learn it for yourself but guard against it if you can.

The 4 o'clock feed is the last for the first day. Leave them until 5 (if early in the season), until 6 if later, but not until dark. The curtains should be raised before the 4 o'clock feed if the day is short, so they will have plenty of light for the final feed. If the day is longer the curtains remain down. An hour after the last feed the water pots are removed; set them outside the circle. Then pick up the tar paper. Brush off any chicks standing on it and put the paper outside the circle. Pile up the differ-

ent pieces, saving what feed remains on them. Scatter this in the litter outside the ring or leave it for the morning feed, whichever is easiest for you. It is better not to scatter it inside the ring where they will sleep on it.

Then let the chicks settle down. If after half an hour or so, when they have begun to settle, they show an inclination to crowd toward the stove, increase the heat by turning the upper screw of the regulator, but do it slowly. You want them to stay at least two feet away from the legs of the stove. As darkness comes on they will miss their mother. There will be a great deal of crying and they will "cuddle" toward one another, trying to "get under." You will simply have to grin and bear this. They will finally settle down, very close to each other. They may favor one side or the other, bunching up; if so, spread them around the stove by pushing a bunch along the straw. You may have to take a handful here and there and remove it bodily to another section. When they are a few days older they will find the right degree in the circle; and very often even the newly hatched will spread round the stove in a perfect circle.

Should the main body crowd the outer edge of the wire circle, the temperature is too high and it should be reduced by turning down the stove. Only on warm nights will it be necessary to increase the air supply by opening the inlet shaft more than an inch or so and the outlet shaft by three inches (on the bottom slide). You can gauge this by your own sensation while in the room. The air should be sweet but not cool. And remember that the feeling you have while standing upright is no guide—your face may feel hot and close but the chicks are far

from the atmosphere you are "tasting." The fresh air is on the floor and the greatest heat is near the root—you must get down to the level of the chicks before your judgment can be taken. If your thermometer reads between 90 and 95 and the chicks are settled with the outer ones near the thermometer, your heat is about right; and if you do not feel a "stuffiness" in the air when you get your face down near the thermometer, your air is about right.

We usually look in on the chicks at about 7 o'clock and again just before going to bed. Newly hatched, they should now look like a big omelette, close together, many with their necks stretched flat along the straw; but they should not be piled three or four deep. If they are so piled up and are the proper distance from the stove there is too much air. Correct this by reducing the opening in the air shafts. Before leaving the house on the last round, test the alarm system by pressing the contact points together first on one side, then the other. The bell in the house should ring each time.

We leave the curtains down at night for the first few nights. Thereafter it is raised after dark.

Second Day

On the second day raise the curtains as soon after daylight as possible. Put down the tar paper plats, scattering the grain on them as you go. This will be rather a tedious process on this day because they have not yet learned that it means "eat." Next day it will go easier. When they have had the feed about half an hour put in the water pots. Temper the water to the heat of your hand and add a level teaspoonful of common baking soda to each quart of water. (Use the two-bucket scheme for

emptying and refilling the pots). This is done to overcome possible fermentation in the little crops, as yet unused to "outside" feedstuffs. Leave them with their feed and water for about an hour. Then roll up the circle and set it aside. If you have the space above the rafter braces, make a place for it up there; otherwise provide a bracket of some kind on the wall on which to hang it. Don't set it in a corner—it looks like mother to them and they are likely to crowd up around it during the day.

If the day opens bright and clear drop the curtains; if it is cloudy leave them up so as to have all light possible. Increase the ventilation by opening the air shafts wider—at least double the opening used during the night. On very warm days you may have to open one or more windows toward noon. Keep the air fresh and pure. There is no danger of overdoing the ventilation during the day—the night is the danger period in this respect. You should give them all the air possible during the day. Keep the temperature up; they can get away from the heat in the ends of the house.

Scatter a light feed of the oats, wheat and corn on the plats every three hours; leave the plats in place on the second day so that the slower ones may yet have a chance to catch on. We make it a point to so regulate the quantity that there will be a little left on the plats an hour after feeding. Empty and refill the water pots at 11 o'clock and again at 3, but omit the soda after the first filling; and scatter the pots pretty well all over the room. If the chicks favor a certain portion of the house, put several pots in the vicinity. Take the chill off the water at each filling.

When bed time comes you will have some trouble in rounding up the herd on this second night. Fasten one end of the wire to the wall near the stove and unrolling it as you go, round the little fellows ahead of you. In a day or two they will keep well ahead and it will be but a few minutes work to put the circle in place. Stay on the outside of the circle as you unroll it. You will likely have to reduce the temperature a point or two on this night to keep them the proper distance from the stove. Do not overlook reducing the openings of the airshafts. Get them back to the position at which you had them the night before. Test the alarm system same as you did last night.

Third Day

On the third day feed and water early in the morning as before; but do not use the soda. Remember to take the chill off the water. Leave them in the circle for half an hour, then remove the circle and pile up the plats, scattering the left-over grain (if any) in the litter.

At 9 or 9:30 on the third day we give them dry bran and charcoal. The bran must be absolutely pure and sweet—if it tastes bitter we do not use it. To a sack of bran (80 or 90 lbs.) we add about 8 pounds of fine charcoal. This is fed in little troughs.

The trough is made of a piece of $\frac{1}{2} \times 3$, in 4 foot lengths, on each side of which is nailed an ordinary lath. The end pieces are 3 inches high and a lath is nailed across the top from one end piece to the other, with a little support in the center of just the right size to keep the top piece from sagging. We use one trough to each hundred chicks. The troughs are set lengthwise of the house close

to the end walls, nine of them near the closed end and five in the end where the door is. If many chicks are working near the stove we transfer one or two troughs from each end to the side walls until they have learned to follow them. In this as well as in every other respect you will note that we go to extra trouble to get the little fellows started.

We find it easier to fill the troughs the first day or two near the door and to carry them into place already filled. We use five gallon oil cans for feed pails. The top is cut out to within an inch of the edge. This one inch is turned over, making the top stronger. Heavy wire is used for a bale; we fasten the bale toward one side rather than in the center. This makes it convenient to carry two pails in one hand which saves steps as two pails full of bran can be carried as easily as one.

The troughs are filled with a small-mouthed scoop or a large sized flat stove shovel. Enough bran is put into each trough to bring it within half an inch of the top of the side pieces. If the trough is filled level full there will be too much waste—there will be some in any event, especially for the first few days as some of the little fellows will crawl into almost any sized opening. We have found that a trough of the exact dimensions given is least wasteful.

The bran troughs are removed at about 11:30. We fasten two brackets to each end wall, not quite four feet apart and about two feet wide, and the troughs are set on the brackets. The top piece of the trough being flat and wide, the troughs will "stack" nicely. The water pots are then refilled and the plats are put down, most of them

where the troughs have been but at least two on each side of the stove. A liberal scattering of grain is spread on them and this remains in place for about half an hour. The quantity can be gauged only by experimenting. Measure it in scoopfuls and if they leave part of it, reduce it next time; if they clean it up in less time, increase it. At the end of half an hour the plats are piled up again and the troughs are replaced. If any are empty they are refilled; but they must be cleaned up before more is added.

At 3 o'clock the water is freshened again and the troughs are removed. Grain is fed at 4 and the plats remain in place until bedtime. If the grain is cleaned up entirely within a short time a little more is scattered, but it must be cleaned up quickly and completely before this is done. The circle is put into place as before, the ventilation is adjusted and the alarm is tested.

Fourth Day

The same routine is followed on the 4th day. At this stage it usually becomes necessary to begin reducing the temperature. The location of the chicks within the circle after they have settled down is the best guide to follow in reducing the temperature. It should be done gradually, one or two degrees at most. The 7 o'clock inspection trip is the best time; then in looking in again just before retiring a re-adjustment can be made if necessary.

Fifth and Sixth Days

On the fifth day chick mash replaces the bran and green stuff is fed at noon in place of the grain. The simplest way of handling the chick mash problem is to

ONE OF THE BROODER HOUSES ON THE TUMBACH EGG FARM

use equal parts of bran and hen mash, with the addition of 100 pounds of bone meal to each completed ton, and this is not only a simple method but it continues the heavy feeding of bran on which we place great reliance. The formula of hen mash will be found in the chapter devoted to feeding the layers. At this stage we begin to weigh the feed with the idea of keeping the chicks on half mash and half grain (by weight). A quantity of grain is weighed into a pail in the morning, likewise a quantity of mash into other pails. This is used for the day's feeding. In the evening the remainder is weighed and the results indicate the course to be followed next day. If your memory is not good, mark the results on a card fastened to the wall in the feedhouse.

The chicks will be slow to take the green stuff at first. We use the plats, to which they have become accustomed. Very little will be needed at first, but in a short time they will take to it and then they are given all they will eat. The plats can then be omitted. When they have learned to eat the greens readily it will not be necessary to remove the troughs at noon. They can be left in place all day.

Seventh to Eleventh Days

On the 7th day the grain is fed in the morning without using the plats; but they are used for the evening feed. At this stage it will be necessary to use a higher and wider netting for the circle; we use one 2 feet high and long enough to make an oval reaching from side to side of the house and about 18 feet at the longest point. It is covered with muslin like the other. To support the wire, cords are fastened to the roof with a hook on the

end of each. When the wire is unrolled the hooks are fastened as they are passed. The ventilation will have to be increased; this is done by increasing the openings in both inlet and outlet shafts. The chicks are likely now to be settling nearer the wire, but this is of no consequence.

If the litter is beginning to look bare in spots, add another inch or two.

The water pots are now set on little platforms. These are made of half inch pieces about one foot square nailed to blocks three inches high. They are set close together, about five feet from the stove, half on each side of it; at the noon filling they are set further back. The water is no longer tempered from this time on unless freezing weather prevails. The pots, platforms and all, are set back still farther when the wire is put up at night and when the wire is in place one or two pots are set inside of it, close to the stove, for the benefit of any chaps that may have overlooked their bed time drink. When the last inspection is made at night all of the pots are returned to their place inside the wire. This gives them water early in the morning, tempered, and at breakfast time they will be found busily scratching.

Twelfth to Twentieth Days

On the 12th day more straw is added to the litter. If baled straw is available save out several chunks of it. Use these to bank up the corners, stuffing loose straw behind them to avoid a nice crawling-in place in which you would most likely find several hundred stacked up and smothered.

A strip of muslin is now tacked to the rear wall, extending to the floor. The wire, instead of forming an oval, is used running from one end wall to the other; one end is fastened just inside the outlet airshaft, the other end on the inlet shaft. It bulges out in the center where it goes around the stove. It is upheld by the cords and hooks which are changed to conform with the new position. The idea is to herd the chicks toward the back wall, where the roosts will be. The muslin on the back wall is a big help. It still looks like "mother." The temperature is increased for the night at this stage as the chicks will be farther from the stove. Some lots will require a bit of herding when this change is made, but ordinarily they take to it readily enough after one or two evenings.

On the 14th day the roosts are let down in the morning before the troughs are put in place; the troughs are set in double rows beyond the roosts with one or two on top of them, set between the cross bars. This helps to get the chicks upstairs. The roosts are raised when the evening grain is fed.

On the 18th day larger troughs are used. These are made of $\frac{1}{2} \times 4$, 6 feet long, for the bottom, with two pieces of $\frac{1}{2} \times 2$ for the sides, and the top is of $\frac{1}{2} \times 2$, the end pieces being 4 inches high. Larger water pots are used (4 or 5 quart) and fewer of them.

Three Weeks and Thereafter

At 3 weeks the morning grain feed is omitted and sprouted oats are fed at from 9 to 10 o'clock. The oats is not allowed to sprout into a matted mass but is used when the white roots are about half an inch long. The

chicks take to this readily. Enough is fed to last them about 15 minutes. It is fed in the litter. At this time we begin adding coarse grain to the evening feed, mixing it with the chick grain in gradually increasing quantities until the chick grain is entirely replaced at about 7 weeks.

We use the same grain for the chicks as we do for the layers excepting that we never give them barley with the hulls on it.

A pan of medium shell and medium granite grit is also given them at this stage and is kept before them constantly.

At four weeks the roosts are let down permanently. Some time after the evening grain feed has been cleaned up, but before the chicks begin to settle down behind the wire, we raise the end roosts and kick the straw into the corners, building it up to the height of the roosts. This prevents corner-crowding and is also an encouragement toward climbing up on the roosts.

We usually clean out the brooder house and put in fresh straw the day before the roosts are to be lowered permanently.

If warm nights prevail at from 3 to 4 weeks it may be necessary to temporarily increase the ventilation when the chicks begin to settle down. We do this by opening the upper slide of the outlet shaft about an inch. It is left open until the 7 o'clock inspection at which time, if the night air is cool, it is closed again.

If the night air is warm it may be necessary to leave a slight opening in this upper slide all night. You can tell by the chicks whether or not it is necessary. If they are

lying close together in the straw, (such as are not on the roosts), or if those that climbed up have dropped off, the upper slide may remain closed.

If they are uncomfortably warm they will lie far apart, some with open mouths. It seldom happens that the upper slide must be left open all night (at this stage) with early hatches; the March hatches may require it. We have even found it necessary during a very hot spell to put in a screen door at their bedtime, leaving the main door wide open, until our own bedtime. In this case the front windows are also left open. The chicks being against the back wall they are in no danger from drafts.

As soon as the chicks have become accustomed to the roosts being left down, usually in two or three days, the use of the wire is discontinued and the muslin on the back wall is removed.

Use of the Yards

The age when the chicks may be permitted outdoors is dependent entirely on the weather. January hatches are seldom turned out before they are 10 days old and then only on clear, warm days. We leave them out but a short time at first, herding them back into the house until they grow accustomed to running in and out. We use a sloping runway, made of boards, as wide as the doorway, to make it easy for them to go back and forth. Care is used to keep the space between the runway and the fence filled with dirt so the chicks cannot pack up in this space; and we also bank the corners of the yard with dirt to prevent crowding.

If the yard is in growing green stuff we cut it with a lawn mower before the chicks are turned out. The out-

side water pot is not used until the chicks have been outdoors off and on for at least a week. This keeps them running into the warm house for water.

Half of the mash troughs are brought into the yard from the house as soon as the weather permits, but on the January hatches this is seldom done before three weeks.

The March hatches are let out earlier and they have their outside water pot and mash troughs earlier also. Common sense will dictate the course to be followed in respect to these matters. **Our rule is to take no chances on exposure to inclement weather.** If a cold wind or driving rain sets in while the chicks are outdoors, when they are less than four or five weeks old, we take the trouble to herd them in. It is a bit troublesome at first, but they soon learn your purpose; and in a short time your appearance in the yard along with a sudden drop in temperature or a heavy rain will be a signal to "scoot."

The second division of the yard is opened as soon as an appreciable number of the chicks begin to fly over the little division fence. We do not cut the green stuff in the second yard—they are allowed to mow it themselves. The feeding of green stuff inside the house is not discontinued when the chicks are turned outdoors.

If the weather is favorable at about 4 weeks, half of the sprouted oats and half of the evening grain is fed outdoors from that time on.

With the late hatches care is taken to keep the first division of the yard from getting dusty; it is wet down regularly.

At from 5 to 6 weeks the cockerels are taken out; but before entering on this phase of the work the description

will be interrupted to discuss possible troubles that may have been encountered meantime.

Chick Troubles and Diseases

The reader, especially the novice, might assume from the description given that we still have all the chicks that we counted out of the boxes. If such were the case there would be no money in egg-farming—it would be too easy to be profitable.

We count on raising to the broiler and egg-laying stages about 80 per cent of the chicks hatched. Judging by what you read in descriptions of brooding appliances this may seem startling to you. And to the experienced man who uses another method it may seem that we do a lot of unnecessary work and spend a lot of time to get such poor (?) results. To the latter might be given the reminder that we are dealing with 1500 chicks all the time—if we had to do all these things in twenty or thirty different compartments, opening and closing that many gates for each operation, we would never “arrive.” As a matter of fact the writer can easily handle from 4,500 to 5,000 chicks single handed and alone on the plan herein given; and he not only can do it but he does and he handles a lot of other work along with it.

The percentage of chicks raised is based on a year after year average and handling from five to six lots each season. In good seasons we do far better—we had one lot of 1,650 this year (1919) out of which the total brooder house mortality was only 85 chicks. This is the best record we ever made with such a large lot. It is not safe to count on doing that well one year with another in

large lots. A greater percentage could probably be raised if the chicks are brooded in small lots; but one man could not handle so many. We prefer making a big showing of matured birds to a higher percentage and fewer of them.

We count on half pullets and half cockerels. This too will vary with different seasons but half and half is a fair average.

Danger Periods

There are three distinct periods in the growth of chicks when they seem more susceptible to weakness and all are related to the process of feathering. The first stage is when they are two or three days out of the incubator. They are sprouting wing and tail feathers at this time. Some will go down under the strain, others will fall behind the flock in development and as a rule will never catch up. The second period, at from 10 to 14 days, is marked by the coming in of the feathers on the crop, on the back and on the neck; and the final period (in the chick stage) is when the feathers come in on the head, usually at from 5 to 7 weeks.

Mention is made of these periods because we keep a careful eye on the chicks at that time. They always look ragged and rather hopeless when the head feathers are coming. We never allow them to suffer from exposure at such times. If they do not seem normally active we give them a tonic for two or three days. We use the Douglas Mixture in the water, at the rate of a teaspoonful to a quart of water. This is put into the water at the morning renewal; the afternoon water is given clear. The formula will be given elsewhere—consult the index.

Diseases

Some chicks will die off for no apparent reason—they are simply found dead, apparently in perfect condition excepting for that sad fact. Experts find reasons for it—in practice we have no explanation. You may safely count on finding one of these every now and again; but if you find them dead in bunches, plump bodies, fine looking little chaps, look to your feed. Is your grain sound and sweet? If it is not fit for you to eat it is not fit for your chicks. And your bran—is it sweet and pure? Or do you find lumps of it tinged with greenish mould? Have you spilt water in the litter and allowed the soggy mass to remain, tainting the grain and waste mash, to be found and eaten by the little fellows looking for variety? Are you giving them partially decayed vegetable tops, or fermented table scraps? Is the meat in the mash faulty? Did you leave them exposed to a sudden chilling rain?

Nine times in ten the reason for numerous sudden deaths will be found in this list. If you find the fault, give the whole flock a dose of salts next morning, common Epsom Salts, a tablespoonful to a gallon of water (dissolve it in hot water and add to your pail) in mild cases, double the dose if the attack is severe. Give them fresh water in the afternoon, and follow with the Douglas Mixture, as already directed, the next two days.

You may have some leg weakness—sturdy chicks getting down on their knees. Once more the scientists give us the cause but we admit our ignorance. We have seen it with all kinds of brooding methods and with various feeding systems. We do not know the cause nor the proper remedy. If the attack is a severe one we assume

that a thorough cleansing and disinfecting of the intestinal tract cannot be harmful and we give them the salts and tonic. Our experience is that the greater number get over it. We segregate those affected, putting them in a large wire covered box, not too near the stove, until they get their legs again.

“Puffy crops” is another common trouble. You will see chicks here and there, early in the morning, with bloated crops which on examination are found to be air-filled. An isolated case can be treated with a bit of common soda, dissolved in water and poured down the throat. If numerous cases develop give the whole lot a dose of soda (as already described), adding a heaping teaspoonful of ground ginger to two or three gallons of water; give this two mornings in succession.

Toe-picking is often encountered. The cause has been ascribed to almost everything under the sun, from lack of meat to an injured toe suffered by the great grandfather. We think it is started by a nervous condition due generally to excessive heat and lack of air, either in the incubator (after hatching), on the road home, or in the brooder house. Once started it is hard to control. At the first sign we make sure there is plenty of fresh air in the house and that the temperature is not too high. Next the windows are darkened; and if the light is still very strong the glass can be painted over with whitewash into which a little lampblack or some blueing is added. Then a special effort is made to keep the chicks busy—rake the litter into piles at intervals; they will try to scratch them down as fast as you make them. Add a little grain to each pile. Give them extra greens. Hang

bunches of lettuce against the walls—anything that will divert them. This is the best treatment we know of. The chaps that have been attacked must be segregated in a box or something of the kind. As long as bloody toes are in evidence they will keep at it.

White Diarrhoea and Coccidiosis

There remain but two well-recognized troubles to be discussed, and, judging by the quantity of matter written concerning them, these two cause by far the greater mortality amongst chicks: White Diarrhoea and Coccidiosis. The writer has so far been spared experience with either of them, although he has been called on many times for assistance in handling chicks so infected. Whether his having escaped them is due to his method of handling the chicks, either in brooding or in feeding, he is not prepared to say. This work being based entirely on his experience he might very properly avoid the issue, but with the understanding that he is dealing with theories he ventures these opinions, based entirely on observation:

White diarrhoea is most commonly recognized as "pasted-up-behind," which is self-explanatory. The chicks become droopy and listless, stand around humped up, usually crowding together for warmth, and die off in great numbers.

Scientists tell us it is a bacterial disease which may be transmitted from generation to generation and from one chick to another. This sounds rather hopeless; and it may be so. The wonder then is that there are any chickens left what with the interchange that is constantly going on, especially with the growth of the commercial

hatchery business. But we will admit that there is a distinct bacterial disease of the kind. Let us take refuge in the suggestion that what is commonly called white diarrhoea in chicks is not that particular disease. From that standpoint it can safely be discussed.

The writer believes that bowel trouble in young chicks, evidenced by "pasting up," is due primarily to a chilling of the chick while very young and when it is most susceptible to such a shock. And in the light of such a belief it will more readily be understood why he so strongly urges extreme care in handling the chicks. If the reader is sufficiently interested he may turn back the pages and learn how the writer would avoid the trouble, which to his notion is the only hope.

A flock of chicks infected with white diarrhoea is well-nigh a hopeless proposition. The best we can do, all we can hope for, is to save the strongest. We would give them the salts and tonic treatment, the salts once a week, the tonic every other day. Most authorities dwell strongly on the merits of sour milk or buttermilk, kept before them all the time. This must not be given in tin or galvanized iron vessels. The best plan is to scald several of the mash troughs, to make them water tight, and feed it in the troughs.

More important is the matter of avoiding further exposure. If the theory herein advanced, that the trouble is due to chilling, resulting in a cold settling in the intestines; if this theory is correct, we must first of all make certain that the chicks are no longer exposed to chilling. Excepting late in the season they had perhaps best be kept in the house for a week or two, where the air is kept

not only fresh and pure but tempered with warmth all over the room, and in addition, a zone of extra warmth may be found close to the stove for those needing it. The objection to letting them outdoors is that the stronger ones, those able to withstand possible severe changes in temperature, will always "scoot" out, and the weaker ones that need a tempered atmosphere will run with them as long as they can, finally bunching up where they are still in sight of the fellows who are enjoying themselves.

A change in the feeding method is also advisable. Let them have their grain and greens as before, but abandon the dry mash feeding and substitute a moistened mash, fed twice a day say at 10 a. m. and 3 p. m. If milk of any kind is available, use it to moisten the mash, not a wet, soggy mass, but a crumbly mixture, one that when balled up in the hand will fall apart readily when the pressure is removed. The addition of finely chopped onions or garlic and stale bread, the latter previously soaked in milk or warm water, would be a decided benefit. Feed the grain sparingly and use the plats regardless of age, but in addition scatter some grain promiscuously through the litter.

It would also seem advisable to clean the brooder house once a week while the trouble is running, putting in fresh straw at each cleaning. Keep the temperature up, especially at night. Keep it high enough so that they will spread out. If the roosts have been let down, put them up again and resume the use of the wire circle, enlarging it sufficiently so that the stronger chicks can get away from the increased heat. Watch the ventilation carefully; give them plenty of fresh air at night, but do it

through the air shafts rather than with open windows. Keep the windows open during the day, and if the days are uncomfortably warm, use a screen door on the main doorway.

The writer believes that when you have done all this, you have done everything possible and that you will save the livable chicks. You may feed some of the many kinds of "dope" offered in the market if you wish—we never use any; but we have not been driven to it, perhaps. Whether you use "dope" or not, give the chicks the care herein outlined; they need it.

Coccidiosis looks as formidable in action as it does in print. It is said to be an infection of the Caeca, sometimes called the Appendix or Blind Gut. The only cases that have come to the writer's observation have been in chicks that were from 6 to 8 weeks old. The outstanding symptom is the passing of a bloody mucus in the droppings. The birds go down very fast and the mortality is extremely heavy. Bichloride of Mercury has been used successfully in treating this disease. The preparation with instructions for use may be had from the Poultrymen's Co-operative Milling Association of Los Angeles.

Don't Worry

Should the reader be new at the work, let him beware of too much pondering over what has herein been related as to chick troubles; and more particularly let him beware of studying too closely the booklets and circulars that will come to him concerning diseases of chicks.

Too many people are influenced by these lurid descriptions; they immediately see all of the many symptoms de-

scribed, and proceed at once to dose and doctor the imaginary ills.

One of the most successful small operators the writer knows, a man who has brooded twelve to fifteen hundred chicks each year for a number of years, has never had trouble of any kind excepting toe-picking; and while the writer has not been present every minute of the time yet he is morally certain that this man has never fed or used an ounce of "dope" of any kind. But he lives with his chicks. If they are outdoors when young and a sudden cold wind comes up, he drops whatever he may be doing and puts his chicks inside. Constant care and thought for the welfare of those chicks is the only panacea he knows; and in the writer's estimation his is the best remedy.

The fact that he raises a larger percentage of his chicks than we do would tend to prove, to us at least, that his greater care shows up in his better results.

Let that be your main reliance; look after your chicks carefully and methodically. And should trouble come to you in spite of it, check back your work (as an accountant would say)—try and find the point wherein you failed to properly protect them, and the finding of the error will be its own best remedy. Make up for it by extra care as has herein been outlined; your chances of overcoming the trouble will be far better if you follow some such method than if you try to make the correction by dosing and dopping. The latter method is like unto a mother whose baby cries because of a loose pin and who quiets it with some "doped" soothing syrup while the pin remains. If you fail to go over your work and locate the cause of

the trouble you have learnt nothing from the experience.

And don't get "rattled." You'll forget to fill the fuel tank or set the house afire if you lose your head. You cannot expect your chicks that have been drooping to show up in fine mettle the day after you have removed some rotten feed or closed the door you left open the night before or restored the supply of fresh air which you accidentally shut off. Give nature a chance to repair the damage, with such help as you are giving her in the way of extra care and special feeding.

Lice and Mite Troubles

We have never had lice on young chicks hatched in an incubator and brooded artificially excepting during our second year in the work when we made the serious mistake of mixing hen-hatched chicks with those hatched in the incubators. This nearly ruined the whole year's work. Since then we take special precautions to see that neither hen-hatched chicks nor old fowls gain access to the brooder houses and yards, nor are any such allowed the freedom of the place in the enjoyment of which they might wander near the brooder yards.

You will have no mites in the brooder house if you spray the house in advance as we do ours.

Cleaning and Spraying the Brooder Houses

We clean and spray the brooder houses just once during the brooding stage. This is done at about 4 weeks, when the roosts are let down permanently. When the January chicks are taken out the house is cleaned and sprayed before the next brood comes on. When the

March chicks are carried in the brooder houses beyond the 6 to 8 weeks' stage the house is cleaned every ten days and is sprayed once a month.

Training the Family Cat

It is an easy matter to train a cat to leave the chicks alone if the matter is gone about properly. If there are young cats on the place when chicks come in they are taken to the brooder house, in among the chicks, are given the "smell" of a chick along with a reasonable cuffing. This is repeated several times and thereafter they usually give the brooder houses a wide berth. If they are found nosing around the brooder house afterward we make a point of having a pail of water handy and if the cat can be given one good drenching the lesson is learned. Should a cat be caught in the house or yard with a chick we drench it in a barrel; if the chick is dead we force it into its mouth for the drenching and then hang it around the cat's neck for a time.

Old cats are harder to train but with patience it can be done. We have a mother cat on the place now who has been found time and again watching a gopher hole in a brooder yard with chicks all around her; and we have watched her take her kittens to the brooder yard fence, evidently to show them the chicks, and when they showed interest she would cuff them just as we did her. The farm is a sort of repository for stray cats.

Buying Partly Developed Chicks

At times an opportunity presents itself to purchase partly grown chicks. If your brooding has not been suc-

cessful or if you could handle more young stock than you have this might be worth while. But great care must be exercised or your last state will be worse than your first. If it is at all possible it would be better to keep the new lot entirely separate from your own. If this is not practicable you must be sure that the birds are not coming from a place where disease has been rampant and that the chicks are not infested with lice. It seldom pays to buy a run down lot that someone has failed with—you are only risking your own.

Under no circumstances should hen-brooded chicks be mixed with incubator lots; this applies no matter how clean of lice they may seem to be. The possible gain is not worth the risk. If you can't keep the hen-hatched lot separate from the others do not buy or take them.

Taking Out the Cockerels

We take out the cockerels at from 5 to 6 weeks—those that are easily distinguished. They can usually be selected by their combs and shape, but the selection at that age is more or less guesswork, especially for a novice. Take out only those of which you are reasonably certain, and as others show up, take them out. Keep cockerels with the pullets rather than to put pullets with the cockerels.

They are put into the cockerel house which has been heavily bedded down with straw under the roosts, a narrow board being tacked to the edge of the roosts to keep most of the straw in place. If the weather is bad they are kept indoors; but in any event they are not let out until toward noon of the day after they are moved.

Water and feed is provided in the house until they are turned loose in the early morning.

We put 250 cockerels into each 9x10 compartment of the house. The first few evenings we make sure that the straw is banked up in the corners under the roosts so they cannot crowd and pile up; they must be watched in this respect for several nights, until they resume their roosting.

The further treatment of the cockerels will be discussed in a separate chapter.

Continuing the Brooder House Work

Taking out the cockerels makes room in the brooder house and gives the remainder a better chance. If the weather is bad it may be necessary to slightly increase the stove heat to make up for the body heat lost by the removal of so many of the flock.

No change is made in the feed or the method of handling the chicks, excepting that the gradual change from chick size to coarse grain is continued until at 7 weeks the fine grain is entirely replaced. The January pullets are taken from the brooder house at from 7 to 8 weeks, dependent on the weather. If the weather is good we take them out at 7, otherwise they remain until 8. The March pullets remain in the brooder house longer, as we do not have room for them until the summer re-arrangement of the laying hens is made. If the room is available they can be removed even earlier than the January lot. We put in higher roosts (in the brooder houses) at 8 or 9 weeks, spacing them 8 or 10 inches apart and about 18 inches from the floor.

The stove is turned off at about 7 weeks, (this applies to the March hatches), this depending again on the weather. They need but little artificial heat at night in normal weather after 6 weeks. We taper it off gradually, also increasing the fresh air supply by using the upper slide on the outlet shaft.

When they are comfortable at night without the stove we start the stove in the morning before turning them outdoors and run it until they have been outdoors and in again for a "warming-up" after tasting the outdoor air. If the day is cloudy or chilly the stove is run all day, turned low; and at the last feed time it is turned up until they have settled down for the night when it is again turned off. This continued use of artificial heat is necessary because the house is a large one and there is little chance for the body heat of the birds to afford any reasonable degree of heat to the comparatively few birds who may need it during the day and who come indoors to find it.

The third division of the yard is opened to the March pullets at about 8 weeks.

Taking the Pullets From the Brooder House

We put the January pullets directly into the laying house. The yards have meantime been ploughed and planted to barley which may be 12 to 18 inches high when they are moved. We put up a temporary fence of 1½-inch mesh netting, enclosing a space the width of the house space to be used and about 25 feet deep. This makes it easier to train them to the new housing place and also saves trampling of the green barley. If we

need it we mow the barley in the remainder of the yard—it will grow up again very fast at that time of the year.

In moving the pullets care must be exercised or some will be injured. They are nervous and flighty when their regular routine is interrupted and when they are shut in the house and some are being picked up and put into crates the others are liable to pile up in the corners, some being smothered. The best plan is to let a large part of the flock pass outdoors, keeping one or two hundred inside. A panel of wire, 2 feet high and 5 feet long, covered with burlap and set diagonally in one corner of the house, makes a good catching place. A few can be driven into it at a time. Meantime we keep an eye out for a possible piling-up of the others—if they are crowding into the other corners we stir them up before going to work on the lot behind the panel.

Never crowd the youngsters in the crates when moving them. A little more time spent at it is a good investment. We always put them directly into the house rather than in the yard. It saves a lot of time, work and worry in the evening; they are determined to get back to their old roosting quarters. This is obviated if they are carried directly into the new house and are kept indoors at least until the next day.

We put the whole lot from a brooder house into a fifty-foot compartment of the laying house—usually six or seven hundred. A special set of roosts is put into place under the dropping boards. These roosts are made of $\frac{1}{2}$ x2 stuff, set 6 inches apart on cross bars of 1x3, 5 feet long. They are hinged to the back wall about 12 inches

from the concrete floor with supports under the center and near the front end. Two sections of roosts are used, each about 6 feet long. This leaves a clear space between the two sections. The floor is bedded down heavily with straw; near the back wall the straw is packed in until it is flush with the roosts. We usually line the back wall with chunks from the bales and pile loose straw on top of these. The purpose is to prevent a piling up under the roosts which is likely to occur the first night or two. Chicks seldom take to the roosts immediately when they have been moved, even though they have been roosting.

We keep them in the house for a full day after moving them to let them get acquainted with the new quarters; and if the weather is bad they are kept indoors several days. An exposure to severe weather is extremely bad policy just after moving a lot of young birds; they are nervous and excited at best and are far more susceptible to adverse influences.

The awning is dropped at night; and if it is very cold (or wet and cold), we hang a burlap curtain from the dropboard reaching to within 8 or 10 inches of the floor. We make it a point to be with them at bedtime the first night; they have come to know us, and in their strange quarters it seems to have a quieting effect to be around. We look in on them at the 7 o'clock round; if the curtain was dropped and they seem to be too warm it is partially or completely raised—as seems best. We look in again just before our own bedtime and make such readjustment as may be necessary. This extra watchfulness is not necessary after a few nights, when they have grown accustomed to the new place.

The main feed troughs are cut off, either by removal (the covers being hung to the outside wall), or by tacking a piece of $\frac{1}{2} \times 3$ stuff in the openings both inside and out. The mash is fed in troughs made of a 6-inch bottom with $\frac{1}{2} \times 4$ pieces for the sides, end pieces 6 inches high, and a piece of 1×4 across the top. Troughs are set both in and outside the house. Troughs of this same size are used for the March pullets in the brooder houses at from 7 to 8 weeks, and also for the cockerels when they reach that age. It is advisable to continue the use of two or three of the smaller sized troughs for a few days after the change is made—this applies at all stages.

The regular house water pots are used after a few days. It is good practice to set one or two of the old style fountains inside the house, on platforms, just after the birds are moved. The pots are cleaned with a brush every day.

The feed is continued as before. The pan or box of shell and grit must not be overlooked.

When cockerels are spotted they are picked up promptly and removed to the cockerel house.

As soon as an appreciable number, say half, of the birds are found on the dropboard roosts at night—if they do not take to the dropboard compartments before they begin to look crowded underneath—the lower section is closed off and all are forced into the upper section. This is accomplished by the use of a set of sloping lath ladders set tight together, fastened to the front dropboard support by loops of wire hung on nails. The laths are nailed to the supports not more than $1\frac{1}{2}$ inches apart and the whole set is fitted perfectly both on the edges where the different sections meet and on the floor. Care should be

exercised to have no opening large enough for a bird to slip through. With the use of these ladders no trouble is had in getting the birds to go "upstairs." If a few stay in the straw at the foot of the ladders we do not disturb them—they will go up in a night or two. But we make sure that none lie on the trough steps or in other out-of-the-way places. In a week or ten days the ladders may safely be removed, and the underneath roosts are taken out at the same time. A ladder is left in the center of each 16-foot section.

As soon as the birds attain a proper size so they cannot crawl through the 3-inch openings, the main troughs are put into use; but several of the 6-inch troughs are continued in use for a few days when the change is made.

When the March pullets are put into the laying house (if they are from 10 to 12 weeks old, as they are with us), they are put directly on the dropboards by use of the lath ladders. They are kept indoors two days after moving if the weather permits. They can't be kept indoors that long if it is very warm. The same trough and yard arrangement is made as was made with the January lots. If they are to be moved at the earlier stage, 6 to 8 weeks, it would be necessary to use the same under-the-drop-board roosting arrangement as was used with the January birds.

Watch the birds carefully when you remove them from the brooder house and do not expose them to chilling weather. Bear in mind they no longer have a warm room to run to. If they have been turned outdoors and rain or a cold wind comes up better take the time to herd them into the house. They are at one of the susceptible stages

of development and if you let them get soggy wet and chill you will surely have a run of colds. Do not let them outdoors very early in the morning. Give them a chance to have their morning drink and to eat some mash first.

Being able to give the young pullets this extra protection with food, water and scratch quarters available, is what makes the use of laying-house quarters superior to the portable colony house system.

Should colds develop in spite of your care, give them the salts and tonic treatment, the salts one day and the tonic twice, a day apart; if they are 8 weeks old or older, double the dose both of salts and tonic. If the colds continue give them this treatment each week; and in case of a severe attack continue the tonic steadily for a week or ten days.

Should the birds take to piling up at night (under the dropboards), put on the curtain when they go to bed and raise it part ways on your last inspection. The curtain makes of the compartment what is practically a closed box and several hundred birds in it will develop a great deal of heat in a very short time. The opening at the bottom of the curtain will allow a sufficient supply of fresh air for an hour or two. **But there will not be sufficient air for the whole night.** The closed curtain is used simply to warm up the compartment as quickly as possible; and warming it up quickly will induce them to spread out before they sweat.

The January pullets are kept on the chick mash until they are at least 4 months old; and if they are well developed and many full-blown combs are in evidence at

that time, the chick mash is continued until 5 months. Regular laying mash is then substituted.

The March pullets are given the laying mash at from 10 to 12 weeks, depending on the weather and their development. If they have grown fast and cool weather has prevailed (which has a tendency to stimulate growth and development) they are continued on the chick mash until 12 weeks; but if it has been hot at intervals (or steadily) the birds will be slower, and they are then given the heavier mash at 10 weeks.

Culling the Pullets

We have learned by experience and by observation to go very slow on discarding and selling so-called "cull" pullets. One can run up their production per bird by making a close culling, taking out and getting rid of all the undeveloped birds at from 4 to 5 months; but we are not so certain that it is a profitable thing to do. For several years we culled them in this manner; but instead of getting rid of the culls we kept them in a separate pen, and by far the larger part of these "culls" were afterwards retained. One such lot, taken from March hatches, outlayed the main flock throughout the high priced egg season, and never did we find we would be warranted in disposing of the entire lot.

A case of mistaken culling that came directly to the writer's notice was one where a friend of his bought 75 cull pullets from a dealer who obtained them from one of the large egg-farms; they were bought on the writer's advice. The purchaser knew how to handle chickens. This particular lot came into laying within two weeks

of the time he got them and they made a flock average of better than 170 eggs in their first year—which is rather good for culls, especially since only one of the birds was discarded.

We take out none but the plainest sort of culls—birds that are far undersized, scraggly, thin, draggy specimens. Anyone can spot these. They are usually an eyesore in the flock. Others that are lagging in development we segregate and keep to themselves for a few weeks, feeding them as we feed the broiler cockerels. This will bring them out if there is anything to bring out. If they do not respond to it we get rid of them. We think this plan is well worth following.

These slower birds may not equal the high-laying record; but if they pay their feed and as little as 50c profit per bird we have made money by the transaction. If they are constitutionally weak they will go down in the first moult, if we do not cull them out meantime, so they are no detriment to our breeding plans. It would be an easy matter to band them if one wished to be absolutely sure of their proving no detriment.

The matter of culling will be discussed further in a subsequent chapter devoted to that subject.

Feeding and Handling the Cockerels

As our cockerels for breeding are taken from the January hatches we do not force the January lots at the start. They are continued on dry chick mash, with sprouted oats fed at 9 to 10 a. m., and grain in the evening. Green stuff is fed, of course, and a pan of shell and grit is kept in each compartment of the yard. At 8 or 9

COCKEREL-BROILER HOUSE ON THE TUMBACH EGG FARM

weeks we make the first segregation for breeding stock. The best looking, active, vigorous birds, those that stand out in the flock, are put aside, in a separate compartment. At this first segregation we take out about three times the number we are likely to need. These are continued on the same plan of feeding.

The remainder, as well as all of the March cockerels, are forced for broilers. They are given a light feed of grain early in the morning; sprouted oats at about 9; moistened mash at 10 (fed crumbly, not soggy); greens at noon; a light feed of grain at 3 to 4, followed by wet mash within an hour. The quantity of all feed is gauged carefully from day to day, an effort being made to feed just what they will clean up in about ten or fifteen minutes. Ample trough space is provided so that all the birds can find a place. We use the 4-inch troughs at first and change to the 6-inch size as soon as the birds are large enough to eat from them comfortably. We keep them crowded; there is little room to spare either in the house or yard.

They are sold off just as soon as the market will take them. We sell a great many at from $\frac{3}{4}$ to one pound, and but few are carried to $1\frac{1}{2}$ pounds excepting when there is a glut in the market and we are compelled to run them up higher. This happens at times—always to our regret. With us it is no question of whether or not it is profitable to feed them for the higher weight. Our object is to get rid of them as soon as we can. We have our hands full, and we think we make more money by giving our available time to the pullets.

A beginner, in his first season, with nothing but the

young chicks on his hands and ample housing space available and ready would be warranted in carrying the broilers long enough to make the 1½-pound weight under the market conditions prevailing in 1918-19. But a Leghorn should not be carried beyond that point. They make the 1½-pound stage more quickly, on the average, than any other breed, but beyond it they fall back by comparison—almost any heavy breed will make the 2-pound stage in less time than a Leghorn will. Furthermore in the ordinary market any other breed is given the preference over a Leghorn at 2 pounds and upward.

There are more culls in the cockerels as a rule, more thin and “wasty” specimens, than among the pullets. These should be segregated and sold as a separate lot and as soon as ever a buyer can be found who will take them. Price is no object. Feeding cull cockerels is about as easy a way to lose money as the writer knows of.

Marketing Broilers

In marketing a lot of cockerels we make it a rule to grade them by weight, putting the one pounders in one yard, the 1¼ pound in another, and the 1½ pound in still another. It pays to do this. Gauging the weight is a matter of experience. The only way to learn is to have a small family scale for the purpose. Two persons can handle the work to better advantage than one working alone. Shut the first lot in the house, the second lot **out** of the house. Take the scale into the house along with a short hook. Pick up the largest looking bird, weigh him, clip his tail and turn him loose again. Use him as a sample to guide your further choice. Birds that weigh up can be put into the yard through the slide door; those

under weight can be put into the next compartment through the partition door; and the very small ones should be put into a crate standing outside.

This is the easiest way we know of to make the grading. If a bird is unruly and refuses to lie on the scale, fold the wings, one over the other, passing the joint of one wing clear round the other wing. When you have graded a few hundred in this manner you will soon learn to pick them out without separate weighing, and you can then use a crate in the yard with a platform scale just outside it, weighing six or more at a time.

The grading should be done early in the morning before the birds have filled their crops. This will save you a lot of dissatisfaction in dealing with your buyer. It is useless to try and sell a lot of feed (inside the birds) at broiler prices; and if you are shipping them, while it is good practice to give them some feed before sending them on the journey, to prevent undue shrinkage en route, be sure to allow for the weight of the feed in counting what you are likely to get for them, as it will be dissipated before they reach the marketman; otherwise you will be like the farmer who said of his pig that it did not weigh as much as he thought it would and he did not expect it to.

Cockerels Intended for Breeders

The cockerels retained for possible breeders are given the use of the large yard as well as the small ones. The large yard has been planted to green stuff previously and they are turned into it. They are continued on chick mash, grain and sprouted oats until they are about 6 months old when hen mash is substituted. Meantime we

pick up any that do not measure up to standard and put them in with the younger broilers for market. This process of elimination is continued until none but the choicest specimens remain. If we have more than we need they are sold for breeding purposes.

They become very troublesome at 4 months of age. There will be a lot of chasing and tearing around. Some will go down in distress and if they are not removed they will be killed. We keep a long-distance ear open at all times and at signs of a specially riotous time we investigate and remove the cause of the trouble. It is death to a hen or pullet that is permitted to remain in the cockerel yards if one should fly the fences.

Some of the birds are likely to be kept in the houses by the bosses and will suffer for food and water. We make it a rule to turn them all out of the house early in the morning, closing the slide doors to keep them out, and leaving the door closed for an hour or two. They are less troublesome in the morning; and in this manner they are sure to get feed and water. In cool weather this can be done again in the evening.

We tried a plan once suggested of keeping a few old cock birds with the young cockerels to act as policeman, putting them in early, while the cockerels were still quite young. This scheme worked beautifully. The old fellows kept the peace and made the youngsters behave, until one bright day the youngsters "rushed" the old fellows and answering the riot call we found the old men down on their knees in different corners; it looked as though a concerted plan had been agreed upon for every single one of the old cocks was utterly whipped.

A brother poultryman recently suggested planting milo maize or egyptian corn in the large yard, putting it in rows close together and sowed thickly. This when grown forms a heavy thicket which would afford protection. We shall try it another season. We welcome and appreciate any suggestion that might lead to easier conditions among the breeding cockerels. It might fairly, truthfully and slangfully be said "they are a tough lot, and the better they are the tougher."

LIBRARY OF CONGRESS

0 002 857 355 8