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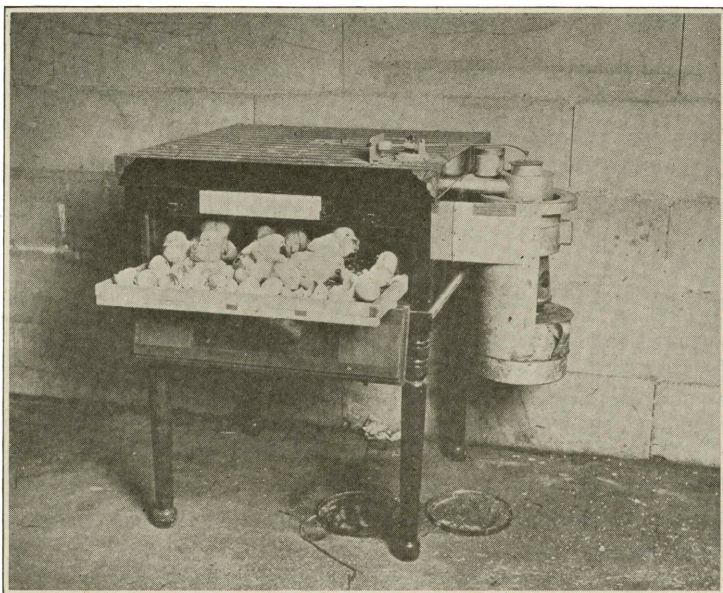
EXTENSION SERVICE

Fort Collins, Colorado

A. E. LOVETT, Acting Director

PRINCIPLES OF INCUBATOR OPERATION

By
O. C. UFFORD



CO-OPERATIVE EXTENSION SERVICE IN AGRICULTURE AND
HOME ECONOMICS---COLORADO AGRICULTURAL COLLEGE
AND U. S. DEPARTMENT OF AGRICULTURE CO-OPERATING

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PRINCIPLES OF INCUBATOR OPERATION

By O. C. UFFORD
Instructor in Poultry Husbandry

Successful incubator operations are based upon four important factors:

1. The proper temperature.
2. Plenty of moisture.
3. The right amount of ventilation.
4. Good eggs.

THE PROPER TEMPERATURE

It is usually advisable to follow the directions of the manufacturer in regard to the proper temperature for any particular make of incubator. The temperature at which such a machine is run, will depend principally upon where the thermometer is located in the egg chamber. With the bulb of the thermometer level with the top of the egg, a temperature of 102 degrees for the first week; 102 degrees for the second and 103 degrees for the third week should be maintained.

A temperature that runs too high causes a large number of blood rings and dead germs, or concludes the hatch too soon.

Eggs subjected to a high temperature should be removed from the egg chamber and cooled until cool to the touch.

Low temperature delays the hatch which is seldom if ever a good one.

MOISTURE

The amount of moisture to be supplied to the incubator depends upon the type of incubator and its method of ventilation. It is generally concluded, however, that some moisture is necessary. This is especially true for incubators operated in Colorado or any of the semi-arid states.

The chick's body is composed principally of water. If the egg loses too much by evaporation during incubation the chick does not have a sufficient supply for proper development and is weakened and unable to get out of the shell.

The best method of supplying moisture is to put it directly into the machine by means of sand trays or water pans which are kept filled with warm water.

One hundred eggs weighing 200 oz. when put in the incubator should not lose more than 20 ounces or ten per cent in weight in nineteen days if the best results are to be expected.

VENTILATION

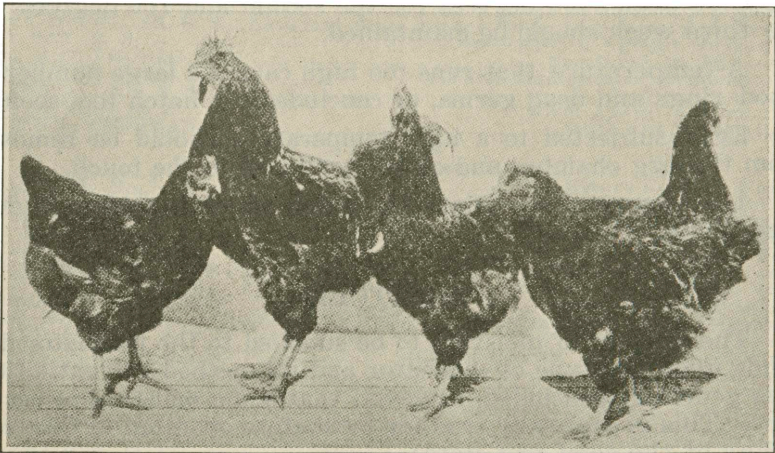
The chick developing in the shell requires a supply of oxygen or fresh air for its proper development. Incubators have various arrangements for regulating the amount of fresh air into the egg chamber. One should carefully follow the instructions of the manufacturer in this respect.

Plenty of ventilation is especially necessary along toward the end of the hatch when the embryonic chick is well developed in the shell. Too much ventilation causes rapid evaporation of the moisture from the egg, unless plenty of moisture is supplied to the machine.

GOOD EGGS

Although an incubator runs perfectly in every respect, it will not hatch eggs if they are not the hatchable kind.

There are many things in the improper management of a flock that will lower the hatchability of the eggs produced.



Stock of Strong Vitality Is Necessary for the Production of Hatchable Eggs.
Courtesy Kansas Agricultural Experiment Station.

Some of these are: Improper feeding of either good or poor rations; lack of vitality in breeding stock; improper matings; lack of range, or too intensive poultry keeping; forced egg production from breeding stock during the winter.

The following directions for incubator operations are general in nature and may be applied to the operating of any machine.

REPAIRING AND CLEANING THE INCUBATOR

Often the incubator to be used, is an old machine and needs a general over-hauling before it is operated. The following directions will be a guide in this respect:

1. Body:

- a. Clean thoroughly with soap and water;
- b. Disinfect interior;
- c. Examine tray and replace with a new bottom if necessary;
- d. Dust diaphragms, re-cover if necessary;
- e. Clean sand trays and supply with fresh sand.

2. Regulatory Device:

(a) Test thermostat and see that all parts are working freely. (Screw nut until nearly all the play is taken up. Then hold a lighted match **several** inches below thermostat. The disc over the lamp should raise quickly.)

(b) See that disc is hanging evenly over vent in lamp.

3. Thermometer.

(a) Test incubator thermometer against a standard clinical thermometer from 95 degrees to 105 degrees F. Place thermometers side by side in egg chamber with bulbs on same level. Note any variation.

(b) See that thermometer is provided with suitable stand or hanging device if either of these are to be used.

4. Lamp and Lamp Box:

(a) Clean out all soot from lamp box and flues. This is important as soot may drop upon flame causing a "smoke up" later.

(b) Pour out kerosene (if any) in lamp and re-fill 3-4 full in order to allow for expansion of oil if it becomes heated.

(c) Examine burner and if not in good condition replace with new. A dirty burner may be cleaned by boiling in water containing some baking soda or washing powder.

(d) Put in a new wick. A soggy or dirty wick may be cleaned as above.

(e) Clean lamp chimney and see that it fits on burner.

(f) Adjust seat of lamp so chimney fits properly in flue.

(g) Wipe off all oil or grease from lamp.

5. Level the machine to secure proper distribution of heat. If a carpenter's level is not available, one can be devised by filling a long glass bottle with water, leaving only a small bubble.

STARTING AND REGULATING THE INCUBATOR

1. Fill tank with hot water, (if hot water type).
2. Trim the wick cutting straight across the top and then snipping off each corner, to give an oval flame.
3. Fill 3-4 full, and light lamp, turning the wick to give a low flame at first, as the size of the flame will increase as the lamp heats up. A high flame before flues warm up will cause smoking. If this takes place the flues must be cleaned before heating system will work.
4. Loosen the adjustments on the regulator so that all the heat will pass through the machine. Allow for expansion of thermostat upon heating.
5. When the temperature reaches 101 degrees F. adjust the regulator until the disc is raised 1-8 inch above the vent on the lamp.
6. Run the machine for at least 48 hours to be sure that it is properly regulated and that the temperature will remain constant.
7. After the machine has once been adjusted and the temperature is constant, don't meddle with the regulating device.
8. Care of the lamp.
 1. Lamp should be filled once daily. Trim wick at time of filling by turning the wick down and rubbing the charred portion off even with top of wick guide with a match.
 2. Keep lamp and burner clean.
 3. Do not turn flame up too high after placing lamp back on machine.
9. If the incubator is a hot air type in which there is a maximum amount of ventilation and particularly if it is to be operated in a dry room, a sand tray covering the entire bottom of machine may be necessary to supply sufficient moisture. In such case the sand should be thoroughly moistened when starting up the machine. If less moisture is required the same pan may be used without sand, as less water will evaporate from free water surface than from the moist sand. Only warm water should be used after eggs are placed in the incubator.

SETTING THE INCUBATOR AND CARE OF THE EGGS

1. Place the eggs in the machine and do not disturb for two days.
2. On the third day begin turning the eggs night and morning and continue until they begin to "pip", about the 19th day, then close up the machine and do not open again until hatch is over. This is important.

3. Sprinkle the floor underneath the machine night and morning. Eggs get sufficient cooling during the turning process. It is not necessary to cool them unless the machine has no openings for ventilation or the temperature goes too high.

SOME HATCHING DON'TS

1. Don't leave the door of the machine open while turning the eggs.
2. Don't fill lamp before turning the eggs.
3. Don't handle eggs with kerosene on your hands.
4. Don't leave the incubator without making sure the lamp flame is not too high or smoking.
5. Don't lay things on top of incubator as they may interfere with regulating device.
6. Don't change regulating device after it has once been adjusted, unless toward the end of the hatch when the temperature has a tendency to climb.
7. Don't forget to fill and clean lamp daily.