# CIHM Microfiche Series (Monographs)

# ICMH Collection de microfiches (monographies)

Canadian Institute for Historical Microreproductions / Institut canadien de microreproductions historiques

## Technical and Bibliographic Notes / Notes techniques et bibliographiques

titute has attempted to obtain the best original
allable for filming. Features of this copy which
bibliographically unique, which may alter any of
ages in the reproduction, or which may
ntly change the usual method of filming are
below.

oloured covers /
ouverture de couleur

overs damaged /
ouverture endommagée

overs restored and/or laminated /
ouverture restaurée et/ou pelliculée

over title missing / Le titre de couverture manque

oloured maps / Cartes géographiques en couleur

oloured ink (i.e. other than blue or black) /
cre de couleur (i.e. autre que bleue ou noire)

oloured plates and/or illustrations /
anches et/ou illustrations en couleur

und with other material /
lié avec d'autres documents

ly edition available /
ule édition disponible

ht binding may cause shadows or distortion along
erior margin / La reliure serrée peut causer de
mbre ou de la distorsion le long de la marge
érieure.

nk leaves added during restorations may appear
hin the text. Whenever possible, these have been
itted from filming / Il se peut que certaines pages
nches ajoutées lors d'une restauration
paraissent dans le texte, mais, lorsque cela était
ssible, ces pages n'ont pas été filmées.

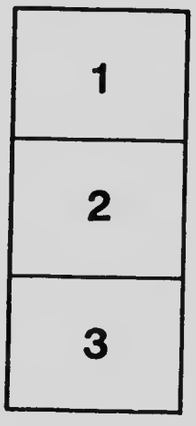
ditional comments /
mmentaires supplémentaires:

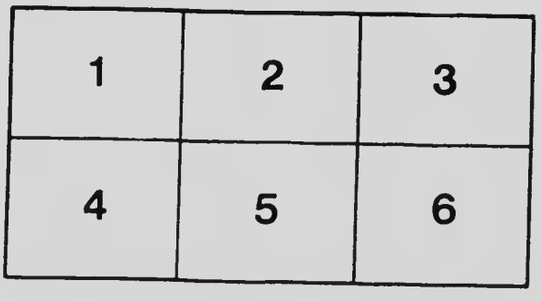
L'Institut a microfilmé le meilleur exemplaire qu'il
été possible de se procurer. Les détails de cet e
plaire qui sont peut-être uniques du point de vue
ographique, qui peuvent modifier une image reproc
ou qui peuvent exiger une modification dans la m
de normale de filmage sont indiqués ci-dessous.

- ☐ Coloured pages / Pages de couleur
- ☐ Pages damaged / Pages endommagées
- ☐ Pages restored and/or laminated / Pages restaurées et/ou pelliculées
- ☑ Pages discoloured, stained or foxed / Pages décolorées, tachetées ou piquées
- ☐ Pages detached / Pages détachées
- ☑ Showthrough / Transparence
- ☑ Quality of print varies / Qualité inégale de l'impression
- ☐ Includes supplementary material / Comprend du matériel supplémentaire
- ☐ Pages wholly or partially obscured by errata sl tissues, etc., have been refilmed to ensure the b possible image / Les pages totalement partiellement obscurcies par un feuillet d'errata, pelure, etc., ont été filmées à nouveau de faço obtenir la meilleure image possible.
- ☐ Opposing pages with varying colouration discolourations are filmed twice to ensure the b possible image / Les pages s'opposant ayant colorations variables ou des décolorations s filmées deux fois afin d'obtenir la meilleure ima possible.

filmed at the reduction ratio checked below /
nt est filmé au taux de réduction indiqué ci-dessous.

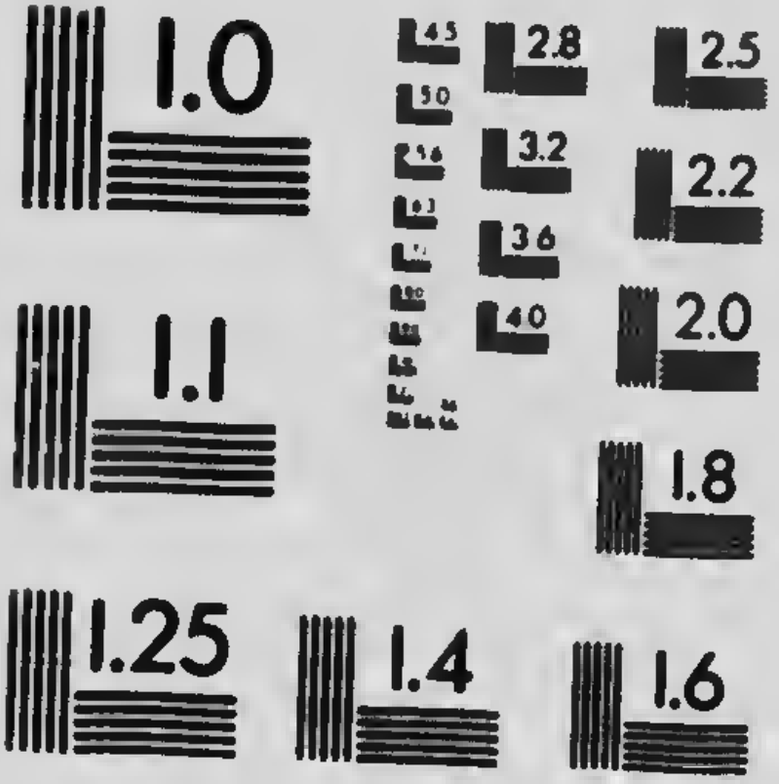
| 12x | 14x | 16x | 18x | 20x | 22x | 24x | 26x | 28x | 30x | 32 |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | √ | | | |

MICROCOPY RESOLUTION TEST CHART

(ANSI and ISO TEST CHART No 2)




APPLIED IMAGE Inc

1653 East Main Street
Rochester, New York 14609 USA
(716) 482 - 0300 - Phone
(716) 288 - 5989 - Fax

**EXHIBITION CIRCULAR No. 2.**

DOMINION OF CANADA.

DEPARTMENT OF AGRICULTURE.

**EXPERIMENTAL FARMS.**

**J. H. GRISDALE, B.Agr.,**
**Director.**

**F. C. ELFORD,**
**Dominion Poultry Husbandman.**

**POULTRY DIVISION.**

# ARTIFICIAL INCUBATION.

BY

F. C. ELFORD.

## ARTIFICIAL INCUBATION.

### BUYING AN INCUBATOR.

If more than 100 chicks are wanted an incubator as a rule will be found more satisfactory and profitable than sitting hens; better not buy an incubator however, if you are not prepared to give it proper care and attention and when you buy do not get the cheapest incubator you can get, simply because it is cheap. The best is none too good, and cheap machines are usually dear at any price. The first cost is nothing compared with the expense of keeping a poor machine supplied with eggs. Buy also from a reliable firm and as near home as possible.

### HOW TO TELL A GOOD MACHINE.

Nothing but results are an absolute guarantee that a machine is good, but still there are certain marks that indicate the probable value of a machine for hatching. The first of these is the general appearance. It should be well made, good workmanship and good material entering into its construction. The doors should hang true and fit without friction, the glass large enough and neatly puttied or battened, the paint or stain applied evenly and the machine should present the appearance of a finished piece of furniture. Good insulation also is absolutely necessary. See that the walls are double and likely to maintain a comparatively even temperature.

There are besides the above many other points of more or less importance. The lamp should have a large enough bowl to last at least thirty hours, convenient to fill, easy to take out and replace, good workable burner and chimney, the mica opening so placed that the whole of the flame is readily seen when the observer is standing, the heater well insulated and made so that it can be cleaned. A reliable thermometer and thermostat, egg trays that slide in and out without catching and the height of the machine should be convenient for working.

### THE SIZE TO BUY.

As a rule not more than three hatches can be taken off in one season and usually two hatches are better, therefore get an incubator large enough to hatch in two settings all the chicks desired. With an ordinary sized flock, a 125 egg capacity will be found more convenient than one double the size. If more accommodation is wanted another incubator can be purchased.

### CO-OPERATIVE HATCHING.

A new system of hatching has lately been introduced into Canada, that of custom or co-operative hatching; usually mammoth incubators are used for this purpose and

those who would rather pay a small fee than hatch their own eggs bring them to these machines and call for the chicks when incubated. This custom is being tried out in some sections and apparently is proving satisfactory.

### Where to Place the Incubator.

A well ventilated cellar with a fairly even temperature makes a suitable location for the incubator. If this is not available, a room in which a moderately even temperature can be maintained without artificial heat will answer. Fresh air is necessary but in admitting it draughts should be avoided.

### Operating the Incubator.

The operation of the machine will be considered under the following heads, heat, moisture, cooling, turning and testing; but it must be borne in mind that as a rule the general directions given by the manufacturers should be followed pretty closely,

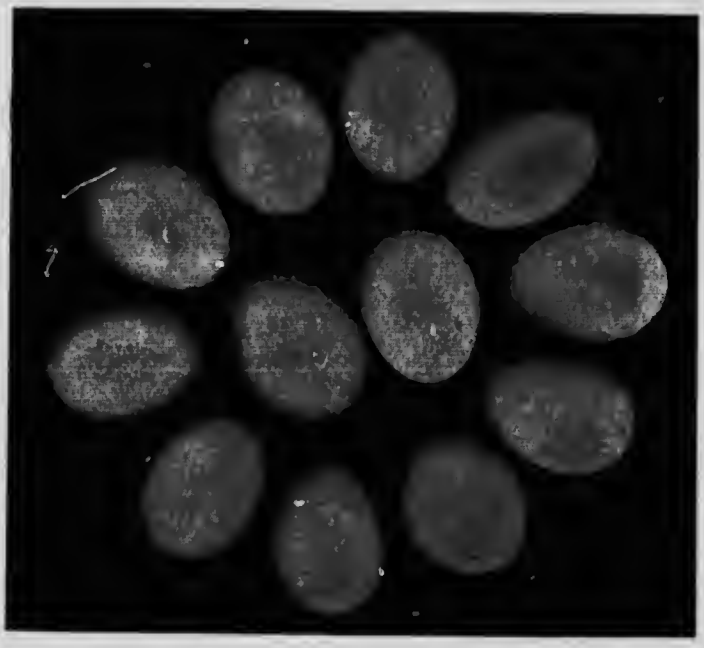


Plate 1.—Suitable Eggs for Hatching.

All eggs put under hens or in the incubator should be of a normal shape and appearance.

at least until they have proven unsatisfactory for local conditions and any general changes should be adopted only when they have proven an advantage by several tests though these tests may be in a small way only. One of the reasons why first hatches often are so successful is because rules for operation are closely adhered to, but by the time the operator has run off two or three hatches he begins to think he knows more than the manufacturers and makes rules of his own which are sometimes followed by disastrous results. Therefore whatever shall be said under these various heads is to be taken in a general way and not to replace direct instructions intended for any particular make of incubator, or to help out in case these instructions do not prove, in your individual case, the best.

*Heat.*—There are two kinds of thermometers in general use, those that hang up and those that stand or rest on the eggs. Usually 102½ degrees is recommended for the standing thermomoters and 103 for the hanging thermometers.

In starting the machine run it for several days without the eggs so as to insure good regulation and when the eggs are put in get the temperature up as soon as possible. If hatches are slow in coming off, raise the temperature in succeeding hatches and vice versa. It is a good plan to have an extra thermometer on hand in case of an accident and thermometers should be tested each spring before the incubation season.

*Moisture.*—Climatic conditions in most parts of Canada are such as to make it advisable to supply moisture. A relative humidity of from 50 to 60 inside the egg chamber gives most satisfactory results. Moisture checks the undue evaporation of the eggs and as a rule the more ventilation that is given the more moisture will be required. Where there is no hygrometer to register the humidity a fair indication of the proper amount can be ascertained by watching the air cell. At the first test on the 7th day, the air space ought to be about ⅛ the size of the egg and on the 16th day about ¼.

Moisture can be applied in a pan beneath the egg tray, or in some makes of machines a wet sponge can be placed above the hot air pipes with satisfaction.

PLATE 2.—Unsuitable Eggs for Hatching.

Eggs that are long, round, or with wrinkles and ridges as shown in this plate should be discarded when selecting for incubation.

As a rule if at hatching time the chicks are dried up and the air space large, too much ventilation has been allowed or not enough moisture given or both, and if on the other hand the chicks are as if drowned and a very little air space is seen, there has been too little ventilation or too much moisture or both.

*Cooling and turning.*—From the second day to the seventeenth, the eggs should be turned twice a day and cooled once, in very warm weather they may be cooled twice. No stated time can be given for cooling, so much depends upon the temperature of the room and the ventilation and moisture given. In turning it is not necessary to turn each individual egg over but rather to shuffle the eggs and in doing so work these at the outside to the centre and vice versa.

*Testing.*—Usually two tests are sufficient, one for fertility and one for dead germs. The test for fertility should take place on the 7th or 8th day of incubation. At this

time as the eggs are held before a light the infertile eggs will appear uniformly bright while the fertile eggs will show a dark spot with a cloudy portion around it. At the second test which is for the purpose of detecting the dead germs, an egg with a live germ will have the appearance much the same as that on the 7th day only the germ will appear larger and darker, probably one-half of the egg will appear dark and the air space will be larger. The dead germ may not appear much larger than when seen at the first test which would indicate that it had not grown as the others had, it also may be stuck to the shell and look like a red streak or, as it is called, a blood ring. All of these should be discarded as they will not develop into chicks.

Practice only will make one perfect in testing and it is a good plan to crack an egg occasionally to see what is inside and if you are not sure whether the germ is alive or not and do not want to break the egg, mark it so that you will know what it looked like, when you see whether it hatches or not.

### Good Breeding Stock.

The incubator is often blamed for poor results for which it is not responsible. The eggs from breeding stock that are lacking in vitality will never give satisfactory results in the incubator and what few chicks are fortunate enough to get out of the shell are almost sure to die in the brooder. The first essential then of a good hatch is to have healthy vigorous breeding birds. To this end see that the eggs are well fertilized, gathered promptly and set as fresh as possible.

### Things Worth Remembering.

Good healthy breeding stock is more than half a successful hatch. The fresher the egg the better the chance of a good hatch. Do not let broody hens sit on the eggs before being gathered nor allow the eggs to become chilled. If eggs have to be kept several days before incubation it is better to keep them in a covered box or pail, not in an open basket as it allows too much evaporation. Keep them in a fairly even temperature of from 50 to 60 degrees Fahr. Select only normal eggs, discarding the long, the round, the rough or thin shell, the double yoked and all others that have any marked peculiarity. Be careful of rough handling at the first of the hatch, treatment that will do no harm towards the end of the hatch might kill every germ the first day or two.

It is better not to interfere with the eggs after the 18th day but keep the temperature up and as a rule better results will be obtained if the chicks are not allowed to drop into the nursery drawer. The difference in the temperature between the egg tray and the nursery drawer is too much for the young chicks and especially if they are not perfectly dry or if they fall through the trap a few at a time. If the chicks are crowding in the egg tray open the door and put those that are dry and smart below into the nursery drawer. A number going into the nursery at the same time will not prove so dangerous and if the work is done quickly in a fairly warm room the opening of the door should not be detrimental to the rest of the hatch.

Hens should be mated from 6 to 10 days before using the eggs for incubating and the influence of the male will last about the same length of time after he is removed. There is no benefit derived from resting eggs after travelling, better put them into the incubator as soon as possible.

In conclusion do not blame the incubator for poor results when the breeding stock is unhealthy or the eggs badly handled. Give the incubator a fair chance and under most conditions it will produce good healthy chicks.

Published by order of Hon. MARTIN BURRELL, Minister of Agriculture, Ottawa, Ont.