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Poultrynz

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Poultrynz Editorial

July is the month in New Zealand where almost all the Poultry Shows have ended. Congratulations to all those who attended and to those who entered. Hope you had a great experience and would like to attend again or even take up exhibiting your birds. Heritage Breeds are most popular but so can be Bantams and other Exotic looking Breeds. Colour plays a big part in selecting a Breed as well as their shape and of course their ability to lay eggs. Whichever you liked at these events it is hoped that you had a good time and thought the visit was well worth while.
Until next issue.
Regards, Ian Selby.

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SAVOURY BREAD SCROLLS

INGREDIENTS

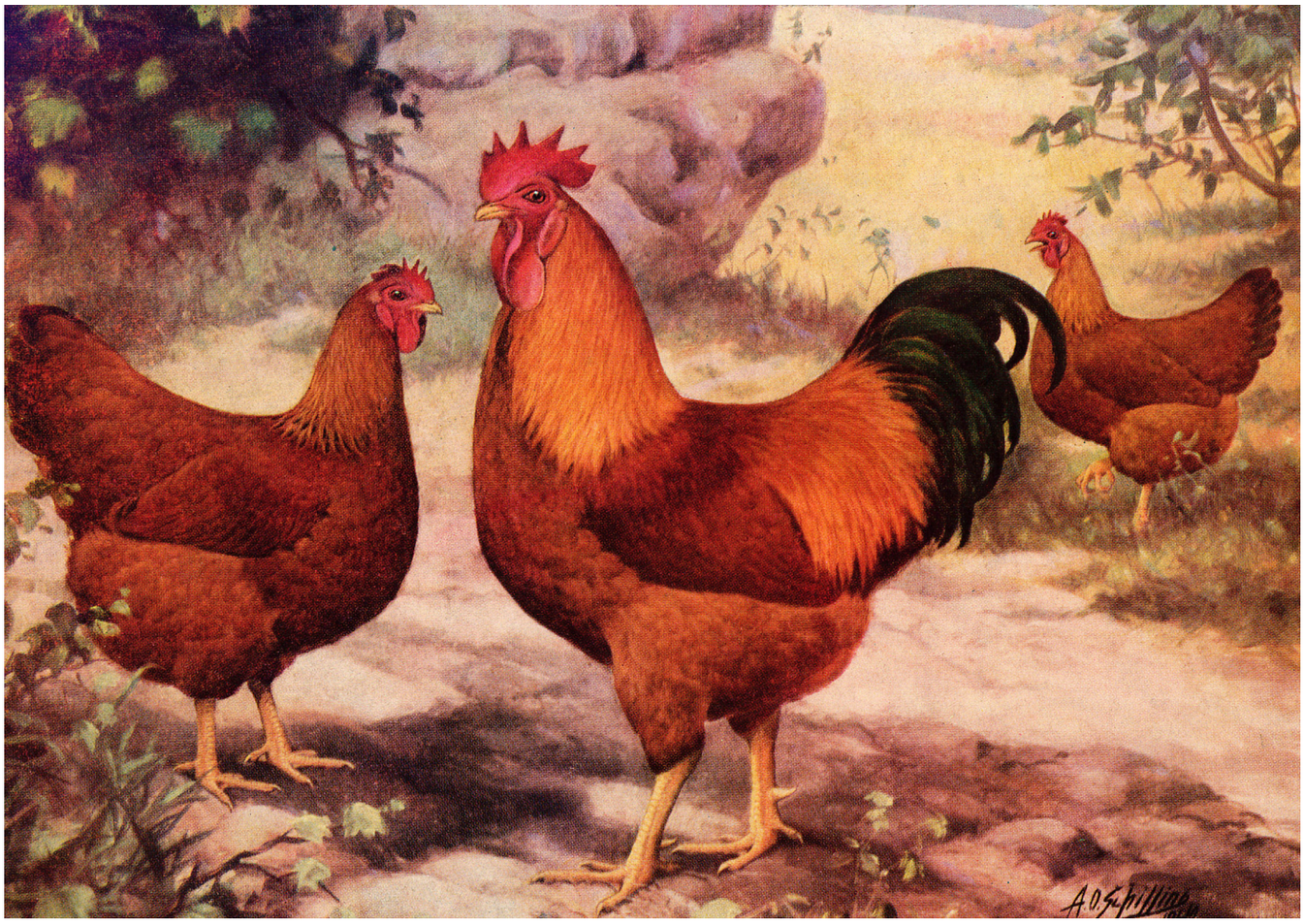
Makes about 22
250ml can reduced cream
32g packet onion soup mix
1 spring onion, finely sliced
1 cup grated tasty cheese
22-26 thick slices white bread
About 50g butter, melted
Extra grated cheese for sprinkling

METHOD

- Heat the oil in a large saucepan or stockpot Preheat oven to 175°C fan bake or 190°C regular. Place reduced cream, onion soup, spring onion and grated cheese in a food processor and pulse until well combined. (Alternatively, whisk ingredients together in a bowl.) Chill for at least 30 minutes.
- Cut crusts off bread and spread slices with cheese mixture. Roll up firmly and place on a lined baking tray. Brush with melted butter and top with a little grated cheese. Bake 10-12 minutes or until golden.

Make ahead: Cook rolls and reheat the next day, or roll them up, chill and cook as needed. These rolls freeze well too.

FEEDING FOR HATCHABILITY AND HEALTHY FOWLS



by Biely and Lloyd - Courtesy of the American Bantam Assn. New Hampshire Reds

Although egg-production is essentially for reproduction, the nutritive requirements of layers and breeders differ in many essential respects. On the whole, the requirements for high hatchability are greater and more exacting than for commercial egg-production. Moreover, the quality of the chicks hatched - i.e., their livability and early growth; are profoundly influenced by what the breeders are fed previous to and during the hatching period.

Since fowls convert feed into eggs rapidly, any variation in the feed will be registered in the nutritive content of the hatching eggs. Either lack or excess of a nutritive factor may be harmful and interfere with the normal development of the embryo. A lack of manganese, for example, will result in low hatchability and abnormal development of the embryo during incubation. On the other hand, excess calcium or phosphorus, or both, may immobilise manganese and cause perosis in chicks under ten days of age.

In view of the changes in natural conditions, it has become increasingly important to supply complete and balanced rations to the breeders previous to and during the hatching season. With something like forty entities (elements or compounds, as the individual case may be) which the food must supply, the number of combinations is almost staggering. That some of the more important of these have already been worked out successfully is indicated by the high records of egg-production and hatchability obtained by many poultrymen. Due credit in this connection should be given to breeding management and modern methods of incubation. A rough calculation from British Columbia figures, for example, shows that less than 70 per cent of all eggs incubated produced live chicks. Assuming 90 per cent average fertility, this means that less than 80 chicks, on

the average, hatch out from every 100 fertile eggs set. A large percentage of loss could be avoided or lessened by proper nutrition of the breeding stock and greater care in the selection of hatching eggs. The nutrients which must be supplied in a balanced ration adapted for breeders will be briefly discussed as follows:

Carbohydrate

Since poultry are generally fed "ad-lib.," little consideration need be given to the total feed supplied to breeders. Under normal conditions, birds regulate their food intake quite effectively. Undernourishment in the sense of insufficient feed is not likely to exist with poultry. There is, however, danger that when both mash and grain are fed some birds or even the whole flock may over-feed on grain, thus failing to consume the essential protein, minerals and vitamins as contained in the mash. Strictly speaking, an all-mash ration or pelleted feed would be the only method of feeding by which all birds in a flock would receive the essential nutrients in a balanced ration. In ordinary commercial practice, however, when birds are in good condition, equal parts of mash and grain give the most satisfactory results. With some flocks, as for example, in egg-laying contests, a ratio of 60 per cent mash to 40 per cent grain gives the most consistent results in number of eggs laid. As a general rule, it is safer to encourage greater mash than grain consumption. Overfat birds, especially in the heavy breeds, do not make desirable breeders; they become sluggish, their eggs are likely to lack in fertility and hatch poorly as compared with eggs from birds that are comparatively lean and active. Many poultrymen have found it advantageous to mix a small amount of fish oil with the grain immediately before feeding. This will ensure an adequate supply of vitamins A and D when the white grains only are fed, particularly for the cockerels which generally eat very little mash.

Fibre

The fibre content of a breeders' mash need not be different from that of laying mash. Best results are obtained when the fibre content is between five and seven per cent of the total feed. Fibre is important not only because it adds ballast to the ration, but also because, primarily, it improves the texture of the mash and prevents stickiness. Ground whole oats and bran are excellent sources of fibre for poultry. The inclusion of these products in high wheat rations improves the texture of the mash and is much more palatable than sticky, finely-ground mashes.

Fat

Little is known about the fat requirements of poultry except that birds can synthesise very efficiently fat from excess carbohydrate. Feeds that are high in fat tend to become rancid. It is therefore advisable to keep the percentage of fat in a ration to around five per cent. A small amount of natural fat is necessary for normal health and reproduction. This is not likely to be lacking when ordinary natural feedstuffs are included in the ration. If any specific fatty acid requirement exists, it is probably always taken care of in ordinary feeds.

Protein

The protein requirements of layers and breeders are between fifteen and sixteen per cent of the total diet. This amount of protein is supplied when mashes containing twenty per cent protein are fed along with scratch gain (about 12-13 per cent) in approximately equal amounts. Recent experimental work shows that the kind of protein fed has an important bearing on hatchability and the livability and growth of chicks. For best results a ration

Fine Oyster Shell Grit

should contain at least a small amount of animal protein, i.e., at least 20-25 per cent of the total protein content should be of animal origin. This would constitute a minimum of five per cent in a breeders' mash. Rations supplemented with vegetable protein only may be satisfactory for commercial egg-production, but, as shown by several investigators, are unsuitable for hatchability. On such rations hatchability may be 40-50 per cent below normal. Furthermore, chicks hatched from such rations show a high rate of mortality. Recent investigations show that in addition to all the known nutrients an additional factor called "animal factor" is necessary for normal reproduction when breeders are fed rations high in corn and soya bean. This factor may be supplied by animal protein concentrates, condensed fish solubles, dried cow manure, fresh droppings, and, to a smaller extent, by some fermentation by-products. While only small quantities of the animal factor are required, it appears to be absolutely essential for normal reproduction and early survival of chicks.

Our knowledge of proteins has advanced so far that we are now able to state the nutritive requirements of poultry in terms of the individual components of protein, i.e., aimno acids. For example, turkeys fed a diet deficient in lysine, an amino acid, showed white areas in the wing feathers, a defect which could be prevented in growing turkeys by including feed rich in this amino acid, or by the addition of pure lysine.

Recent experiments at the University of Wisconsin and elsewhere have indicated that there is a nutritional relationship between tryptophane, which is an essential amino acid, and the vitamin niacin. Certain diets were found to produce deficiency symptoms which could be alleviated by either niacin or tryptophane. These observations indicate that it may be important to supply adequate levels of niacin in order to minimise the requirements for tryptophane.

With the increased knowledge of the amino acid composition of feeds, great use could be made of such products as linseed meal,

Mash - crumbles - pellets

cottonseed meal, and peanut meal if they were supplemented with the essential amino acids lysine and methionine in which they are deficient. There are already on the market various amino acid mixtures which may be used to advantage in supplementing ordinarily constituted rations. Rations formerly considered to be complete may be considerably improved and made more efficient in the light of newer knowledge of the function and availability of amino acids.

Minerals

While the importance of minerals such as calcium, phosphorus, manganese and salt in poultry nutrition has long been recognized, there is little information available regarding "trace" minerals and the interrelationship among the minerals themselves. Calcium in the form of limestone or oyster shell is essential for the formation of shell. Along with phosphorus, it is necessary for the building of sound bone. The assimilation of these two minerals, calcium and phosphorus, depends upon the absolute and relative proportions of them in the ratio and, in turn, is dependent upon an adequate supply of vitamin D.

Manganese, although required in small amounts only, is necessary for the normal formation of bone and development of the embryo, thus playing an important part in reproduction. Magnesium is required for the smooth formation and quality of egg shell. Salt supplies two minerals, sodium and chlorine; the former is an important cell regulatory element, and the latter is an essential constituent of gastric juice.

Wheat

Potassium, an element which is abundant in all plant life, has so far received comparatively little attention in poultry nutrition. However, it has recently come into prominence in connection with the control of so-called bluecomb disease.

Iodine, iron, copper and magnesium are ordinarily present in sufficient amounts in common rations to meet the normal requirements of breeders. Comparatively little information is available, however, on the role and importance of the so-called "trace" elements, cobalt, zinc, nickel and others, which are required only in very minute quantities. They are the subject of intensive research, and probably hold a clue to many unsolved nutritional problems.

Vitamins

Familiarity, people say, breeds contempt. The word "vitamin" has been bandied around so much that often times it arouses a sense of contempt on the part of the layman. The commercial advances made in poultry keeping during the past years are, in the main, due to discoveries in the field of vitamins. Were it not for the discovery of vitamin D, it would not have been possible to rear and maintain chickens indoors. The steady increase in hatchability that has taken place during the past years is due to a greater appreciation of the role of vitamins and, particularly, recognition of the value and extensive use of riboflavin as a supplement in poultry rations.

The minimum requirements for nearly all the vitamins have been fairly accurately worked out. The nutritional requirements for practical purposes should be fairly well met if these minimum standards are doubled, although for optimum nutrition they should be trebled. Unlike most other nutrients, the vitamins are required in very minute amounts - parts per million and if fed liberally are not likely to be injurious. Very little is known, however, at present time about the interrelationships that exist between different vitamins. The pertinent information about vitamins may be briefly summarized as follows:

Of the fat soluble vitamins A, D, E and K, the A and D are of the greatest significance in poultry rations. The requirements for vitamins A and D have been very well worked out. Vitamin A is available in natural or dehydrated greenfeed, fish oil and to a small extent in yellow corn. This vitamin plays a very important role in reproduction; furthermore, if provided in ample amounts in the diet it is stored in the egg and in the liver of newly hatched chicks. A reserve of vitamin A in the eggs is good insurance insofar as the first two weeks of the chick's life is concerned.

The vitamin D requirements may be readily

met by either sunshine or the various vitamin D preparations on the market. There may be as much as two to five per cent difference in the percentage of bone ash of chicks, depending on whether the diet of the breeders was high or low in vitamin D. New Hampshire chicks show an abnormal amount of black pigment deposited as a result of vitamin D deficiency. This defect may be readily removed by the addition of vitamin D to the diet.

Of the dozen or more members of the vitamin B/G complex so far discovered, at least half are of practical importance in poultry nutrition. They are riboflavin, pantothenis acid, pyridoxin, biotin, folic acid. All of these are necessary for reproduction and growth. They play a particularly important role during the first two weeks of the chick's life.

Chicks that start with a low reserve of these vitamins in their tissues at the time of hatching may be considerably handicapped. Moreover, chicks fed the same diet hatched from eggs produced on different diets show marked difference in growth and physical condition. Dermatitis in chicks and poults, curled toe paralysis, perosis, deformities in skeleton, may be traced to certain deficiencies in the breeders' diet. General weakness and growth failure in chicks may often be attributed to borderline diets fed to the breeders.

Many of the vitamins of the B/G complex can now be used quite economically in the synthetic form. However, before so doing, it is advisable to make use of natural products so far as possible. To provide an abundance of the members of the vitamin B/G complex, a breeders' diet should include a daily supply of fresh greenfeed. If fresh greenfeed is not available, then good quality dehydrated greenfeed should be used. Milk products are considered to be good sources of the vitamin B/G complex, and should be used when available at reasonable cost. But even if the above products are used in abundance, there is still the possibility that the diet will lack one or more vitamins.

It is wise, therefore, to make use of vitamin-rich supplements which, when added in small quantities, will correct the particular deficiency without necessarily changing the general composition of the rations. In such instances, consideration should be given to the following supplements: liver meal, good quality yeast, various fermentation products such as BY, Curbay, and others and synthetic vitamins. By making sure that the breeders' ration is well fortified with the necessary vitamins, hatchability may be maintained at a high level. Furthermore, the carryover to the chick would ensure high viability and satisfactory growth.

It should, of course, always be remembered from a management standpoint that when both mash and grain are fed it is the mash that generally contains the valuable animal protein, minerals and vitamins. In discussing the nutritive requirements, we are not concerned with just what the mash supplies, but what the total feed contains that is, the mash and grain and any other supplement which the bird consumes.

Any chain is only as strong as its weakest link. Breeding, management, and incubation are all very important links in the chain of reproduction. But each rests upon the nourishment received by the breeding hen. The nutrients that she consumes must provide materials not only for her own body needs and the eggs which she produces, but for a future generation.

BANTAM BREEDING AS A HOBBY

Courtesy of the American Bantam Association

Broody Hen sitting on eggs

Little has been written concerning the keeping of Bantams for the purpose of egg production, which is but natural seeing that most breeders do not keep Bantams for that purpose.

The large army of Bantam fanciers whose main object is the breeding of Bantams for exhibition should not, however, be overlooked as they do make the Bantam Fancy.

It is a mistake for the beginner to believe that they can purchase good foundation stock cheaply, for a really good breeder has invariably spent a good deal of money and years of work in getting together a first class flock.

No genuine breeder will run the risk of losing his reputation by selling inferior stock and it should also be remembered that it costs no more to feed good stock than it does to maintain inferior Bantams.

Artificial incubation undoubtedly has its advantages for the large scale breeder but it is an opinion that the more or less despised broody hen provides the best means for hatching where quality rather than quantity of chicks is the objective. At least, there is no better or more natural means of hatching.

The best means of setting a broody is next to the ground using straw for nesting material. The ideal place is beneath a nice shade bush, but a packing case with the bottom knocked out (to permit of the eggs resting next to the ground) will serve very well.

Care should be taken to place the nest where the weather can do it no harm and the sun cannot shine directly on it. The box should be so arranged that the hen when returning to the nest cannot jump on the eggs, causing breakage.

When setting the hen, the ground should first be well dampened and the straw worked into a saucer shaped nest. Choose only clean sound straw, hollow straw tends to harbour mites and lice.

Water, feed and a dust bath should be handy to the nest, and care should be taken if removing the hen from the nest during setting to see that no eggs are caught up her wings as these may fall and break others.

The hen should be disturbed as little as possible, as natural instinct may cause her to leave the nest if interfered with too much.

Sometimes, when a fancier wants to get together a setting of eggs from one particular hen they find it best to pen the hen with the male and not remove the eggs from the nest until the full setting is obtained.

This is explained by the fact that if left in the nest the eggs are warmed each time the hen visits the nest, as they would under natural conditions, where as if

Broody Hen with her chicks

removed individually the eggs would not be warmed at all.

Experience has shown that it is always better to leave the eggs in the nest when breeding from a single hen.

Once the chicks hatch out they should be placed in a coop with the hen and no food given for about 24 to 36 hours, after which a little chick starter should be provided.

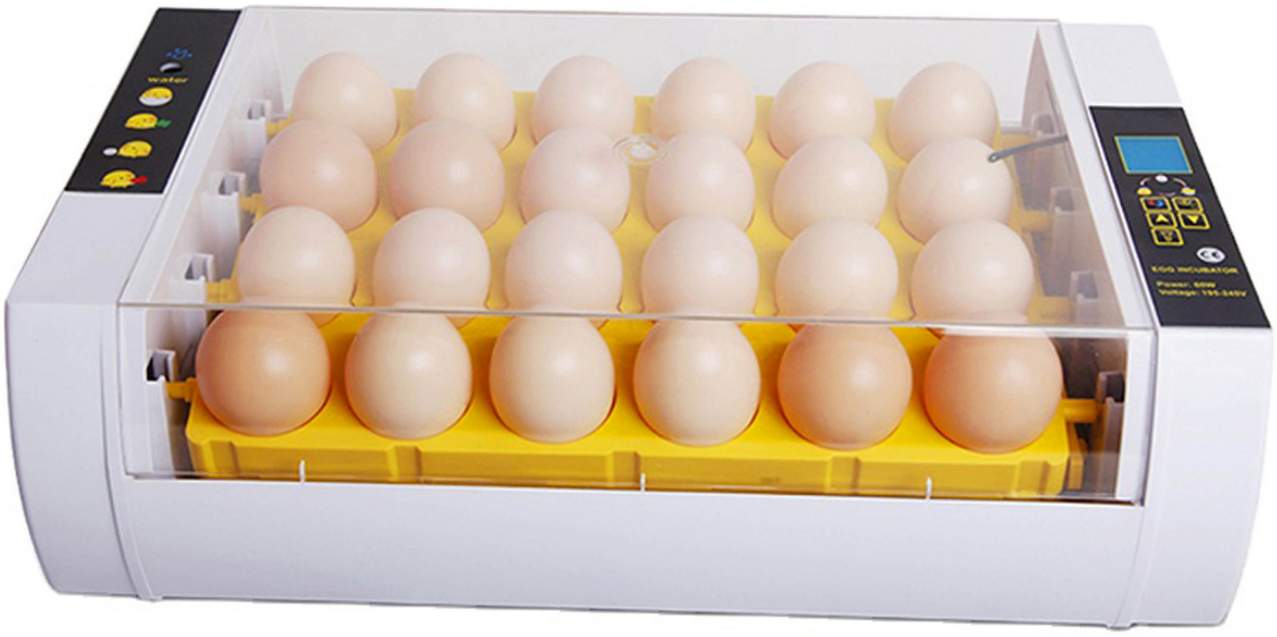
It is most important that free range be available for the crowding chicks to roam over, permitting them to receive much natural food such as insects and green-feed.

A good deal has been written about training Bantams for the show room, but I am firmly convinced that by far the best way is to encourage them to become tame when young.

It is much less easy to teach a Bantam how to conduct itself in the show room if it has not been brought up to be tame.

Favoured is close penning when preparing for a show, except in certain cases. Some Bantams are of a highly strung temperament and it may do more harm than good, the fancier should observe which methods suit best his particular Bantams. All exhibition birds should be sufficiently tame to pick tid-bits from the hand of the owner.

SUCCESSFUL INCUBATION



Small Poultry Incubator

The hatchability of eggs can be severely reduced by improper care prior to incubation. If it is not practical to put the eggs in an incubator as soon as you get them, protect them from extreme variations in temperature. Ideally, eggs should not be more than 7 days old when they are set (placed in the incubator). Beyond that point hatchability declines.

If it is necessary to hold the eggs before incubating, store them in a room where the temperature is around 50 degrees Fahrenheit and the relative humidity is 70% to 80%. Temperatures below 40 degrees Fahrenheit reduce hatchability. Turn them daily; under no circumstances should the eggs be held at room temperature because temperatures at this level are detrimental to hatchability. Embryos will begin to develop at subnormal rates when the temperature reaches about 80 degrees Fahrenheit.

LOCATION OF INCUBATOR

Locate your incubator in a room where the temperature is between 70 and 75 degrees Fahrenheit, and which is free from drafts and excessive variations in temperature. Do not place the incubators near windows where it will be exposed to the direct rays of the sun, raising the temperature so much that all the embryos will be destroyed.

THE INCUBATOR

Before setting the eggs, ascertain that the incubator is in good working order. Put some warm water in the water pan, place each thermometer so that the bulb is 1 inch above the screen and operate the incubator until the temperature inside holds at 99 to 103 degrees.

Depending on the type of incubator used, adjust the control so that the temperature is steady and there is no heat loss anywhere.

PREPARATION OF EGGS

Eggs must be turned while in the incubator, so before incubation, mark them with a pencil to determine if they have been properly turned. An excellent method is to put an “X” on one side of the egg and an “0” on the opposite side. Then you can always tell when the eggs have been turned because either all “0”s or all “X”s are turned up.

HUMIDITY

Nature has provided that the eggs shall dry out to some extent during incubation. This loss should be about 11% of the original weight, but any more than this is detrimental.

Water must be placed in the incubator to avoid excessive moisture loss. Keep a pan of water in the incubator at all times. The surface area of the pan should be about as large as the tray of eggs.

The amount of opening in the incubator also influences

the level of humidity; when the humidity is too high, open the vents all the way and when the humidity is too low, vents or openings should be nearly closed, but never completely so. Weather conditions will affect the relative humidity in the incubator.

The ideal moisture level is about 50 to 55 percent relative humidity (83-87 degrees Fahrenheit on a wet bulb thermometer) for the first 18 days and about 65% (89-90 degrees Fahrenheit wet bulb) for the last 3 days. Excessive drying because of low humidity will cause the chick to stick to the shell and fail to survive. Some variation above or below the ideal level usually do not affect hatchability drastically.

When refilling the water pan, use warm water. Hot or cold water will affect the temperature of the incubator too much. To provide increased humidity during the last three days of incubation, set an extra pan of water or put a wet sponge. A word of caution: Do not let the eggs come in direct contact with the water at any time.

Egg Candling

TEMPERATURE

Temperature in the still air incubator can vary from 99 to 103 degrees Fahrenheit with no harmful effects, if it varies between these limits rather than staying at either extreme. If it stays at either extreme for several days, the hatch maybe somewhat reduced. Overheating is much more critical than under-heating. Overheating will result in abnormal embryos, speed up development and lower hatchability.

A thermometer should be situated in the centre of the incubator if possible, and the bulb of the thermometer should be level with, but not touching, the tops of the eggs.

PROPER VENTILATION

Proper ventilation is very important during the incubation process. While the embryo is developing, oxygen enters the egg through the shell and carbondioxide escapes in the same manner. As the chicks begin to hatch, it is essential that they receive an increasing supply of oxygen. This means that the air openings need to be opened gradually to increase the flow of air.

LENGTH OF INCUBATION

Chicken eggs require 21 days to hatch, but the incubation period for eggs of other species of poultry varies. The approximate incubation periods for various species of poultry and game birds are:

Breed	Days
Chicken	21
Turkey	28
Duck	28
Muscovy Duck	33-35
Goose	29-31
Guinea Fowl	26-28
Pigeon	16-18
Ring-neck Pheasant	23-24
Mongolian Pheasant	24-25
Bob White Quail	23
Japanese Quail	17-18
Chukar Partridge	22-23
Peafowl	28

TURNING THE EGGS

When the eggs are put in the incubator, lay them on their sides and turn them at least 3 times a day. Turning prevents the embryo from sticking to the shell membranes as it will do if left in one position too long. Good results can be obtained by turning the eggs first thing in the morning, again at noon and the last thing at night. Of course, it is better to turn the eggs more than three times a day. In any case, they should be turned an odd number of times so that the side that is up longest will be staggered from day to day. Otherwise, the egg will

be in the same position every night, which is the longest stretch of time between turns.

When you turn the eggs, move them to a different part of the tray to offset variations in temperature in the different parts of the incubator. Continue to turn eggs from the first through the 17th day only, never after the 17th day.

There are incubators in the market equipped with automatic turning gadgets, which eliminates the manual chore of turning the eggs individually.

TESTING THE EGGS

Although it is not necessary to test eggs for fertility, you can eliminate the eggs which are not going to hatch. It is an interesting phase of incubation as it is possible to clearly see the developing embryo through the process of candling.

The first parts of the embryo that can be seen by candling will be the head and the eye which will appear as a dark object. If the embryo is alive and circulation is established, the contents of the egg will have a pinkish colour or cast. But if the embryo is dead, the contents will appear muddy or brownish.

The live and growing embryo will eventually occupy all of the interior of the egg and will not transmit light; thus, it will be impossible to see anything but the air cell at the end of the incubation period. Infertile eggs and early dead embryos can be detected readily because the egg will appear clear.

Removing the eggs from the incubator for candling does little harm if you handle them gently. It may slow up development of the chick, though, depending upon how much the egg is cooled. Generally, if the eggs are removed from the incubator, two or three times for a period of no more than 15 minutes each, such cooling will make little difference in the total incubation time.

On the other hand, if eggs are cooled for several hours because of power failure or some other reason, hatching time may be delayed. It is as important not to cool the eggs too long, as it is to avoid overheating.

FINAL STAGES

After the 17th day, eggs should not be turned, and the incubator should not be opened unless it becomes necessary to add water or make some necessary adjustment. Chicks will start to pip around the 19th day. All chicks which are going to hatch should be out of their shells by the 21st day.

If the eggs were chilled or you ran into operational difficulties during the incubation period, the hatch may be delayed. Chicks that hatch beyond the 22nd day are usually not healthy, vigorous ones.

When most of the eggs are hatched, lower the temperature to approximately 95 degrees F; this permits the newly-hatched chicks to dry off. At this time, all the air vents should be opened.

HOW THE CHICK EMERGES FROM THE SHELL

The head of the chick develops at the large end of the egg. Between the 15th and 16th days, the chick orients itself so that its head is near the air cell at the large end, of the egg. Not long before the chick is ready to make its way out of the shell, its neck acquires a double bend so that its beak is under its right wing and pointed toward the air cell.

About the 19th day, the chick thrusts its head forward. Its beak quickly breaks through the inner shell membrane, and the chick's lungs begin to function. The complete respiratory function does not usually occur until the 20th day of incubation.

Using its egg tooth (a tiny, sharp, horny projection on the end of its beak), the chick pecks at the shell until it pips its way through the shell and begins to breathe air

directly from the outside.

After the chick has made a hole in the shell, it stops pipping for 3 to 8 hours and rests. During this time, it is acclimatising its lungs to the outside atmosphere. After the resting stage is completed, the second stage of pipping begins.

The chick begins to turn slowly inside the egg. As it turns, usually counter-clock-wise, the cutting edge of the chick tooth continues to chip away. In 2-5 hours, the chick has made about three quarters of a turn inside the egg.

As the movement progresses around the shell, the chick begins pushing on the egg cap (large end); squirming, struggling and working feverishly for about 40 minutes. Finally with a vigorous shove, the chick emerges free from the shell, still wet and panting.

When completely out of the shell, the chick lies still as it is extremely tired and exhausted. It rests for a few minutes and begins to rise to its feet and gain co-ordination of its muscles. Within a few days, the egg tooth, its usefulness over, will disappear.

As soon as the chicks have dried and fluffed up completely, transfer them to a brooder or holding quarters where the temperature is approximately 95 degrees F.

AFTER THE INCUBATION

When the hatch is completed, disconnect the incubator and remove all shells and unhatched eggs and wipe the interior clean with a soapy sponge. Permit the incubator to air dry for several days. Cleaning can be made easier if a layer or two of cheesecloth or crinoline is placed on the rack on the 17th day of incubation, to catch the egg shells and other debris. This will also help prevent injury to the chicks' navels. After the chicks are removed, the cheesecloth can be discarded.

WINTER GREEN STUFF FOR POULTRY

Fowls eating grated Carrots

Sprouting wheat

Silver beet

Green Feed for poultry

Courtesy of the American Bantam Association

While Fowls do pretty well in winter on a hard grain feed, it will be found that they will do better if given some green stuff occasionally. But it is not necessary to feed much green food as such food is cooling rather than heat forming. If you have only a pen or two of them it will not be much of a task to find green stuff as there is usually enough of such vegetables in the waste from every kitchen in the way of pieces of cabbage, lettuce, carrots, etc. Under such circumstances it is well to produce in the autumn all of the vegetables from the garden which might otherwise go to waste. Cabbages, sugar beets, carrots, turnips or similar succulent vegetables are very desirable and should be put away in a cool cellar. You will have to use the cabbages first as they will spoil the quickest, but you will soon learn such things.

In feeding such vegetables it is best to hang them in such a manner that the birds will have to take some exercise in getting what they need. Do not hang the vegetables too high at first. But after the birds become accustomed to them you can make them take quite a big jump to get a pick at them. This will give the birds some exercise which will be beneficial to them.

Should vegetables be unobtainable, the next best thing, or we might say the best thing after all is sprouted eats. To sprout oats, place them in a tray of a size suitable and large enough to grow enough feed for one day's feeding and this will depend upon the size of your flock. The trays should be made with sides about two inches high and the bottom should be woven wire such as used on window screens. Two or three such trays should be made and this will give a supply for every other day as it will take about seven days to grow sprouts about one inch in length, which size is said to be the best, because after they get larger than that they loose in nutriment. It will not be necessary to feed such food every day unless you are attempting to secure a big egg yield such as in the early spring when eggs are wanted for hatching purposes.

The oats to be sprouted should be soaked in warm water for about twenty-four hours; then they should be spread on one of the trays being careful to make them not over one inch thick, and they should be kept moist by watering every day. A good plan is to have a rack made so as to hold these trays one above another. By such an arrangement you will save time in watering as you will then simply have to water the top tray and it will drip down onto the bottom one.

Sometimes the oats become mouldy and musty and cause trouble when feeding. To prevent this it has been recommended that the oats be treated as follows:

In the summer there is no problem as they can get ample green food if turn out onto the lawn or a small garden will supply both table and Bantams.