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### PRODUCING GUARANTEED EGGS

Heretofore the egg business has been characterized by lack of definite standards and indifference on the part of producers and market talent. Of recent years a special effort has been made to improve the method of producing eggs. It is estimated that fully 17 percent of the eggs laid in the United States are lost, due to the neglect of farmers and egg dealers. This loss amounts to about \$50,000,000 annually. Dirty eggs, failure to gather them frequently, and poor methods of storage and shipping to market are responsible for this great loss.

Although the production of eggs is an old business, people do not seem to appreciate how perishable they are. In Arizona the summer climate renders it difficult to store eggs successfully. The market, however, is good. On this account eggs should be marketed as soon as possible and not kept on the farm for more than three days. Poultrymen should use improved methods of producing and handling eggs until they are marketed. This would result in increased prices to the producer and enlarged demand by the consumers, who would have greater confidence in the quality of eggs used.

### PRODUCING A NORMAL EGG

The physiology involved in the development of an egg is most interesting. The right ovary and oviduct do not develop, but the left enlarges until it occupies the body cavity. Egg yolks are developed in the left ovary, which contains several hundreds of the yolks. These vary in size from minute specks just visible to the eye to the fully matured normal yolk. They are attached to the ovary by means of a short stem which extends around the yolk. When mature the membrane splits longitudinally and liberates the yolk, which drops into the funnel part of the oviduct. As the yolk passes down the oviduct it is fertilized and gathers the albumen, two shell membranes, and finally the shell and its pigment. The development of the yolk requires about 14 days, and the rest of the egg develop-

ment takes place in about 24 hours. During the early stages the yolk grows by laying on concentric layers of yellow masses, and the thickness of these layers varies according to the food, health, and vitality of the bird and laying ability of the hen.

The fresh egg is clean, wholesome, and of good flavor but is very susceptible to deterioration by improper storage and handling. It often happens that the points of egg production are distant from the place where they are used, and there must be some delay before eggs reach the consumer. There has always been an unlimited demand for best-quality eggs, for which discriminating consumers do not hesitate to pay a premium. The recent disclosures of putrid eggs being used for baking purposes have produced much alarm among consumers. This has had a tendency to reduce the consumption of eggs. There is also a fear in the mind of a person breaking a boiled egg that it will be spoiled. It is not the loss of food contents in the egg that is feared, but rather the mental shock produced by the sight and odor of a spoiled egg. The demand for best-quality eggs has been so great that it has been found profitable to cater to the special trade which demands "guaranteed eggs."

#### WHAT ARE GUARANTEED EGGS?

Guaranteed eggs, as the words imply, are of superior quality in every way. They must be fresh, clean, and uniform in size and color. Either producer or the middleman may guarantee the eggs, but it is always understood that they must be satisfactory to the consumer.

Many eggs meet the standard requirements for guaranteed eggs without being called by this name. Any poultryman who has developed a good trade for eggs at an advanced price may be considered to be producing eggs of, or near, this grade. There is no virtue in the name unless the guarantee is lived up to. Furthermore, almost any person in the egg business will replace rotten eggs with good ones if notified by his customers.

Many persons have found that a guarantee is a useful means of attracting the attention of consumers. Such a guarantee frequently secures customers, but effort must be made to hold them by maintaining a high standard of excellence.

#### ADVANTAGES OF PRODUCING GUARANTEED EGGS

1. Increases consumption.
2. Supplies eggs of unquestionable quality.
3. Avoids waste.
4. Brings higher prices and greater profit.
5. Customers obtain a regular supply.
6. Promotes a tendency to long-term contracts.

Advantages of marketing guaranteed eggs are gained by both producer and consumer. The producer takes more interest in the poultry and makes a special effort to improve the quality of the eggs, for which he receives higher prices. The consumer is especially benefited because he is enabled to secure a regular supply of fresh

eggs. The price is higher than the regular market eggs, but he is certain of obtaining good quality. These eggs may be used where one could not trust eggs of ordinary quality, such as for boiling and special drinks.

#### CHARACTERISTICS OF GUARANTEED EGGS

*Freshness:* The first prerequisite of a guaranteed egg is freshness. Eggs should be used which are strictly newly laid. If kept in a cool place and never exposed to the heat for any length of time a week-old egg cannot be distinguished from eggs one day old. The keeping quality, however, is damaged by storage, and it is therefore important that guaranteed eggs should be strictly fresh. A fresh egg can be distinguished easily from stale or cold-storage eggs. The yolk of a fresh egg should be round and stand high when broken. The albumen next to the yolk should be jelly-like in appearance, but the outside layer of the albumen should be watery. Old eggs are readily distinguished by the flat appearance of the yolk and by the uniform watery appearance of the albumen.

*Attractiveness:* Guaranteed eggs must be the best that can be produced, therefore they must be attractive. The consumer is certain to receive impressions from the general appearance of the eggs. This will influence his opinion of the freshness and wholesomeness. They should be uniform in size and color, and must be clean. Not one inferior egg may ever reach the consumer. Soiled eggs should be sponged off but not immersed, badly stained eggs had best be consumed at home. Small eggs are not tolerated, for they do not meet market requirements. Firm, strong-shelled eggs are important, as a single thin, porous-shelled one may break and soil several others. It is also found that thick-shelled eggs keep and ship much better than thin-shelled.

*Uniformity:* Uniformity has a magic effect upon the buyer. Eggs should be uniform in size, shape, and color. It is not only important that the contents of each crate be uniform, but a similar class of eggs should be shipped throughout the year. This brings premium prices. By grading eggs it is easy to eliminate all that vary in any way.

*Size:* The standard egg should be 2.25 inches long and 1.7 inches in diameter at the widest place. Such an egg averages a trifle over 2 ounces in weight, or 1.5 pounds to the dozen. Shipping cartons are made to carry this sized egg; other sizes do not pack or ship well, as evidenced by the fact that the highest percentage of broken ones occurs among eggs of irregular size. A few large eggs mixed with those of average size detract from the general appearance and value. Small and large eggs should be kept at home or used to supply ordinary commercial trade.

*Color:* Eggs of the same color always appear larger and more attractive than mixed lots. There are two distinct colors in market eggs—brown and white. Certain markets have a preference for a special color; thus the Boston market favors brown eggs and the New York market white eggs. Fortunately, Arizona consumers are not discriminating in this respect, but they seem to prefer white eggs.

## HOW TO PRODUCE GUARANTEED EGGS

Several well recognized factors are necessary to secure a large egg yield. Some of the most important are good stock, comfortable quarters, proper food, sufficient exercise, reasonable cleanliness, and favorable weather with a provision for shade. These points should receive due consideration whether or not one is producing guaranteed eggs.

*Good birds:* The hen, being in herself a regular egg machine, must be healthy, vigorous, and of good breeding. The first consideration, therefore, is to obtain good birds. Money invested in good hatching eggs or breeding stock will be the foundation for future profits. Since the average Arizona hen yields only 71 eggs per year, it follows that selection and breeding must be practiced at all times. It is not enough to have a good breed of birds, but these must be selected and culled from year to year, with the idea of constantly improving the flock. It has been found that breeding and selection may not only control the shape and color but also result in increased size and yield of eggs. This, therefore, enables the farmer to produce the type of eggs demanded in market. The use of a good male bird is of the greatest importance in breeding. He should come from high-producing and vigorous parents. The male bird has a greater influence upon the egg-laying qualities and type characteristics than the female, but neither sex should be allowed to deteriorate.

*Pure breed:* In selecting the breed, general characteristics must be considered, such as their adaptation to special locations, their nervousness, color, size of eggs laid, and their winter laying qualities. Pure bred hens should be selected, as they are more attractive and are better layers. It is a mistake to keep a lot of mongrel fowls, as they supply eggs varying in size, shape, and color. Even pure bred birds should be carefully culled out periodically, so that the eggs produced will weigh two ounces or more and be uniform in appearance.

*Breeding to produce guaranteed eggs:* One of the chief considerations in producing guaranteed eggs is to maintain a constant supply throughout the year. It is almost as important as securing a large yield. It is always difficult to secure a supply of fresh eggs during winter months, at which time prices are unusually high. Pullets are best for producing winter eggs. They should be hatched early enough so that they will mature and lay in November. Artificial spring conditions must be produced in order to stimulate good egg yielding during the cold months. It may be necessary to select two breeds—one for winter eggs and another for summer eggs. The White Leghorns and Rhode Island Reds may be used to advantage for this purpose. It is best, however, to pack the white eggs separate from the brown.

To facilitate grading, all hens should be eliminated that do not lay eggs standard in size, shape, and shell. To assist in this selection it may be wise to trap-nest, for this enables one to study the number and kind of eggs laid by each hen. The trap nest also serves to distinguish the early layers from those that begin to lay later in the

season. Fortunately, pullets that begin to lay early in life are the best layers. This makes a simple basis for weeding out inferior layers.

The late moulting birds, as a rule, are the highest producers although this is not always true. The size of comb and wattles is generally a good indication of high-producing birds, the body characteristics, such as the depth from base of tail to the fluff between the feet, the broad back, and the large crop, as the heavy layer is naturally a heavy eater and she must have the capacity to digest her food properly. The business hen is always active, nervous, and takes no time to loaf.

*Comfortable quarters:* Poultry must be comfortable before good results can be secured. Laying hens are especially sensitive to their surroundings. They are somewhat timid in nature and should be allowed considerable freedom. Nothing is better than the freedom of the farm, where they may secure exercise, variety of food, green vegetable matter, and pick up bugs, worms, grubs, sand, and pebbles.

The housing of poultry in Arizona is more neglected than almost anywhere else in the country. There is a tendency to neglect the birds and allow them to roost wherever they please. Where houses are constructed they are usually too small and not sufficiently protected from drafts and ram. The structures are of such inferior quality that there is no way of tempering the heat in the daytime and of keeping the houses warm at night. Such conditions offer opportunity for the spread of disease and impair the vigor and usefulness of the flock.

In Arizona, poultry houses are used primarily for roosting at night and supplying shade from the burning sun during the day. The size of the house and yards, therefore, will depend upon the number of birds to be accommodated. A house 12 feet square with a ceiling not less than 5 feet high at the lowest side will accommodate 100 hens. The cost of such a building and the required fences should not exceed \$75. Fresh air, dryness, sunlight, good ventilation without drafts, and uniformity of temperature are the chief factors to be considered in the construction of poultry houses. One should have the houses arranged conveniently, so that they may be cleaned easily and treated for external parasites.

Hens cannot be comfortable during the hot weather without shade from the sun. A grape arbor, or such trees as mulberry, cottonwood, peach, or even mesquite will furnish suitable shade. Trees should also extend over poultry houses, where possible, so as to prevent the direct rays of the sun from striking the house.

*Feeds and feeding:* Few people understand how to select the best feed for hens under Arizona conditions. This is unfortunate, as the best results are possible only when one has made a careful study of the various phases of the poultry business. Egg rations are made of some kind of whole or cracked grains, mashed mixtures, meat (animal protein), and green foods. Besides these, charcoal, grit, and shells should be always available. The following points **must** be considered in selection of a ration:

1. How to feed.
2. Size of the ingredients.
3. Palatability and attractiveness.
4. Nutritive effect.
5. Adaptability to purpose in view.
6. Composition and digestibility.
7. Variety.
8. Effect on product.
9. Cost.
10. Whether home-grown or to be purchased.

To keep laying hens in vigorous condition but not too fat, they should be fed liberally. To produce large amounts of eggs, laying hens must be kept in good flesh. They require food that is palatable but not too expensive, which contains a good proportion of protein. Certain feeds such as onions, rape, turnips, fish scraps, and others may affect the flavor of the eggs if fed in too large quantities. These should be avoided, as consumers are sensitive to flavors. A rich golden color in the yolk is preferable. Green alfalfa and yellow corn make a rich yellow yolk, while linseed meal, if fed too heavily, produces a green color. Wheat, oats, and beets give the yolk a pale color.

*Clean quarters:* If for no other reason than to keep the birds healthy, care should be exercised to keep all surroundings clean and in good condition. Unsanitary houses, muddy yards, and dirty nests are responsible for many soiled eggs. Washing eggs injures the quality and removes the gloss which occurs on the outside of the egg to close the pores. Sponging is better than washing, but this does not remove stains. Eggs that have been soiled by dirt or other eggs being broken in the nest should be cleaned before they are sold as guaranteed eggs. Soiled eggs may be made attractive by rubbing with a moistened cloth on which a little baking soda has been dusted. Such eggs, however, do not keep well and should be marketed immediately or used at home.

*Nonfertile eggs:* Eggs for fancy trade should be nonfertile, as they keep much better than the fertile ones. A temperature of 70° F. and above will soon injure a fertile egg, while 100° F. will do less harm to an infertile one. Since eggs are often shipped to market it is uncertain how long a time will elapse between the laying of the eggs and their consumption. Every possible effort, therefore, should be made to increase their keeping qualities.

*Swat the rooster:* When the breeding season is over, remove all males and produce only nonfertile eggs. Fertile eggs are responsible for the enormous loss by decayed eggs. It has been estimated that about 90 percent of all rotten eggs are due to fertile eggs and the consequent development of chicks in the eggs. By removing the male bird from the layers the females are given a rest, which results in more eggs and tamer birds. Extra males, in any case, are only boarders and should be disposed of.

*Gather eggs frequently:* The nests should be placed in a cool place where the eggs may be gathered conveniently. It is important

that eggs be gathered twice a day in hot weather. Eleven a. m. and 4 p. m. are considered the best times to gather eggs. Where trap nests are used, hens must be liberated from four to six times daily. Fertile eggs will begin to develop at 68°F., which temperature is quickly reached in our hot climate. After beginning to incubate, the egg passes rapidly through changes which impair its quality, and development may be continued at low temperatures.

*Proper storage.* After eggs are gathered they should be placed in a cool, dry place. A temperature of 31° to 34° F is most desirable, as there is little loss of moisture, and bacterial or chemical changes at this temperature are slow. It is impossible to get such a low temperature except in cold storage, but a temperature of 50° to 65° is satisfactory for a few days. If the temperature of the eggs goes as high as 70° F., the germ continues to develop and fertile eggs will soon spoil.

As fertile eggs commence to incubate inside the hen before the egg is laid, it is necessary to remove the eggs quickly to a cool place so as to check this development; if not, the embryo chick may soon be detected on the surface of the yolk, thereby making the egg unfit to be classed as a guaranteed egg.

There are often as many as 1,500,000,000 eggs in storage at one time in the United States. Producers are not in the storage business, however, and should make every effort to land their eggs on the market in a fresh condition. While the eggs are kept on the farm they should be placed in a cool room. A cellar with floor sprinkled with water is perhaps as good a place as most farmers can find. Eggs may be contaminated by means of decayed matter or vegetables with pronounced flavors. For this reason they should be stored where there are no onions, cabbage, fish, rancid butter, and citrus fruits.

*Confine the broody hens:* Broody hens should be immediately confined to a crate made of lath or wire. If allowed to remain on the nests they will soon give eggs classed as "seconds," or, in extreme cases, the incubation progresses so far that the eggs are unfit for use. Another advantage in confining the broody hens is that they quickly may be made to resume their egg-laying, and little time is thereby lost for the brooding period.

*Market frequently:* Guaranteed eggs should reach the consumer before they are a week old at the most. This delay is not necessary, however, as shipments may be sent hundreds of miles in less than a day. It is possible that a large crate of eggs could not be produced in less than a week. In such cases it is advisable to use small crates, or else cooperate with a neighbor who can take the eggs to town on alternate market days. The logical place for the egg is on the market or with the consumer as soon as possible after it is laid.

*Producers should cooperate:* Producers are realizing the importance of cooperation. Nowhere is this more necessary than in the production of first-quality eggs. It has been found that where a community specializes in the production of any one article, it is more successful than localities in which cooperation is not practiced.

The aims, standards, and methods thus used are always superior to those where there is less competition and inspiration. The result is an improved quality of product and higher prices.

The Arizona State Poultry Association, realizing the importance of community specialization, has taken active steps to promote this method of production. Following is an outline of a proposed amendment to the by-laws of this association

"ARTICLE IV. GUARANTEEING EGGS"

"Section 1. Whenever ten or more members of the Arizona State Poultry Association shall signify their intention of producing guaranteed eggs they may meet with the president, vice-president, or chairman of the executive committee and the secretary of the association for a conference. Upon approval by the aforementioned officers, each member desiring to purchase eggs with the association guarantee, shall sign the following agreement

"Section 2 *Agreement*.—I agree to gather all eggs sold under the association guarantee during the months of May, June, July, August, and September, daily. During these months I will allow no males to run with the laying hens. I agree to buy cartons and seals of the association secretary. I will estimate the number of cartons and seals necessary to contain output for two months and notify the secretary the number required. I will exercise every precaution to produce good infertile eggs. If eggs in cartons bearing my number are reported as spoiled, within a reasonable time, upon proper proof submitted to the secretary, I will make good the same. I agree that in the event of three complaints in one season, duly investigated by the secretary and each separately reported to me, that I will surrender all rights and privileges in the association and return all cartons and seals, for which I am to be compensated in full.

"Section 3. The secretary after receiving the estimates of the individual members, shall calculate the number needed, for at least two months. He shall then notify each member the amount of money required for the supply. Upon receipt of the money he shall at once order the cartons and seals. He shall charge the actual cost of the cartons and seals as purchased in quantity, plus the freight.

"Section 4. The secretary shall receive compensation at the rate of 12½ percent of the money paid by the members for cartons and seals in compensation for labor and postage.

"Section 5. The secretary shall cause to be printed placards bearing the inscription, 'Clean, fresh eggs, guaranteed by the Arizona State Poultry Association, for sale here.' These placards to be sold to members at cost.

"Section 6. Each member is privileged to market his eggs in any manner that he pleases. But the association would recommend cooperation methods. It is believed that by the use of placards in local stores throughout the State the consumption of Arizona eggs will be greatly increased.

"Section 7. All cartons shall bear this inscription: 'The eggs contained herein are guaranteed fresh, clean, and infertile.'"

R. H. WILLIAMS,  
*Animal Husbandman.*