

THE ROLE OF EGG LAWS IN EGG PRICING

Leonard A. Voss

¹³⁰
SR ~~128~~, January, 1971
Agricultural Experiment Station
University of Missouri-Columbia.

PREFACE

This study is a part of the research conducted in cooperation with the Economic Research Service, twelve State Agricultural Experiment Stations, and the Consumer and Marketing Service of the U.S. Department of Agriculture. The objective of the studies is to evaluate the present egg pricing system, methods for improvement and alternative pricing systems.

The basic publication providing an overview of the studies, the egg pricing problem, and alternative methods and systems for pricing eggs is Marketing Research Report No. 850, "Pricing Systems for Eggs," by George B. Rogers and Leonard A. Voss, Economic Research Service, USDA, May, 1969.

The studies at the Missouri Agricultural Experiment Station, under the leadership of Dr. Leonard A. Voss, associate professor of Agricultural Economics, are concerned with the adequacy of grades and standards for egg price determination. This particular study is of the state egg laws and their role in egg pricing.

CONTENTS

Introduction	1
Procedure	1
History of Grading.	2
Progress Toward Egg Law Uniformity	3
Current Situation	4
An Analysis of the Impact of Nonuniform Standards Between States	6
Deficit Production States with Lower Grade Standards	7
Deficit Production States with Higher Standards	7
Deficit Production States with Lower Grade Standards	7
Surplus Production States with Higher Grade Standards	8
Uniform Grades Are Needed	8
Conclusions	8
Recommendations	8
References.	10

THE ROLE OF STATE EGG LAWS IN EGG PRICING

Leonard A. Voss*

INTRODUCTION

Egg laws play an important role in the determination of egg prices. The prices are reported by market news through the various communication media from various points in the United States.

All states have egg laws and all state egg laws refer to a set of standards and grades or contain the standards for the state egg grades.

Standardization is the sorting of a heterogeneous supply into more uniform lots; however, the classification isn't done by a predetermined set of standards. Grading, on the other hand, refers to the sorting of products into various homogeneous categories (referred to as grades) established by measurable standards.

The objectives of this study are to determine:

- (1) the extent and nature of any differences in the standards and grades between states.
- (2) how differences which exist may affect the general pricing system for eggs.
- (3) a basis for an interpretation of the uniformity of prices between areas or the lack of uniformity between areas.

PROCEDURE

A copy of state egg laws was obtained from each of the 50 states. These were examined primarily for comparison of the egg weight standards and the standards for air cell size for consumer egg grades.

Air cell size was singled out because this factor is the primary consideration in quality determination and because air cell size is a highly variable characteristic of shell eggs. Moreover, air cell size is frequently the limiting factor which determines the final grade classification.

Differences in air cell size standards are used in this study to illustrate differences between state egg laws. Air cell size is the most frequent variable in the final grade decision. And the industry recognizes price differences by grades.

National uniformity exists regarding the use of grade terminology. All states use the AA, A, B terminology to designate the consumer grades of eggs. This uniformity of terminology in egg grades for quality and size is of material assistance in reporting prices and for the purposes of price comparison.

The information on prices is almost entirely from USDA Market News reports. Transaction values for shell eggs are reported from 36 locations by Market News.

Neither state or federal market news reports refer to the standards used in grading eggs. Users of the market news service presume that there are no differences between standards in the various states and that all eggs are packed according to uniform standards. A few states also have a specific state grade which is presumably used within the state to a limited extent and in nearby areas of adjacent states.

A state's standards for grades, and the grades, are a guide to the content of specific lots of eggs that are packed in a particular state in accordance with the standards for the grades of that state. The prices reported from locations presumably reflect the values at which transactions occur.

*Dr. Voss is associate professor of Agricultural Economics, University of Missouri-Columbia, Columbia, Missouri.

A basic assumption implied here is that individuals and institutions that receive eggs from producers would tend to use the guidelines for standards and grades established within a particular state for packing eggs.

If there is a difference in standards between states, a comparison of prices between states loses some validity.

HISTORY OF GRADING

Bender, in his study of the evolution of the grading standards for table eggs, indicated that the primary functions of egg grades as initially conceived and adopted were to facilitate the development of specialized market operations and to decrease the variability in lots of eggs (1, p. 1). An evaluation of grades should be made on the sole basis of their contribution to pricing efficiency; that is, whether prices are accurately established as reflected through the marketing system by effective communication between the consumer and the producer. An efficient egg pricing system should communicate consumer preferences in prices in a market place to producers so that consumers maximize their satisfactions from a given income flow. Knowledge of standards or reliance upon homogeneous standards by consumers is the only basis for rational consumer choice.

The Federal Food and Drug Act, passed in 1906, and a flurry of food and drug laws from 1910-1916 defined inedible eggs. Candling had long been a method used by some members of the trade to separate out inedible eggs. Enforcement of food and drug laws and the passage of candling laws in the Midwestern states provided the first universally recognized method used to determine and define inferior quality. After inedible eggs had been defined, the next step was to divide edible eggs into "fair, good, and best" (1, p. 7).

The definition of "freshness" in terms of age of the egg and the requirement that this definition be used at retail level resulted from extensive use of cold storage to maintain egg quality. The misuse of cold storage and relatively poor egg shell treatment eventually brought cold storage laws first in California and Maine in 1909, and later in most major egg consuming states (1, p. 8).

The age of an egg as an indicator of quality became firmly entrenched in state laws and has become a generally accepted criterion of "freshness." The concept of deterioration of eggs from their "fresh" laid condition became the next acceptable basis for defining quality. Egg industry people made a plea for uniform definitions of quality that would make it possible to grade individual eggs according to their condition at a given point in time in relation to the fresh-laid condition. The standards developed by the U.S. Department of Agriculture in 1923 essentially established the concept of quality based on measurable changes from the original fresh-laid egg. It was about this time that the criterion of flavor was first used in connection with egg quality, and interestingly enough, by cold storage people (1, p. 8).

The multiplicity of standards developed at trade centers resulted in a lack of uniformity in many of the specifications and quality measuring methods. In addition, disparities in state regulations and enforcement already had been recognized as major inter-regional trade barriers by 1920. The first tentative draft of the U.S. Department of Agriculture standards for eggs was made in 1923. Final adoption was in 1925 (2, p. 5). These standards differed from established trade practices in several important respects: (1) no distinction was made based on the location of production area; (2) the standards made no attempt to use treatment of the egg as a criterion for evaluation; (3) changes in the egg were used instead of age of the egg; (4) standards did not change with seasonal quality variations; and (5) they specifically defined the interior quality of an egg as the size of the air cell as determined by candling.

The trade apparently accepted these departures from the common practices in use at that time and the various sectional interests quickly agreed on the size of the air cell to be specified for each grade.

The trade suggested that the specifications for air cell size be compatible with the four criteria used to measure levels of egg quality which were being recognized at that time: (1) eggs from nearby flocks, (2) exceptional eggs from more distant areas, (3) average eggs from distant areas, and (4) cold storage eggs (1, p. 12). The principle of the limiting factor is used in grading eggs, as in quality standards of most commodities, in that the attribute which falls in the lowest classification automatically determines the grade of the product. In other words, the grade can never be higher than the classification of the lowest attribute for the product.

A commonly accepted idea that an area should reserve its market for local producers was part of the development of the period from the late 20s through the early 30s. As a result, state egg laws in many states were specifically designed to provide a trade advantage to the locally produced eggs. The "fresh egg" laws of New York appear to have been specifically designed as implicit trade barriers. The unique features of the 1927 New York law were: (1) special labeling requirements, (2) compulsory retail inspections, (3) specific definition of fresh eggs, and (4) definition of which eggs can be classified as nearby eggs. Only the "fancy" and "A grades" were to be called "fresh" by law. It was presumed that eggs shipped in from the Midwest and other distant production markets could seldom reach New York as grade A or better (1, p. 15).

The general continuity of the 1925 USDA standards has been maintained in spite of some revisions. Most of the revisions were relatively minor. Changes in consumer grade standards for individual eggs have dealt with: (1) yolk visibility, (2) yolk centering, (3) tremulous air cell, (4) air cell size, (5) grade name, (6) grading method. The change in the air cell size made in 1924 from the initial 1923 specifications was effective until 1963. At that time, the air cell size for grade A was reduced from 2/8 to 3/16 inch. It should be added that in 1939 air cell size was reduced for Grade A and Grade B, but the change was very temporary.

PROGRESS TOWARD EGG LAW UNIFORMITY

A survey of state egg laws in 1956 revealed that 41 states used the USDA standards for determination of interior quality. Five other states used standards which were similar. In 29 states, all of the size and weight specifications were the same as those in the weight classes for the consumer grades of eggs issued by the U.S. Department of Agriculture in 1947. Sixteen other states based weight designation partly on USDA consumer grade weights. In 35 states, grade designations were the same as those used in USDA standards (3, p. 8).

The use of uniform standards or grades and terminology developed through the years has facilitated trading and contributed to the expansion of market outlets because it has improved the reliability of the price and quality relationships for consumers.

Eggs must move great distances or some consumers would not receive an adequate supply of eggs. In 1968 nine North Atlantic states had 24 percent of the U.S. population and only 14 percent of the U.S. eggs were produced in this region. This was the region with the greatest deficit of fresh egg supplies. The West North Central region had the greatest surplus, producing 15 percent of the eggs in an area having only 8 percent of the U.S. population.

The function of grading can best be performed if grades and standards used are the same in all areas of the United States. Because this is not presently the case, price information, as published in market news reports and other trade publications, should not be compared except on the basis of known quality and weight standards for the product. Thus egg prices cannot be compared effectively unless the grade and quality of the product is described carefully or the reader has a knowledge of differences in grades and standards. Grades are often referred to as the "short hand" for such a description. To be most effective, an industry-wide, uniform grading system should be established and used.

Industry leaders are reportedly working continuously toward this goal. However, since the last survey of egg laws was made in 1956, little progress toward uniformity has occurred. In fact, attempts by some state leaders to protect the market within a deficit state by establishing artificial

barriers that hamper the movement of eggs into the state has resulted in a greater nonuniformity of standards. When a nationally produced and nationally traded commodity can be described and discussed in uniform terms, confidence in nation-wide trading results. Educational programs on grades also are easier to execute and contribute larger benefits to the entire industry. Under these conditions, brand names can be more easily established and their reputation strengthened.

The use of uniform grades, standards, and terminology does not imply a limitation to the use of trade brands nor do they conflict with them in any way. A good merchandising effort will be enhanced by the use of trade brands used in conjunction with uniform grade identification. Egg brands tend to increase pride on the part of the person or firm packing and selling the eggs and build confidence of the wholesale and retail dealers and consumers in the grading skill, efficiency, and integrity of the packers.

The various qualities of eggs when packed under uniform standards and grades can more readily find suitable market outlets. This can reduce materially the distribution costs and can give greater consumer understanding and satisfaction.

CURRENT SITUATION

Air cell size is one of the critical quality criteria used in grading eggs in the shell. This characteristic has been used because it is relatively easy to measure and has been shown to be closely related to over-all egg quality. The use of the principle of the grade being determined by the lowest scoring attribute adds to the importance of the air cell size. Use of other attributes, such as albumen thickness standards and tolerance, varies considerably between states, but air cell size is commonly used in most egg grading. For these reasons air cell size was used in this study to show state egg law differences.

The minimum egg weight was examined because egg weight standards have been the subject of considerable discussion from time to time in the shell egg industry. Moreover, tolerances in the standards have been quite variable between states.

Generally standards for individual states appear to vary less from U.S. standards on weight than quality. All but eight states essentially agree with U.S. weight standards and three of these have minor differences in weights on small or peewee sizes. Smalls and peewees are only about 4 percent of total egg production.

Twenty-six states have laws or regulations requiring the state egg quality and weight standards to be the same as the U.S. standards of quality and weight (Table 1, item 1). In these cases, the state standards change when the national standards change. Uniformity of standards is encouraged by this process. Altering the state standards is not a problem in 10 of these 26 states because these states do not publish state standards but refer the reader to the U.S. standards. Three additional states (of the 26 states) publish no standards for quality but do for weight.

The problem confronting some of the remaining 13 states is to keep their quality standards updated to agree with Federal standards. For one state, this means a change in the state egg law because the standards are part of the law passed by the state legislature. The other 12 states have their standards as a part of a general set of regulations. These state egg laws are made effective by legislative action and give the state regulatory agency authority to set standards and other details. Five of the 13 states publishing their own standards use the obsolete 2/8 inch as the maximum air cell depth for grade A. In one state this is part of the law. Eight states use the 3/16 inch air cell depth as is used by USDA standards. All 16 states publish weight standards that agree with the Federal standards; however, in 15 of these states the weight standards are a part of the regulations and in one the standards are written into the law.

TABLE 1
STATE EGG LAW DIFFERENCES IN STANDARDS FOR AIR
CELL SIZE AND WEIGHT

Practice	Number of States Following Practice For:	
	Air Cell Size	Weight
1. Standards defined to agree with U.S.		
a. Publish no standards	13	10
b. Publish 3/16" as A air cell size	8	
c. Publish 2/8" as A air cell size	5	
Total states	<u>26</u>	<u>26</u>
2. Standards essentially agree with U.S. standards		
a. Publish 3/16" as A air cell size	10	
b. Publish 2/8" as A air cell size	12	
Total states	<u>22</u>	<u>16</u>
3. Publish 3/16" as AA air cell size	<u>2</u>	
4. Publish different weights on small or peewee		<u>3</u>
5. Publish no or less weight tolerance		<u>5</u>

Source: 1969 Survey by the Author

Those individuals or organizations responsible for preparing new egg laws are frequently not aware of current U.S. standards. One of the five states having the 2/8 inch maximum air cell depth for Grade A quality eggs has a regulation dated 1968. The state egg law, passed in 1968, states the Federal standards shall be the state standards. Federal standards were changed on August 1, 1963, reducing the Grade A air cell maximum depth from 2/8 to 3/16 inch. However, the U.S. standards for weight have not changed since December 1, 1947.

Many states have quality and weight standards that apparently were written to agree with the U.S. standards without defining the source of the standards (Table 1, item 2). In regard to quality, 22 states can be so classified. Nine state regulations and one state law give 3/16 inch as the maximum air cell depth for Grade A. The other 12 states show 2/8 inch air cell depth for grade A; 10 states specify depths in regulations and 2 in state laws. Six state regulations and one state law listing 2/8 inch as the Grade A air cell depth were issued after the 1963 Federal law change.

All states have 3/8 inch as the maximum air cell depth for Grade B.

The two oldest state regulations were issued in 1947. The next dates from 1958. The median year for regulations is 1964.

All states except two specify 1/8 inch as the maximum air cell depth for grade AA eggs. The two exceptions have 3/16 inch for AA grade air cell depth, which is the same as A grade air cell depth for the U.S. standards. These two states have 2/8 air cell depth for Grade A. California is notable in nonconformity as it is the leading egg producing state; it is also the one where the most

eggs are labeled AA grade at retail. The second nonconforming state is Indiana which was seventh leading egg producing state in 1968. Both states produce a surplus of eggs. Eggs may be AA by air cell size in California and Indiana but only Grade A by U.S. standards or the standards of any other state. In both states, the standards are part of the state egg law.

The weight standards for 16 states agree with the U.S. standards, two are specified in the law and 14 are in regulations. Standards in three states, Indiana, Massachusetts, and New Hampshire, differ only in the minimum weights for smaller sizes. Indiana and Massachusetts have no minimum weight provisions for "peewee" eggs. The New Hampshire regulations provide that no individual small or peewee size eggs shall weigh at a rate less than the minimum net weight per dozen (the minimum weight per dozen divided by 12). The U.S. standards provide for a minimum net weight of 15 ounces per dozen for peewee eggs but no minimum for individual eggs.

Five states have weight standards that are considerably different from the Federal standards -- New York, New Jersey, Georgia, Pennsylvania, and Vermont. New York departs from Federal standards more than other states. In that state the minimum net weight rate for individual eggs is the same as the average weight at the minimum net weight per dozen for each weight class. There is no tolerance provision for individual eggs. As an example, the minimum net weight for large eggs is 24 ounces a dozen or an average of two ounces per egg. By New York standards, no egg below two ounces, i.e., weighing less than a rate of 24 ounces a dozen, is permitted in the large size. The U.S. standards have 24 ounces per dozen minimum net weight per dozen but the minimum for individual eggs is at the rate of 23 ounces per dozen, i.e., 1 and 11/12 ounces each, and there is no limit on the number of eggs weighing 1 11/12 ounces that can be included, provided the dozen weighs 24 ounces.

The New Jersey regulations permit only one egg of the U.S. standard minimum individual egg weight in each dozen. In Georgia and Pennsylvania, two eggs of the U.S. standard minimum individual egg weight are permitted in each dozen. The Vermont regulations provide that the minimum weight for individual eggs shall be at the rate of 1/2 ounce per dozen less than the U.S. standard minimum net weight rate per dozen. This means that the minimum weight for individual large eggs is 1 23/24 ounce or at the rate of 23 1/2 ounces per dozen.

There are other items of state egg laws and regulations that were noted but not studied. Variation in tolerance provisions is quite large among the states. The variation in temperature provisions for holding eggs is particularly wide and the labeling requirements vary both in wording and size of type. Some states provide a minimum size for the printing type that gives grade and size designations. A few states require a specific size of type in printing these items.

Some states require that the carton specifically designate out-of-state produced eggs. One deficit egg production state recently passed a law stating that eggs produced in that state shall be so labeled. This type of classification is obviously intended to be discriminating against out-of-state produced eggs. National food chains have long complained that they are required to have many differently imprinted cartons available at packing stations to meet the regulations of the various states because these regulations vary so widely.

It is apparent that in many cases, the laws and regulations of states are designed to offer protection to local producers. This is particularly true of deficit states.

AN ANALYSIS OF THE IMPACT OF NONUNIFORM STANDARDS BETWEEN STATES

As egg laws and egg grade standards differ, an analysis on a state basis of the impact of higher and lower grade standards on pricing efficiency would be in order.

In this analysis the assumption is made that consumers (1) have a very high degree of confidence in grade labels and buy by grade label (2) are not able to discern the small differences of 1/16 inch in air cell depth (3/16" vs. 2/8"). Eggs below Grade A are only rarely available in retail food stores. Surveys of consumers indicate that over 90% of eggs purchased are Grade A or Grade AA.

When consumers used unlabeled consumer Grade A and B eggs, 73 percent did not differentiate between the two grades (4, p. 39). Also evidence and studies indicate that the demand for eggs is highly inelastic.

Deficit Production States with Lower Grade Standards

For this analysis an assumption is made that a deficit egg production state has lower Grade A standards than the U.S. standards, such as 2/8" maximum air cell size. In such cases, the lower standards would tend to result in a higher percentage of the flock run eggs going into the A grade and, therefore, the quoted prices would have a tendency to be somewhat lower. As consumers are grade-price motivated and are not aware of any actual differences in grading with respect to egg quality, producers in a state grading eggs according to the higher national standards would tend to command a relatively lower price because of the price established via lower standards of the intra-state egg grading procedures.

However, it might be that the prices within the state would need to be near those of the higher grading standard in areas where higher standards are associated with higher prices before needed supplies of eggs would be shipped into the state. In this case, there would be a tendency to raise price in the lower standard area and the local producers and marketing agencies might have a larger working margin which would tend to stimulate egg production within the state.

The other alternative might be for out-of-state firms to grade eggs according to the lower quality standards. In this case the local eggs would have the advantage since the grading to two standards in out-of-state plants would tend to increase marketing costs.

The prices reported for the lower standards in the deficit state would show the egg prices at a disadvantage compared to the prices in other areas. Many people comparing prices would not realize that in reality this lower price was being reported on a different quality of egg and thus not directly comparable to prices from other states.

Deficit Production States with Higher Grade Standards

There are no states with materially higher quality standards than the U.S. standards. However, if a deficit state had higher standards than the national standards, prices would tend to increase for local eggs and might or might not give greater margins for institutions in the market channel and producers. The higher prices would cause outside eggs coming in to be regraded to meet these higher standards, which would increase costs for the outside producers. If this occurred the reported prices for eggs graded to higher standards would be confusing to people reading market news reports and trying to make price comparisons because the differences in higher standards probably would not be immediately known to all members of the trade.

While no states have higher quality standards in air cell size than the U.S. standards, New York has higher weight standards. It is difficult to ascertain any price differential for heavier eggs resulting from packing to New York standards. Possibly this is because the egg industry accepts New York City prices as a primary base price for the country. If there is no price difference for the heavier eggs the returns are decreased as the yield of larger sizes is reduced. A preliminary study indicates that the income to producers may average 2.7 percent or more than 1 cent per dozen less due to the lower yield of larger sizes (5).

Surplus Production States with Lower Grade Standards

The situation for a state that has surplus production and has lower standards than U.S. standards could cause considerable confusion on the part of local firms trying to market eggs out of state. The lower standards might have a price-lowering effect for eggs produced, packed, and sold within the state. Competition might force large local firms to pack some eggs to the lower standards to meet this situation. But eggs packed for shipment out of state would have to be graded to higher standards. This would add to the marketing cost and would also mean that eggs graded for the local market could not be shipped to states with higher standards without regrading.

Surplus Production States with Higher Grade Standards

A surplus state with standards higher than U.S. standards would place egg marketing firms in the position of having added costs of grading for two standards and the added costs would probably need to be allocated against eggs sold within the state.

If the quality and weight standards vary to such an extent that it becomes economically feasible or necessary to change the pack to meet the criteria of a state with different standards, it adds to the cost of marketing. Any change on the packing line to assure that the pack meets different quality and weight standards results in some lost motion, probably some down time, and a different percentage of yield from flock run eggs. All of this adds to the cost of sorting flock run eggs into the grade designation for the respective markets. These factors, in turn, add to the total marketing cost.

In addition to cash costs, there is at least a potential social cost involved. Dual grading contributes to more imperfect egg pricing in the market. The lack of uniformity of quality designation and weight designation makes price comparisons more difficult and results in more imperfect market knowledge on which to base trading and pricing.

UNIFORM GRADES ARE NEEDED

The national market for eggs seems destined to continue. Egg production will tend to be concentrated in areas that have cost or production advantages although transportation cost changes could easily alter this pattern. As long as a national market exists, anything other than uniform egg laws will have a generally undesirable effect on the egg industry.

CONCLUSIONS

1. Shell egg quality and weight standards vary among states. The quality standards tend to be less variable than weight standards. Two states vary sharply on quality standards and five on weight standards.
2. State shell egg standards can cause enough differences in the consumer pack to make price comparisons between areas very difficult or meaningless.
3. Changes in state standards still have not been made to achieve agreement with changes in Federal standards, even where it is the apparent intention to have the standards agree.
4. Uniform quality and weight standards and uniform packaging regulations would enhance pricing and marketing efficiency.
5. Potentially, state standards and laws could be eliminated.
6. Added marketing costs are incurred where packing to several state standards is necessary at a packing station.
7. Standards should be a part of regulations and not a part of state egg laws. This would facilitate changes in standards when they are needed.
8. The present national market for eggs, the continued concentration of production, and the growing deficits in some areas make the use of uniform grade standards and terminology a necessity for optimum pricing and marketing of shell eggs.

RECOMMENDATIONS

Movement toward uniformity of egg laws and standards is long overdue. There has been no significant change toward greater uniformity since the last review of state egg laws in 1956. Some laws passed during the last few years have even tended toward less uniformity.

The recognition of this problem by the National Association of State Marketing Officials of State Departments of Agriculture and the adoption of a program to achieve uniformity of state egg laws and standards to agree with the U.S. standards should be expedited. The model egg law

developed by the Association of State Marketing Officials is appropriate but state legislatures have used it as a guide and have added too many varying details.

The National Association of State Departments of Agriculture, trade organizations, and many individuals have made efforts over a period of years to secure uniform egg laws. Efforts have been made to secure greater uniformity in enforcing standards, tolerances, and allowances. The lack of uniformity of enforcement can accentuate differences between states or for all practical purposes make differences between states with similar egg laws.

The number 3 recommendation of the National Egg Pricing Study Committee is:

3. Uniform Standards, Weights, and Quality Specifications for Shell Eggs

The Committee recommends the development and adoption of nationwide uniform Federal-State standards and enforcement procedures for shell egg grades, weights and quality.

The committee had as members representatives of all segments of the nation-wide poultry industry (6, p. 9).

A recent move in Congress for legislation to prohibit state shell egg standards from abridging U.S. standards would achieve greater uniformity of standards but would not solve the problem of higher standards nor aid in the problem of the differences in state labeling and packaging regulations.

The achievement of true uniformity of egg laws will require the elimination of state egg laws. Federal standards and trade regulations for eggs then can be developed and used nationwide.

REFERENCES

1. Bender, Lloyd D. , "An Economic Evaluation of Market Functions and the Evolution of Grade Standards for Table Eggs," Research Bulletin 875, Columbia: University of Missouri, December 1964.
2. Pond, T.H. and Lester Kilpatrick, "Grading and Inspection of Eggs and Egg Products," Agricultural Information Bulletin No. 159, Washington, D.C.: Agricultural Marketing Service United States Department of Agriculture, January 1959.
3. Mehl, Paul, "State Egg Laws and Regulations," Agriculture Handbook No. 112, Washington, D.C.: Agricultural Marketing Service United States Department of Agriculture, December 1956.
4. Voss, Leonard A. and Quentin D. Banks, "Consumer Preferences and Their Application to Egg Grading Standards and Marketing Procedures," Research Bulletin 813, Columbia: University of Missouri, September 1962.
5. Voss, Leonard A. , unpublished study, Columbia: University of Missouri.
6. National Egg Pricing System Study Committee, "Report of National Egg Pricing System Study Committee," Trenton, New Jersey: New Jersey Department of Agriculture, May 1970.