Egg grading and consumers' preferences with special reference to Iowa egg marketing

Richard Lawrence Day Morse
Iowa State College

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EGG GRADING AND CONSUMERS' PREFERENCES

WITH SPECIAL REFERENCE TO

IOWA EGG MARKETING

by

Richard Lawrence Day Morse

A Thesis Submitted to the Graduate Faculty
for the Degree of

DOCTOR OF PHILOSOPHY

Major Subject: Consumption Economics

Approved:

Signature was redacted for privacy.

In Charge of Major Work:

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Iowa State College

1942
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CHAPTER I. THE FUNCTION OF GRADES AND GRADING IN THE MARKET

Preparatory Note as to the Function of the Market

In order that the reader may better understand the frame of reference within which grading will be discussed, certain categorical statements are made relative to the function of the market. The economic system is concerned with the allocation of limited resources among many alternative uses. Insofar as one accepts the assumption that producers should take into account consumers' preferences he will conclude that a satisfactory market is one which informs producers concerning consumers' preferences, as expressed in prices, qualities and rates of consumption, so that these may be taken into account in planning production and directing supplies within the market. The performance of any function such as that of informing consumers about the relative qualities of the various foods available and the transmission of information about consumers' preferences from consumers to producers through a series of market agencies is not a costless process. The refinements in the process of providing information should in some measure at least depend on the costs involved in relation to the consumers' willingness to pay for them. The cost of a part of the process of providing the information may be assumed by the State and thus be separated from the consumers' willingness to pay.
Interrelating Producers and Consumers

A simplified discussion of the process that interrelates consumers and producers is usually subsumed under the heading of supply and demand. It can be summed up in the following words:

I. When, at the price ruling, demand exceeds supply, the price tends to rise. Conversely when supply exceeds demand the price tends to fall. II. A rise in price tends sooner or later to decrease demand and to increase supply. Conversely a fall in price tends, sooner or later, to increase demand and to decrease supply. III. Price tends to the level at which demand is equal to supply.¹

The market supply of a commodity is the summation of the quantities of the commodity in question which various producers of this commodity would supply at given prices. Whether or not it is profitable for a firm to enter into the production of this commodity or for a firm now producing to increase its output or to continue its former output depends largely upon the cost of production and marketing in relation to the price.

The market demand for a commodity is the summation of all the individual demand curves of consumers. Each individual demand curve represents the consumer's allocation of given income among a multitude of wanted goods and services. If it were true that a consumer budgets his funds and makes his purchases in such a way as to maximize his satisfactions, his demand curve for any product could be constructed if the

following facts were known: the consumer's income and an indifference map representing the various combinations of two or more goods which he would be equally satisfied to have.

The interrelation of demand and supply has different aspects according to whether one considers the short-run or the long-run situation. In the short run the physical character of the product may be fixed and producers' efforts are concentrated on searching for those consumers whose purchases will net them the most profit. On the other hand, in the long-run situation it is possible to make changes in the product in accordance with new information that they have acquired concerning consumers' preferences.

The directing of production in line with consumers' preferences is not an automatic process. Information at every point where decisions are made is of the utmost importance. Consumer practices are of great importance. The consumer, in order to maximize his satisfaction must be acquainted with the possible benefits of the products under consideration and must take time to weigh their relative merits. The more fully he is informed of the merits of one product in contrast with others, the more his final choice will indicate his preference.

Consumers must weigh the relative merits of various commodities, as more oranges, or more apples, more eggs or more butter. They may also be faced with deciding between two different qualities. For some products, differences in qualities can be readily recognized in the
market if the product is carefully inspected. For a few products information on relative quality is provided. For many commodities, however, the quality is an unknown factor and sellers may try to pass off a low for a high quality. For the consumer who attempts to get the maximum amount for his dollars a dilemma commonly arises. Prices are announced, but the important factor of quality remains an unknown.

Price is the exchange ratio of money for goods. If the unit in which either the money or the goods is expressed is equivocal, so is price.

"Congress shall have power ... to coin Money, regulate the Value thereof, and of foreign Coin, and fix the Standard of weights and Measures ..." (Sec. 8, Article I). With this power Congress has coined and regulated the value of money, and it has fixed certain standards of weights and measures. Twenty-five cents a gallon is definitive as to quantity as is twenty-five cents a dozen. But neither a gallon of gas nor a dozen of eggs is, except to the individual who within his limited range of experience finds all varieties of gasoline or all eggs equally acceptable. Congress has not seen fit to fix measures of quality although it has delegated such power from time to time, e.g., to the Secretary of Agriculture. In any case, the merits of the pricing system rest directly upon the meaningfulness of the prices; the meaningfulness of which rests with the acceptability to the individual of the commercially used standards for money and for the commodity.

Many steps have been taken to make prices more meaningful in many
types of transactions. The establishment of grain standards permits dealers to trade in grains on the basis of price alone without even seeing the grain. The standards for cotton were adopted internationally as early as 1925 for the trading in cotton.\(^1\) In Canada the grades for eggs are so established that egg price quotations in Quebec are comparable with those quoted for the Vancouver markets.

Price control initiated in 1941 has brought increasing awareness of the need for more precise measures of quality to be used in conjunction with prices in governing sales. "Upgrading" is the term used by the Office of Price Administration to characterize the technique used to sell lower quality products at the ceiling prices. The practice of "upgrading" serves as a constant threat to the effectiveness of price ceilings. Other administered price schemes such as the proposed "Forward Prices" also depend for full effectiveness upon ability to establish meaningful prices.

The theory of the pricing process is based on the assumption that the consumers can translate their wants into market selection satisfactorily.

It is essential if the pricing system is to function in such a way as to gear production with consumption, that consumers know what they want and express those wants in their market selections. Obviously, however, any system devised to facilitate the allocation of resources in accord with consumers' wants is limited to the extent of consumers' and other buyers' knowledge of their wants. It is also limited in its effectiveness to the degree to which consumers and other buyers are able

(See also, 1922-23, p. 18; 1923-24, p. 14.)
to recognize the qualities of commodities in the market. Does the market enable buyers to increase their awareness of quality and to permit them to develop more precise notions of their preferences? And does the market permit consumers and other buyers to translate their wants, however well conceived, into market selections?

**Misrepresentation leads to false selection.** Two packages of equal size may contain an equal quantity of goods and sell at the same price. Those consumers desirous of getting the largest quantity per dollar may identify size of package with quantity of contents and purchase the bulky and perhaps largely unfilled packages. Merchants would be wrong in interpreting such actions on the part of consumers as meaning that they prefer lower quantities of goods in packages of equal size and price.

**Lack of information may lead consumers to rely for their market selections upon criteria not necessarily related to desired qualities.** The historic case is the New York City preference for white eggs and Boston's preference for brown eggs. An explanation given for this development is that historically white and brown eggs were produced by flocks nearby the stated cities. Both Boston and New York City had to rely on eggs shipped from as far as the Midwest. These shipped eggs were mixed colors or brown. In the absence of proper refrigeration and rapid transportation, the brown eggs as received were much inferior to the white. White became identified in New York City with the fresh eggs and eggs of reliable product, and the brown and mixed eggs with storage and shipped eggs. To a lesser extent the reverse of this situation
existed in the Boston market. Yet shell color bears no necessary relationship to quality or size of eggs.

Information lacking, consumers are unable to develop refinement of their tastes and wants. Only by a trial and error method can many persons determine their personal likes and dislikes. If goods having certain attributes cannot be identified when purchased, the consumer is unable to test scientifically and determine which are the attributes desired. Insofar as the consumers in the market are unable to select purposively, they are unable to experiment and discover what qualities are desired. Production cannot be geared to consumers' preferences if they are not expressed in the market.

Goods desired by the consumer may not be available for selection. If a consumer who prefers cabbage to squash, goes to the market to buy a vegetable, and finds only squash available, the consumer is thus unable to express in the market her preference for cabbage over squash. Another less obvious example may be: Many consumers have reported that they have been unable to purchase fresh eggs. Fresh eggs are not regularly available in some markets.

The business man's reply to this sort of argument is that the consumers are not willing to pay the price necessary to place such goods on the market. For if they were, some enterprising businessman would introduce the good on the market. This reply is correct insofar as the business man is able to judge consumers' preferences and does attempt
to act in response to them.

Consumer may not know that satisfactory commodities are available. For example, the labeling of all eggs, both those fresh and those not fresh, as fresh eggs, may make it impossible for consumers to discover those eggs which they look upon as fresh. Some sellers may make a special attempt to serve those consumers who want high quality eggs. But they may have no standard terms which may be used to describe their eggs which may not be used by other sellers with much poorer eggs to sell. Brand designation may be used and consumers through experience may discover that they can rely on the brand to give them the quality that they desire.

The theory of the pricing process, as commonly presented, presupposes a market organization such that consumers' preferences as expressed by the consumer by means of price and rate of consumption will be carried back to the producer as the initial allocator of resources.

Failure to adopt market grades inhibits effective operation of the price system. It is assumed here that effective operation of the economic system requires that the market be so organized that consumers' preferences as expressed by consumers through their consumption of various goods will be carried back to the producers of those goods.

Ignorance, misinformation and prejudice in the minds of market agents leads to producers having very inadequate information about consumers' preferences. Market agents formulate their impressions of consumers' preferences in part on the basis of complaints received and on the basis of trial and error. If the merchant is unable to buy upon
the basis of specified quality, he is unable to know exactly what he is selling; hence, unable with any assurance to determine the basis of consumers' satisfaction or dissatisfaction with qualities offered. In lieu of systematic knowledge the merchant must either be a highly qualified man for making ad hoc judgments about people's likes and dislikes, or be a poor judge of factors influencing sales. If he does not discover the preferences of those to whom he sells, he cannot transmit adequate information to the person from whom he buys and direct sales and production in accordance with consumers' preferences. Inadequate information at any point or inadequate transmission of it to the next in line in the market may disrupt the entire process of integrating consumption and production.

Producers denied the opportunity to sell higher quality products at higher prices are also denied the economic incentive which may be necessary to produce the higher quality products; thus the pricing process is thwarted. As a result resources may not be allocated to yield greatest consumer satisfaction or maximum income to the producers. The sale of eggs in Iowa is a good example of failure to take into account consumers' preferences for various qualities. This fact will become more evident in later discussion.

Grading and Grades

Grading and grades defined

For the purposes of this dissertation, grading is defined as the
process of sorting heterogeneous units into groups less heterogeneous with respect to their specific attributes or characteristics. In this sorting, the products are arranged in steps, degrees of classes according to size or quality.

A grade is any one class into which the product with certain characteristics would fall.

Most commodities have many characteristics. Among the characteristics of an egg are weight, shell color, yolk color, upstanding condition of the yolk, thickness of the white. The white of an egg, for example, will vary in the proportion of the total white which is classified as thick and as thin and on the thickness and the thinness of the two parts of the white. Scores or grades may be designed to describe a specific range in the condition of the white. And similar scores or grades may be established to describe gradations in other characteristics of the egg. Grades may be established which reflect a pooled score of several characteristics. The selecting of characteristics to be included in a combined score is one of the things to be considered in the chapter which follows.

Differences among consumers

Those persons with a keen awareness of the minute differences that characterizes all living things might hold that each egg is unique, just as each person is unique. On the other hand there may be persons who
claim that as long as the egg is not rotten, one egg is the same as any other. It is highly probable that for most products consumers will differ somewhat in their judgment of the relative quality of an assorted stock of any commodity. Consumers will differ in the characteristics that they take into account in rating the product high or low, in what quality is rated high or low, and in the importance that is attached to the differing qualities of the various characteristics and of any of the many characteristics taken into account.

When consumers do not differ in these ways these quality preferences can be described as homogeneous. If preferences are not homogeneous the question arises as to whose judgment should be reckoned with when appraising the adequacy of a grade system. The answer to this question rests primarily on the function of grading in the market, a discussion of which follows. More specific answers will be given in the following chapter on grade criteria, particularly in the discussion of the basis for formulating grade specifications.

Function of grading in the market

The essential economic function of the market, as already stated, is to instrument the coordination of production with consumption; to establish the machinery by which consumers' preferences for various qualities as expressed in price and rates of consumption may be relayed to the producers (and marketing agents) who, in turn, allocate or direct the allocation of limited resources among the ordered preferences.
It is the function of grading to provide adequate description of the qualities of the products to the buyers and sellers in the market. Hence, the test of a good grading system lies largely in its usefulness in providing information to buyers and sellers to assist them to coordinate short-run and long-run supply with demand, and in its usefulness to consumers in helping them to choose intelligently among the various qualities offered for sale. The worthwhileness of the costs involved in grading and in providing useful information can be judged by their effect on total cost in relation to the services thus rendered to consumers. Consumers may be willing to pay more for their eggs if they are graded than if they are ungraded. If they find it more satisfactory to have graded than ungraded eggs available, they may be willing to pay more even if there is no improvement in quality. Grading may bring a reduction in the cost or an improvement in quality. These effects are, however, not a necessary result in order for the grading to be worth while.

Advantages of grading

The special merits of egg grading will be discussed in a later chapter. Here some of the outstanding advantages of grading of agricultural products in general will be reviewed, bearing in mind the various types of markets -- the local market where the farmer sells, the wholesale market where the unit of sale is large, often running to a carload lot, and the retail store where unit sale is commonly one dozen or pound.
The advantages of grading have been very ably summarized by Professor Erdman as follows: 1

1. Grading expedites the movement of the product directly into proper channels of the trade.
   a. It permits a finer adjustment of available supplies to the particular requirements of the various markets, thereby widening the outlets for any specific class of product. This is important since market preferences vary.
   b. Grading sorts out grades which are not worth long hauls or careful handling.
   c. Grading prevents losses from rehandling and saves the expense of rehauling which would be necessary were ungraded products forwarded to markets using only certain qualities.

2. Grading facilitates trading operations by providing a common language.
   a. Grading permits the sale of products by description, thus facilitating transactions at long range without the expense of inspection and also making possible future trading.
   b. It tends to obviate misunderstandings, thus reducing the number of rejections, and at the same time obviating an immense amount of litigation.
   c. It lessens the time and effort required to bring buyer and seller to a common understanding. (Sale by sample rather than personal inspection).

3. **Grading makes possible accurate price quotations.**

4. Grading facilitates financing, since it permits a more accurate evaluation of product in storage. Warehouse receipts reading in terms of specific grades are more desirable as a security for value can be determined from market quotations.

5. **Grading facilitates storage:**
   a. By sorting out for immediate sale goods which would not keep.
   b. By permitting combination of many lots without preserving identity of each.

6. Grading provides a basis for cooperative pooling of products, which simplifies many problems involved in cooperative marketing.

7. **Grading encourages better production.**

   Any statement of advantage is bound to be incomplete in its details. Insofar as grading permits more effective operation of the pricing process, so does it contribute to the advantages of a more effective pricing process. And insofar as it is advantageous to refer to qualities in descriptive terms, so is it advantageous to have grades. The application of these two postulates to specific commodity market operations could lead to an almost endless statement of advantages of grading.

Some types of grades

Grading may be related to the products of a single firm or to the products of many firms who sell in the same market. When related to products of a single firm, grading usually takes the form of brand names.
Grades are more usually thought of, however, in terms of their application to the products of many firms; the grades applied to wheat or cotton are well known examples.

Grades may be employed in only one type of market, such as the futures market, or in two or more types of markets. For agricultural products the producer may sell his produce on a grade basis to the first buyer who in turn may sell on a grade basis, and the consumer may eventually buy the product on the retail market on grade. These grades may not be identical for all markets, and will tend to vary according to the information which the buyers and sellers in each market wish to have concerning the product, but in general they are likely to have many points in common insofar as each buyer buys for resale. Ultimately the product reaches the consumer. The usefulness of the grade varies directly with the recognition it receives in the market.

Grades may be classified according to the bodies which officially or unofficially recognize the grades. Such recognition may, for example, come from manufacturers' associations, mercantile exchanges, retail and other trade associations, or the United States Department of Agriculture.

Also grades may be classified as to whether they are mandatory, permissive, or voluntary (or recommended). Mandatory grades are grades, the use of which is required for all transactions under conditions specified by the particular official organization concerned. Permissive grades are grades, the use of which is voluntary, but which if used must be genuine. Voluntary or recommended grades are grades recommended for
adoption by the market agents, and which if used may or may not be in full conformity with the recommendations, i.e. the product may be labeled as of the recommended grade, but not conform completely to the standards established for the grade.

Why Is Not Grading Widely Exercised in the Market?

In spite of the economic advantages which result from sorting the commodity upon the basis of recognized grades, they are not widely used in the marketing of many commodities. On purely a priori grounds the assertion that sorting which is economically justified is not undertaken may appear to be an absurdity. It might be supposed that if the sorting were economically justified, then the economic forces would impel the adoption of grades.

Many conditions retard and others indefinitely restrict the introduction of grading. The analysis of the advantages of grading neglected to point out that the volume of products handled in some markets was too small to make it worth while to have a reliable system of grading. For some products grading or sorting may be economically justified, but only if undertaken on a comprehensive scale; that is, if undertaken through the adoption of standardized grades to be used throughout the market. Failure to adopt standardized grades arises if the initiative for the formulation and adoption of the grades rests upon the partial if not total acceptance of a large number of persons.
Grading that permitted comparison of the qualities of products of various firms might bring a reduction in the profits of firms who through brands and advertising had convinced consumers that their products were of higher quality than in actual fact they are. This group is likely to be active in their opposition to grading and, if influential, may prove to be an obstacle of considerable importance.

Grading may also bring losses to firms because it changes the flow of the product through the market. For example, exchanges may fear that buyers may tend to purchase directly rather than through the exchange and decrease the volume of goods flowing through the exchange if buyers could buy goods of known and equally guaranteed quality directly.

Those firms producing low grade products are likely to oppose grading. If price were differentiated on the basis of quality such a group might well look forward to a reduction in the price that they would be paid.

Ignorance of the possible benefits is probably a very important factor in the lack of interest in grading among some groups. Many misconceptions exist about the probable regulations that would handicap free enterprise and prevent a man from doing what he wants.

For some products many of the advantages of the grading system accrue only after the system gets into full operation. For most products the setting up of a grading system is full of complexities. Rules and regulations must be evolved, and usually an independent grading agency must be established.
Inasmuch as price and quality are so closely related it may be necessary to relieve the buyer or seller of the responsibility of performing the grading operations. Conceivably, the price an individual would be willing to pay for a unit of the commodity might depend on whether he was the person to determine the grade or whether it was the seller, or an independent agent. If prices are to have the same meaning to all persons operating in the market, they should be quoted in terms of standards common to all. Hence this may require the establishment of an independent agency or grader to perform the grading operations.

Satisfactory grading rests almost entirely upon enforcement of standards. Such enforcement may appear to some persons to be an unjustifiable intrusion into their economic affairs. To establish and enforce the use of standards and limit competition solely to a price basis has not become a part of the mores of the business world. The business world speaks of "price competition" and "quality competition". And the thought of an enforcement official whose duty it would be to eliminate "quality competition" is repugnant.

Ignorance and lack of objectivity may result in irrational actions on the part of those who could benefit by a proper grading system. The immediate effects of any change foreshadow the ultimate benefits to be derived from changes in market practices. Chance of loss may be great in the eyes of the individual relative to the small benefits, although the benefits to the industry may be tremendous.
CHAPTER II. CRITERIA FOR GRADES AND GRADING SYSTEMS

In this chapter criteria for grades and grading systems are to be considered. In particular, the following points will be discussed: the formulation of grade specifications, grade terminology, numbers of grades, the points where grading should be done and the procedural pattern necessary for applying some of these criteria in view of seasonal shifts in supply or demand.

Basis for Formulating Grade Specifications

Fundamental basis - consumers' preferences

Although goods flow from production into consumption, preferences must be reflected in the opposite direction, from consumption to production. It is the function of grading to provide efficiently a description of the qualities of products to buyers and sellers on the market if supply is to be properly coordinated with demand; that is, information as to the market demand must be pressed backward in the market process toward the producers. Since the market demand rests in large part on consumers' preferences, their preferences should serve as the fundamental basis for formulating grade specifications. Grade specifications should be read from consumer to producer.
The importance of this statement becomes more evident if attention is called to the almost endless variety of information which might be included if the specifications were to be based on the ingredients and composition of the product. There would then logically be no end to the amount of information which might be included in descriptive labels. For practical purposes, however, descriptive labels are generally confined to describing at best only those product characteristics (or the ways in which the product will function) which are of interest to the prospective users of the product. If the label is to be of value to him, the user must then learn the significance of such description for his uses. This prerequisite, to a consumer who generally uses many products in different ways, may inhibit the consumer from making full use of the label. For example, descriptive labels of suiting material might include information concerning the percentage of wool, rayon, cotton, the thread count, and other technical information concerning the weave, the dyes used. Expert knowledge of textile chemistry and physics would be required to interpret such information into answers to such important questions as how the product will function in use. How well will it hold a press? How well will it wear? How well will it shine? And lacking knowledge, the users, often prejudiced and mislead by popular misconceptions, are frustrated in making wise choices. Consequently, much of the information furnished may be of no value to them.

Grading is a process of arranging products from high to low according to relative differences. One or more characteristics may be taken into
account in such a sorting. If the grading is to be based on consumers' preferences it is necessary that consumers and graders array the product as poor, fair, good and best, in the same way. It has already been pointed out that consumers' preferences may not be homogeneous. Wide differences among consumers with respect to the way they would rate products may interfere with the development of a satisfactory grading system. If the great bulk of the consumers are agreed in the rating of a product then it may be feasible to ignore the preferences of small minorities. It is true that people get to like that to which they have become accustomed. For example, if they have never known the flavor of a fresh egg which has been handled with speed and care, but only those carelessly handled, they may prefer the flavor of stale eggs to that of eggs which are used shortly after they are laid. If consumers' preferences are not homogeneous one cannot assume that the quality most preferred by the majority of the people will be the one for which the highest price is paid. This point will be discussed at some length in Chapter III.

Information about the product required by various market agents

In view of the fact that ultimately the product is to be sold to consumers, at every stage in the marketing process consumers' preferences must be considered. Nevertheless, at certain stages, because of technical considerations, the type of product which the particular market agent wants for resale may differ from the type of product sold in the
consuming market. For example, dirty eggs which have been cleaned properly should be as acceptable to consumers as eggs which were originally clean. To the agent who wants eggs for storage, however, cleaned eggs are less desirable than dirty and much inferior to clean eggs. Hence, for eggs to be sold at once to consumers, only two grades on the basis of this characteristic are needed, "clean" and "dirty"; whereas eggs sold in markets in which storage operators are buying should be classified as "clean" and "cleaned"; or preferably, "clean", "water-cleaned", sand-blast cleaned", "15% sodium hydroxide cleaned".

The particular requirements of market agents and processors do not raise new questions. These requirements are the result of technical market considerations which arise as the product moves through the market system and considerations which are important for their effect on the quality of product ultimately supplied consumers. If consumers' preferences are broadly interpreted to include the requirements of market agents and preferences of processors and commercial users, most of these considerations may be subsumed as a part of consumers' preferences and can be treated analytically as such.

Some procedures that take into account existing preferences

The federal government in the formulation of its tentative grades generally has proceeded by formalizing existing market-grade practices. In that the adoption of such recommended grades has rested with the acceptability of the grades to the trade, "radical departure from the
established method of doing business" which might make the trade look with suspicion upon the proposed grades has had to be avoided. This "inductive" approach toward the establishment of grades and the encouragement of their use undoubtedly has been the most efficient, especially for those commodities for which the grades as commercially used were acceptable when formalized. Grades for certain meat products and for eggs have not met with equal success, however, because the commercial practices when formalized became subject to heated criticism by the trade. This development for eggs will be discussed later.

The point to be made, however, is that a "deductive" approach to the problem of grading is now required if the benefits of grading are to be had by the producers and consumer of the commodities for which the "inductive" approach has failed. It is for this reason that an analytical approach as in contrast to an historical approach is taken in this chapter.

**Characteristics on which grades should be based**

In developing grades that are based on consumers' preferences it is necessary to determine those characteristics the quality of which is important to consumers. Grade specifications should be established which classify each product characteristic considered important by consumers and which classify into relatively homogeneous groups the qualities of the characteristics whether considered singly or combined. If consumers are relatively indifferent as to the quality differences of any char-
acteristics then this characteristic can be ignored in the grading. Likewise, if consumers consider the particular characteristic relatively unimportant, in the interests of simplicity it may be well to ignore it. And if consumers are relatively indifferent as to the several characteristics as well as their qualities, no grade is required.

After the important characteristics have been selected it is necessary to decide whether each of these characteristics is to be described or graded separately or whether two or more of the characteristics are to be taken into account in determining the grade. If a combination is to be considered the effect of various combinations needs to be examined carefully. By pooling the characteristics into one score and using one grade term the description of the quality of the product in some respects becomes less complex -- one descriptive term has replaced several. Grades based on the scoring of the quality of several characteristics are likely to be most satisfactory if what is considered high quality in one characteristic is highly correlated with what is looked upon as high quality in the other characteristics that are included. The pooled score in that case reflects the condition of each characteristic taken into account in the score. For example, consumers may rate a large egg high and a small egg low. But size has no relation to the internal quality of the egg. On the other hand, flat yolk, which is believed by many to be rated low by many consumers, is usually associated with a flavor that comes from aging, a quality that is also believed to receive a low rating from consumers. A grade based on
these two characteristics is likely to be a good measure of both.

Grades are not necessary for product characteristics and qualities which are evident to the buyer. Although grading is intended to supply buyers and sellers with information relative to the product, it is by definition inefficient to supply buyers and sellers with information concerning product characteristics which are apparent. For instance, it is not necessary to announce the grades based on shell color for eggs which are marketed uncovered (although the eggs may already have been sorted as to shell color). However, for eggs sold on the futures market where the eggs are not readily available for personal inspection at the time of sale, or even for eggs sold at retail sealed in cartons, it may be necessary to designate the shell color.

It should be mentioned, however, that although certain product characteristics may be observable it may not be measurable by eye. For example, eggs mixed as to size may cause the consumer to misjudge the size of the egg. Also care must be taken to insure that the apparent quality is the one which consumers are interested in. For example, size of the eggs may be visible to the consumer, but the consumer may also be interested in uniformity of size, in which case it may be necessary to establish grades based on uniformity of size.

Measurability of the product characteristics

Certain technical characteristics of the product may necessitate the adoption of grade specifications which themselves are not the
product characteristics consumers prefer. Such a situation may arise if the specific qualities consumers prefer are not readily measurable. In order to be satisfactory, however, the variation in any characteristic which is measured must be closely related to the variation in the quality of a characteristic which is important to consumers. For example, the size of air cell of a shell egg is commonly employed as a measure of the internal quality of the egg. It is not in any way a quality factor which is of direct concern to the consumer. It is, however, associated with the age of the egg and the conditions under which it has been held. These in turn affect the flavor of the egg and the condition of the yolk and the white. Some grades also take into account the mobility of the air cell. This is a measurable characteristic but unlike the size of the air cell, it is not likely to be related to the qualities of the egg important to consumers. Further discussion of the difficulty of measuring the relative qualities of characteristics important to consumers is to be found in Chapters V and VI.

Grades based on the "history" of the product

If the product characteristics are not subject to measurement, then a certification program or some other method which gives formal recognition of the history of the product must be instituted. For example, the grade name "Hennory" has arisen to classify eggs that have been produced on commercial and specialized egg farms where special care, presumably, is taken of the hens and the eggs. And many states require
the labeling of cold storage eggs a type of history grade, in part because of a presumption that cold storage eggs are different, that such differences are not reflected in the customary commercial grades and perhaps even that the differences are not commercially measurable. No method has been developed for the complete grade-testing of shell eggs without injuring the egg shell. Hence, history of the product is used as the basis of grading premium priced eggs. Also, even when adequate measurements are available, it may be more economical to check the quality of the product by certifying its history than by examination. For example, city milk sheds are composed of producers certified by the health inspector as eligible to supply sanitary milk to the city. This practice may be the result of lack of proper techniques for measuring the purity of the milk when received, it may be a more economical method of insure that sanitary milk is received, or merely the result of an historical precedent and perhaps a subtle means of delimiting the trade area.

Grade Terminology

The effectiveness of grading as a means of informing buyers and sellers of the product depends directly on the ability of these persons to perceive the quality of the product from the grade term or label used to designate the quality. One approach is to label the product so as to describe important quality characteristics. Some of the difficulties in doing this have already been presented.
A grade may be a measure of the relative quality of one characteristic or of two or more. If the quality of several characteristics of a product is important, the combining of characteristics reduces the number of grade terms that is needed in describing any one product. Also inasmuch as the quality ratings of the product characteristics have an ordinal relation, an ordinal arrangement of grade terms, using either letters or numbers seems to be desirable; e.g., A, B, or C; 1, 2 or 3. It is possible to use the same grade terms to express the ordinal relation of quality factors for many products and thereby establish uniform grade terminology for many of the products sold in the market. This is an important consideration, inasmuch as consumers purchase many products for many uses and need a systematic, uniform and standardized grade terminology. The effectiveness of the grade terminology used for one product in carrying import to the consumer surely is greatly increased if the same grade terms are used for the many products, even though a technical specification would relate to very different sets of characteristics.

A summary of the issues involved is presented by Samuel P. Kaidanovsky in a discussion dealing specifically with "Grade Terminology for Food Products". He writes:

Examination of the charts (giving grade designation of food products) illustrates the confusion that exists in wholesale transactions by the trade which is more or less specialized in its operation, the variations and special designations do not create a serious problem. This is true because in all such cases the variation has been brought
Progress in the direction of simplified terminology for consumers is being made, notably in the case of canned goods, butter, and eggs. A considerable quantity of canned goods is now being marked with the A, B, or C designation on each individual can. The marking of the cans with U.S. Grade A, B, or C is also being developed on an experimental basis by a few canning plants that are under continuous supervision of Federal inspectors. A large quantity of butter is being marketed in retail channels under a "certificate of quality" that informs the consumer of the quality of the butter contained in the package. Simplified grade designations are also being carried through to the consumer in the marketing of eggs that are graded and packed in retail cartons under the supervision of a Federal inspector.

Objection to the use of uniform grade terminology in terms readily understood by the consumer has usually been based, first, upon the assumption that consumers would discriminate unduly against any commodity carrying a designation that indicated it was of second or third grade and, secondly, upon the fear of distributors that much of the value of brand advertising would be lost. There is, for example, a feeling among the trade that the consumer would be more likely to buy "Choice" beef than "Grade B" beef even though both terms refer to the same quality. There is also a feeling among distributors that if all products were uniformly labeled under standard quality grades the advantages to be gained through advertising and other means to build up preferences for private brands would be impaired.¹

Number of Grades

In the above discussion of the process of grading and the composing of grades the question was not raised concerning the numbers of grades

needed. A test of a good grading system is its ability to convey information to the buyers and sellers relative to the quality of the product. The question logically arises as to how extensively grades should be developed to satisfy this test. What kind of information is useful? How useful are the various refinements that might be made? What is the cost of providing the various refinements of information? The test of efficiency in providing any service was discussed at length in Chapter I. A comparison must be made between the additional benefits from any service and the additional costs. A firm in deciding will weigh marginal cost against marginal revenue. The consumer will weigh in terms of utility, the additional service against additional cost. The purpose of this section is to establish an economic criterion for establishing the numbers of grades which may be economically justified.

A product might conceivably be sorted into as many groups as are necessary to fulfill a condition that all goods falling within each group are equally acceptable to every consumer and buyer. The articles in each of these groups might be thought of as a commodity\(^1\) which would be defined as a product having specified characteristics of a given quality rather than a range of perceptible qualities as is true with many grades at the present time. The number of these commodities would border on infinity and might be called fundamental commodities. If such a division were made among products it should be recognized that for many consumers their conception of a commodity would include many fundamental commodities -- since some consumers would be unaware of

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\(^1\) Cf. Triffin, Robert., Monopolistic competition and general equilibrium theory. Harvard Univ. Press. 1941. pp. 78-96 for discussion of the economic meaning of a "commodity"
certain quality differences that divide up the product into the several commodities. For instance, to persons who prefer brown eggs equally well as white or any other shell color, none of the color divisions (the number of which would be required to satisfy all consumers might be infinite) is of significance. The marginal rate of substitution of brown for white eggs is infinite; they would refuse to pay a premium for white over brown eggs, or vice versa.

Conceivably for each of the fundamental commodities an individual has a separate demand. A summation of individual demands constitutes the market demand curve for a commodity. This demand curve is then used as an index of the relative desiredness of goods to consumers. The complementary index is the cost of grading. These two indices provide the necessary parameters to satisfy the criterion for efficient grading; the result is the following rule which satisfies the criterion for efficient grading and which may be applied in the market in delimiting the numbers of grades. If price and rate of consumption resulting from the establishment of an added grade does not yield an increase in revenue greater than the increase in total cost evolving from the extra grading and handling; that is, if the consumers do not value the added grade greater than the cost of introducing and maintaining the grade, then the extra grade is economically unjustified and should not be established. A successful prosecution of this rule would reduce the

1Only demands for particular commodities can be added together. A demand curve constructed from the sum of demands for two commodities is without meaning.
number of "fundamental commodities" to an economical number which would
be promulgated. This is not to say, however, that individuals would
be denied the right to have products "graded to order". The rule given
above is intended solely as a basis for rational market-wide action and
uses market data for its prosecution. Persons who individually desire
a different grade of product more than the grades made available in the
market and value this grade at the cost involved in performing the
extra grading are perfectly rational in having products "graded to order".

When is a grade uneconomic?

The cost of grading increases as the number of grades increases.
An increase in the number of grades increases the number of grade classes
into which the product may be put and, hence, increases the number of
packages, number of labels and records and necessitates greater accuracy
on the part of the grader.

Using the rule already stated of how to determine when a service is
economical, that is when efficiency in the use of resources is being
achieved, it is possible to outline the procedure to be followed in dis­
covering when too many or too few grades are being used. Helpful
information may be secured by the following process:

1. Transform a given grade into two others. Continue this process
   of division until, as a limiting case, either each unit sorted is
   unique, or groups of units are homogeneous with respect to every
   attribute to every consumer. A reverse process may be used:
grades of a product may be summed (two grades may be summed into one grade) to the extent, as a limiting case, that the originally ungraded population is simulated. There may be physical difficulties to this subtractive or additive process, but the principle is nevertheless correct in that the number of grades may be delimited to the original product or may be increased almost without limit.

2. With each transformation make a comparison of the relative contribution to consumers when making important distinctions with the cost of the changes in market practices, including grading, it necessitates.

In economic terms, inasmuch as the demand price represents the summation of a point on the individuals' demand curve, each derived in an attempt on the part of individuals to maximize their individual welfare, the intersection of the marginal cost and the demand determine the worthwhileness of the refinement in the grade. Hence, from the viewpoint of consumers as well as producers, the criterion for determining whether an additional grade should be added should be determined by comparing net revenue using certain grades with the net revenue with another set of grades. If the difference is positive and greater than the cost of grading, the extra grades should be introduced.

For example, there is conceptually a demand curve for brown eggs, for white eggs, for cream eggs, and for mixed color eggs. Each, by definition, is a separate commodity, and the demand curve for mixed eggs is not a summation of the demand for each of the separate colors included. Likewise, the costs for producing each of the separate colors
does not add up to the sum of the total. In that there is no necessary relationship between the parts, a diagramatic analysis is not feasible.

Applying the rule: If the shapes of the demand curves for white and mixed color eggs are such that the revenue from selling the white eggs and remaining eggs separate is greater than the cost of making the separation, white eggs should be separated from the others. Similarly, browns may be graded out for separate sale. If cream eggs were disliked, the sale value of the "mixed" would decrease for as whites and browns are sorted out, a higher concentration of the disliked creams would remain and the loss in the sale value of the mixed should also be computed and added to the cost of grading.

Further analytical complications arise from the fact that this is a dynamic and not a static problem. Once the grade system has been introduced the entire map of consumer demand and of cost of production may change as producers and consumers accustom their production and consumption habits to the new grade system. For instance, hatchery programs for flock improvement and breeding for, say, uniform shell color might take on renewed significance in the minds of producers, the hatcherymen and the researchers with the prosecution of an established grade system. Also, certain practices may be adopted by producers merely by change in habit and which incur no additional money cost. The "social cost" of the poorer practices had not been charged to individuals prior to refinement in market, once they are made explicit to the producer, he may find it profitable to alter his practices. For example, cross breeds
which produced eggs of unstandardized colors could be eliminated after
a season or two in favor of breeds which produce uniformly brown, white,
or cream eggs, whichever color paid the highest premium, oteris paribus.
The result of an economically justified grade system would be increased
production of eggs consumers prefer and increased revenue to producers.

These dynamic changes should be included in the rule by adding the
word "anticipated" to net revenue and cost in the original criterion.

Attention should be called to the fact that through the adoption of
this rule, output will not be curtailed in the marketing of many farm
products. This is not a typical case of price discrimination or product
differentiation. Once the grade system has been established each
individual producer and market agent will act so as to equate his
marginal cost with price. The demand curve facing each dealer should
be perfectly elastic, or, in any case, at least as elastic as would the
demand curve in lieu of the grade system. In fact, the better enforced
are the grades, the more elastic is the demand curve facing each dealer
because his customers' buying horizon increases with more reliable
description of the product.

In an actual market situation there might, for example, be two grades
of a product. These may be held by some persons to be too few, since
one of the grades is recognized as including a very wide range in quality.
Such a grade might be taken and separated into two grades. In order to
discover the usefulness of these two grades, in comparison with the one
which existed before, it would be necessary to continue their use for
some time in order to get the effect of the dynamic changes which have just been described. The presence of too many grades might be revealed by combining any two grades between which consumers appeared to be making very little distinction. Complaints from consumers would be a measure of the inconvenience which such a change would bring.

A study of responses of consumers in a market having a larger or smaller number of grades together with a knowledge of the cost of introducing another grade or the savings that would be effected by dropping a grade would also be a means of getting information on the most economical number of grades.

Where Should Grading Be Done?

Here the same rule can be used as was applied in determining the number of grades. Grades should be developed at any market level where they are economically justified. This test is, however, far from simple since long-run as well as short-run conditions need to be considered. If the participation of a large proportion of the dealers within any market is necessary in order to get maximum returns and if grading in other markets is necessary in order to get maximum returns in a single area or type of market, possible benefits may be discovered only over a considerable period of time. Individual firms which anticipate the potential benefits of grading may individually be able to do little. Firms are likely to favor grading if they see the possibility of an increase in net income within a relatively short period of time. They
may fail to press for grading if benefits accrue only out of long-run adjustments. Some legislation designed to increase the amount of grading would have the state assume much of the cost of grading in the various markets. It would then cease to become a concern of the individual firms. Cost does, however, remain a factor to be weighed by the State.

The following facts should be taken into account in determining where grading of any product should be done:

1. Grading does not serve to stimulate improvement of the initial product unless the price that is paid to the initial producer is on the basis of quality. This may necessitate grading being done in the local market. Other schemes, however, have been developed whereby the initial producer is paid a minimum amount when the product is delivered. The additional amount that he is paid is determined on the grade received by his product in some concentration point which, in turn, reflects the resale value of the product in the consuming market.

2. For some products one grading is sufficient. In deciding on the market where this should be done cost and effectiveness should both be considered. Perishability is a highly important factor in determining the number of times a product must be graded. This depends on the nature of the product and the care with which it is handled. Meat, for example, is highly perishable but it is held in cold storage. One grading is usually sufficient. Canned fruits
and vegetables would require only one grading. Oranges once graded in California need only a superficial low-cost reinspection in New York before they are sold for retail distribution. In that the oranges are initially satisfactorily graded subsequent re-grading cost is largely eliminated, and only the cost of periodic sample inspection is required. Since eggs are likely to deteriorate between Iowa and New York City, for example, it may be important to have them graded and later re-graded: graded in Iowa in order to satisfy the buyers as to the relative merits of the eggs, and again when in New York in order to satisfy New York retailers as to the relative merits of the eggs they wish to buy to sell to consumers.

3. The cost of grading in many cases declines with increase in volume of the product to be graded. It is partly because of this that grading of many products has been introduced first in the central and wholesale markets, where a large volume of the product tends to be concentrated. Reduction in cost with increase in volume is likely to occur if complicated machinery is used, if the customary volume is less than enough to employ one full-time grading expert or if supervision of the graders is necessary in order to maintain consistency in the interpretation of the standards. If grading is required in a market where the volume is too small to use the most efficient service and the cost of accurate grading is significant, dealers in the market with the small volume may be put under considerable pressure to be careless in their grading.
The introduction of grading in some markets is likely to have much greater repercussions on competition among firms than in others. The degree of solely price competition, as in contrast with price-quality competition, differs greatly between some local markets and the wholesale markets into which the eggs move.

Thus questions concerning the advisability of establishing grades may evolve around (1) the creation of a grade system that would permit efficient grading and increase price competition for the purchase and sale of the graded product, as against (2) the leaving unrestricted the freedom to grade, and, as a result, impair as full a development of price competition for the purchase and sale of the product as could be attained. The first policy, in some places would result in drastic reduction in the number of grade-buying establishments in order to insure a sufficient volume to warrant as complete a grade system as is economically attainable; perhaps it would necessitate the restriction of grading to government-managed or certified grading stations. The latter policy would not force the volume of eggs to pass through a fewer number of establishments and thereby permit efficient grading. Hence, grading would become less widespread and a fewer number of grades justified.

Conditions related to decreasing cost of grading with larger volume of products also involve conditions that affect competition. In a situation where with increase in volume of products graded, the cost of
grading decreases, there will be a tendency for grading to be concentrated in the hands of one or a few firms. The possibility of such a condition plus the desire for an impartial grading agency, lead many persons to favor the State's assuming responsibility for the grading of many products. This consideration is particularly pertinent in connection with legislative programs designed to make grading mandatory.

Application of Grade Specifications Over Time

The problem for consideration here is whether the grade specifications should be flexible or rigid; and, if flexible, varied in accordance with certain price differentials as between the grades. The question of flexible grades need not arise for commodities which are truly uniform in character of production from time to time and are put to uniform uses from time to time. But seldom are such conditions ever met, particularly for agricultural products. Yet for purposes of argument, maximum flexibility will be assumed to exist because (1) the supply of the product is seasonal, (2) product changes in the distribution of various qualities, i.e., the range of qualities may remain the same, but their frequency distribution change, (3) consumers' preferences change seasonally; the qualities desired in one period may be discounted in another. All of these influences, of course, find expression in price changes.

The procedure followed in attacking this problem is to cast into abstract and comparable form the principles underlying the manner in which some leading trade organizations and some state grade laws have
attempted to cope with the problem. This is done in the discussion immediately following. The fifth classification, however, has never been recognized commercially but is included as a policy which is consistent with the arguments developed heretofore in this dissertation and which thus serves as an application of the criteria formulated.

For present purposes the following alternative policies should be viewed in terms of a mandatory grade system. Otherwise, the arguments would be confounded with judgments relative to the acceptability of the grade system to the dealers affected.

Classification of policies relative to flexibility of grade specifications

1. Rigid, that is, fixed technical specifications for each grade name established.

2. Flexible specifications so that for each named grade either an absolute number or a given percentage of the total product falls within the grade regardless of the price differentials. Commercially this policy is termed "percentage grading".

3. Flexible specifications designed to maintain definite or the most profitable price differentials between grades.

4. Rigid specifications for each named grade and rigid price differentials as between grades.

5. Rigid specifications for each grader, but allow for the combination of grades if their separation is economically unjustified.
By rigid grade is meant grades fixed as to specification as well as to numbers of grades. Also, the term "grade" as used here refers to the grade term and not to the quality of the product. Each of these policies will be discussed in turn.

1. Rigid technical specifications for each grade name established. Most state egg grade legislation is in accord with this policy. Justification for such a policy lies in part in the following things:

   a. "A pound is a pound the world around" is the expression which reflects the feeling that grade terms should be definite and reliable; the same from place to place and time to time.

   b. If consumers' preferences are constant over time, confusion would result by not maintaining the identical labels for the same goods. And, even if consumers' preferences do change over time, there may not be reason to change the grades proposed. They change gradually and probably incoherently among individuals and in such a manner generally that less confusion would result from permitting individually each consumer to realign his preferences to the proposed grades; rather than revise the entire set.

If the grade specifications are rigid, a consumer, because of the homogeneity of the qualities of the products within a given grade, may be able through experience to discover the grade which he most prefers and to select it. If grade specifications were not rigid there would be the constant difficulty of discovering the relative merits of the grades.
An example of the issues involved in the alternative of flexible or rigid grade specifications is to be found in contrasting the merchandising policies used in gasoline and motor oil sales. As the seasons change the type of gasoline and motor oil needed for efficient operation of an automobile change. The major gasoline distributors change the quality of the gasoline selling under a brand name to fit the season. For example, in the winter they advertise that their brand of gasoline has been "winterized" and assure the automobile owner that he can continue to buy with assured satisfaction the same grade of gas for winter driving that he bought in the spring and summer. On the other hand, motor oil, although branded, is sold on specifications, standardized for the entire year and probably for many years. The consumer is able to learn these various grades of oil and to relate them to requirements of his automobile for the various seasons. As the seasons change, he changes his grade of oil. Hence, the automobile owner buys the same grade of gasoline the year round, but the specifications for that grade are supposedly adjusted to meet his automobile's requirements; in buying oil, however, he buys a different grade as the requirements of his automobile change. Because the specifications for the grades of oil are constant, the consumer has been able through experience and advice to discover the grade which he prefers and to select it.
grades only at considerable cost and confusion if grade specifications were flexible.

Certain difficulties are, however, involved in maintaining rigid specifications:

a. Assuming that grades are promulgated and not revised with changed conditions, specific grades may be maintained in certain markets for which there is no economic justification in view of the arguments developed above concerning numbers of grades.

(1) At some levels in the market there may not be sufficient volume of certain qualities to yield a marketable product. A tremendous volume of business may be required to permit sufficient accumulation of the scarce qualities to warrant a separate grade, e.g. the number of grades at country points may be fewer than are justified in the central market.

(2) At other times of the year the general level of quality may rise with the effect that the cost of sorting the better from the average, or the cost of sorting out the inferior would be greater than the purchaser would be willing to pay. To force grading under such circumstances could be justified only to maintain the identity of the grade (a cost which viewed over time may be justified) or as a means of providing employment for the graders during times when their services would otherwise not be needed. Seasonal employment might lead to higher pay during time of employment with
no difference in the cost of their services.

b. Dynamic changes in production and in consumers' preferences may bring need for change. Rigid specifications may standardize the product in such a way as to discourage the introduction of new developments. Any standardization scheme tends to standardize existing practices and to delay the introduction and recognition of new techniques until long after the time when their adoption would otherwise have occurred. Yet checks may be instituted which will avert extreme rigidity: the individual seller or processor may be permitted to place on his merchandise a label, a description, designating the new technique or process used, or a tentative grade indicating important qualities not covered by any grading system in operation. This may be done formally by requiring the registration of such tentative grades and labels whether they initiate from within the trade or by a public authority authorized to promulgate grades. And these goods would be subject to inspection and enforcement by a regulatory authority. This would insure the public of receiving a product as labeled. In addition to the tentative grade or label it might be required either that the products should be grade-labeled according to the standard grades, or that no tentative grades should be permitted unless the interested party can prove that the product differs significantly from any of the existing established grades. The first would put in the jurisdiction of the consumer the decision as to whether the product is significantly different;
the latter would confine such judgment to the inadequacies of our objective methods of measurement and to the subjective judgment of the men with power to decide what differences are significant. In addition, of course, other precautions may be instituted as they are found necessary to preserve the forcefulness and meaningfulness of the established grade-labels.

c. Somewhat related to the issue already discussed is the criticism that standardization limits freedom of choice and freedom of trade. The power to promulgate grades, to require proper posting of prices, to inspect and punish either by fine or publicity for misrepresentation without doubt curtail some of the accustomed "freedoms". The whole question of "freedom" versus "regulation" will not be entertained in this dissertation. Nevertheless, it is well to recognize that the largest portion of this dissertation will be devoted to description and appraisal of existing and proposed controls governing the marketing of eggs. Most of these controls are imposed by the trade itself, some by the government. The issue is not so much "freedom" versus regulation as it is: Who makes the rules? What are the governing criteria? What checks are available to curb misuse of the powers to prescribe the rules of the game? Those are the real issues.

2. Flexible specifications so that for each grade either an absolute amount or a given percentage of the total product will fall within it, regardless of the price differentials. This is what is commonly
known as percentage grading.

Probably few members of the trade have ever expressed their grading policy in such terms, yet the policy prevails in the grading of many agricultural products. "Grade 'em tight" if there is an abundance of the better quality available, -- and "loosen up a bit" when the better quality is scarcer. They "make the grade". Psychologically also, there is a tendency for graders to grade according to this policy. Teachers have been accused of grading a good class on higher standards than a poor class. A formal recognition of this policy may be found in the practice of the New York and Chicago Mercantile Exchanges. They alter their grade specifications seasonally by relaxing the tolerances when eggs of higher quality are scarce, and tightening them when the better quality eggs are increasingly forthcoming.

In justifying such a policy several arguments may be advanced:

a. There is the assumption that purchasers of the products have no absolute standards of preference; that those who want the highest quality want just the best that is to be had and not any particular quality.

b. There is the belief among some that it is better merchandising policy to sell as of a quality grade name slightly undergrade merchandise to customers accustomed to purchasing that grade if better quality merchandise is not available. An alternative policy would be to persuade the customer to purchase the avail-
able but lower quality merchandise bearing a genuine but lower quality name. Put in the form of a question the issue here is:
Should a quality of product be labeled as Grade A because it is the best quality available during a period for generally low quality, and be called Grade B in periods when better qualities are available on the market?

These arguments turn on whether purchasers have no absolute tastes or standards for choicemaking. If the quality grade is known to have a certain rank in the market as, say, best, fair, or poor, it may be correct that it is better merchandising policy to sell to those who want the "best", the best that is available (within limits) regardless of the quality, rather than call their attention to the fact that the merchandise they now find to be perfectly acceptable was formerly sold as second best at a much lower price. For again, when the general quality of the merchandise is raised, the customers might fail to pay the premiums for the higher quality merchandise and continue to purchase the "fair" quality. And if quality is lowered without consumers being aware of this fact, the lowering of price may not be equivalent to what would occur if the products were graded in accordance with former specifications.

Criticisms of the policy of "percentage grading" are of several types:

a. Some persons question the assumption that purchasers do not have absolute standards of preference for the various qualities
50.

of a product. It may also be maintained that even though such standards do not exist at any given time, this condition may not justify a policy which denies purchasers a means of self-education as to the relative desirability of certain absolute specifications. For example, consumers have been provided a means of relating the grade of motor oil with the requirements of their automobile. Likewise, if eggs graded on basis of specifications known to the consumer, consumers could relate the various qualities of the eggs with certain uses.

b. It is presumed that consumers' preferences change coherently, and that it may be more efficient for the processor of the product to make the necessary adjustment for the consumers rather than attempt to educate all the consumers to adjust. For instance, using gasoline as an example, as winter approaches, the entire range of automobile users' needs for gasoline shifts toward gasolines of higher octane ratings. It might be argued that it is more economical for the gasoline distributors to make this shift rather than attempt to educate consumers so that they may individually make the shift.

3. Flexible specifications designed to maintain definite or most profitable price differentials among grades. Probably the chief argument for adopting a flexible specification policy for grades is that a particular group may be interested in manipulating grade specifications to secure maximum revenue.
When there is a scarcity of top grade goods with a large premium for them over second grade goods, the grader is inclined to loosen up on his grade requirements and introduce somewhat inferior goods into the top grade. To "loosen up" or "tighten up" in grading is common terminology in the trade.

The trade may be inclined to feel that unless requirements for the top grade are relaxed the supply in the top grade will be small and the high price will cause some consumers to shift to a lower grade than they are accustomed to buy and that later it may be difficult to win them back to the higher grade. Many dealers are inclined to feel that price differences as between grades should exist, but should not be permitted to "get out of line". The manipulation of grade specifications in order to secure maximum revenue is discussed by Dr. J.D. Black as follows:

Although grades have already been established for most farm products, the work in this field is very far from complete. The grades established have been based altogether too much on purely technical considerations. They have been worked out for the most part by men with little appreciation of economic factors. The objective in any set of grades, from the standpoint of producers, is so to delimit them that one year with another the producers will have disposed of their total crop of all qualities in such a way as to yield them the highest net return after taking out marketing expenses.... The system of grades which will work out best one year will not work out best another year. It is entirely possible that certain kinds of flexibility should be provided for, although such a suggestion is anathema to the technicians who have been establishing grades. The grades which the trade had established as a result of experience were not based on technical considerations altogether, but took account of actual experience. They
reflected the habits of consumers and the producers. There is ample justification in some cases, therefore, for the opposition of the trade to the grades which the federal government has established.\(^1\) (p. 411-412)

4. **Rigid specifications for each grade and rigid price differentials as between grades**

This policy should be recognized readily as an economic impossibility. It follows a theory that you may "have your cake and eat it too". Nevertheless, this policy was written into a cream grading law of Minnesota and enforcement was attempted. The legislature apparently wanted to guarantee to the farmer that he would benefit by the grades, or perhaps cream quality improvement leaders wished to stimulate (even if artificially) better dairy production practices. Such a policy makes certain assumptions about the relative elasticity of demand and supply that are probably far from being true. For example, a given price differential between two grades may not cover difference in the cost of production of the grades. If this occurred the production of the low quality product would be encouraged. In such a circumstance it would be difficult to prevent the differential from widening. At the same time, if the price differential more than covered the difference in the cost of production, resources would be shifted away from the production of the lower and shifted to the production of the higher quality. The

supply and demand conditions would press in the direction of narrowing the price differential.

Whatever may be the intentions of the supporters of such legislation, it should be recognized that to require a creamery to pay 2¢ more for something consumers will pay only 3¢ more for means either the law will be found unenforceable, or if enforced, that the 1¢ serves as a tax upon creameries to subsidize improvement of cream beyond improvement either desired or needed by consumers, the burden of which may be shifted back to the producers at the lower quality in the form of lower prices. Adjustments in supply would in time break down the differential.

5. **Rigid specifications for each grade, but allow for the combination of grades if their separation is economically unjustified.**

This policy assumes that grading systems must be set up without knowledge of the number of categories into which the product should be divided for the market. It may be felt necessary to experiment by expansion and contraction, and hence to effect changes in the grade specifications, to discover what number of grades should exist. The process involved in making such comparisons has already been discussed.

The merits of a policy of rigid grade specifications with provisions made for combining grades are several:

a. The policy permits a type of flexibility which makes it applicable at any level in the market process: farm to local dealer, local dealer to shipper, shipper to central market, central market to
jobber, jobber to retailer and retailer to consumer. The unit volume handled in each of these market processes varies, and the number of grades which may be economically justifiable in one market may not be the same in another market handling a different unit volume (assuming volume to be an important determinant of the numbers of grades which may be maintained).

Hence a large number of grades may be made mandatory for trading in the central markets. Whereas for trading in smaller markets the grades used in the larger markets may be combined and a smaller number of grades may be made mandatory. However, individual traders could maintain all or some of the larger number of the recognized grades if they find it to be economically desirable, individually. For example, six grades may be found economically defensible for operations in the larger markets. These grades are numbered in their ordinal relation to each other, one through six. In some markets only the combined grades, 1-2, 3-4, and 5-6 may be economically defensible and be made mandatory, although some traders may find it profitable, for example, to grade 4 separate from 3.

b. Since the grade specifications remain fixed over a sufficient period of time, interested persons can learn the meaning of the grades both as to specifications and as to their application to the individual's uses. The grades will be accountable and reliable.
Market agents and graders need to be attuned to but one set of grade specifications. Certain new grades may occasionally come into use. Their specifications will, however, not be foreign to existing specifications. For each new grade will be a further subdivision of a grade already in use, or a combination of two grades already in use.

Flexibility is provided in the system insofar as the number of grades is concerned. Although the "gradations" do not permit gradual, casual and informal changes when and where changes may seem to be required, they do permit specific changes. These are of such a type that they cannot in any way be looked upon as attempts on the part of the sellers to chisel on quality.

From the standpoint of enforcement of the grades, and standardization of grades used, this is an advantage rather than a disadvantage.

The application for the rule used to determine the numbers of grades rests upon an objective criterion, that of the expected net revenue, which is subject to empirical tests. Its application does not rest with the individual judgment of the grader. Nor is the individual market agent able to effect flexibility without open declaration by changing the grade-label of his product. The entire system permits of a rational and planned grade program.

The number of grades that would be permitted would be that at which the value of the service to the user is equal to the cost
of the service and not beyond. Up until that point grading
is of social value. Even beyond that point, however, grading
may be of social value if the estimates of revenue are not con-
 fined to the immediate but take into consideration as they should
the dynamic effect of grading upon production and consumption
practices over time.

The major criticisms of rigid specifications which allow only for
a combination or a splitting up of existing grades are:

a. Although an adjustment is made possible in the number of grades,
the policy may not permit the type of adjustment that is needed.
In a grading system with four grades it may be desirable to have
three grades. Two of the existing grades might be combined,
but this might result in much less homogeneity of quality in
one grade than in the other two. The most desirable step
might be to reshuffle the range of qualities of the product
into three groups -- the specifications for each of the grades
in that case might have to be changed.

b. The policy makes little allowance for dealing with changes that
may occur in the quality of the product or in consumers' prefer-
ences. The possible ways of meeting such dynamic factors were
discussed on page 46 above.
Summary

In this chapter there has been developed a basis for formulating grade specifications and a rule for determining the numbers of grades to be used in any market. Recognizing as one of the chief problems confronting grade formulation, the changing market conditions with shifts in supply and demand, attention was given to possible approaches to the handling of this problem. In contrast with policies which are implicit or explicit in the market as it has functioned or been regulated to function, a policy consistent with rules and criteria developed in this dissertation was developed and appraised. The operation of such a policy was sketched and criticized.
CHAPTER III. METHODS OF INVESTIGATING CONSUMERS’ PREFERENCES

In the preceding chapter consumers’ preferences were given as a fundamental criterion for formulating grade specifications. Attention will be given in this chapter to outlining and appraising the various methods which have been used in investigating consumers’ preferences.

Aspects of Consumers’ Preferences

Consumers’ preferences are not absolute, but relative; they can be expressed only in terms of alternatives among which consumers may make choices.

Two facts about consumers’ preferences as to quality are of interest: (1) the order of preference among the various qualities; and (2) the magnitude of the relative preferences. For formulating grade specifications, that is, in determining the fundamental commodities, the ordinal relation of the qualities is important; for establishing the grades which are likely to be found economically justified in the market, that is, delimiting the "fundamental commodities", the magnitude of the preferences, particularly as expressed in prices, is important.

When consumers are asked which of two qualities they would rather have, assuming no difference in price, their preferences can satisfactorily be conceived merely in an ordinal relationship. When price
differences are injected it is possible by consumers' choice among alternatives to gauge to some extent the strength of the relative preferences. What one attempts to measure by a consumers' preference survey is really the shape and position of the demand curves for various qualities of products; the amount of purchasing power consumers are willing to sacrifice for given quantities of specified commodities of given quality.

Of course the findings fall far short of the goal, and at best, only a partial picture of the consumers' preferences is secured. In some instances, information secured is limited to single points on various demand curves.

Consumers' preference studies in the main have focused on the relative preference among products which are looked upon as close or fairly close substitutes for each other. These products can be put into two categories: (1) different types of products; and (2) various qualities of any one product. The relative preference for pork, beef, veal, or lamb might be studied, or for meat, eggs, cheese and fish, or for various fruits such as apples, bananas and oranges. Or attention might be directed to the preference for the various qualities of any one product, as the various qualities of beef, bacon, chicken, oranges or eggs. In this analysis attention is focused on the study of consumers' preferences among the various qualities of a single product.

Why Study Consumers' Preferences?

Questions about consumers' preferences are of two general types: (1) What are consumers' preferences? and (2) What forces are shaping
them and might cause or are causing them to change? That is, questions concern the static or the dynamic picture of consumers' preferences. Investigators may be motivated by one or more objectives:

1. To effect a better coordination of production and supply with consumption. If both short-run and long-run adjustments are important, the investigator would seek to discover the relative preferences for various qualities of any one product characteristic or combination of characteristics for the purpose of product improvement or of directing the distribution of a given supply among various markets. In some cases the ordinal relationship alone is sufficient to formulate the policy for product improvement, if difference in cost among the qualities is not important.

Information as to relative strength of preference among qualities may be necessary in order to determine the profitability of various qualities in view of the difference in cost among the various qualities under consideration or in order to distribute the various qualities among the various markets better in accord with market demands.

2. To discover conditions influencing consumers' preferences in order deliberately to modify them or to perceive the effect which various current changes are likely to have on consumers' preferences for various qualities. How intense or strong are consumers' preferences? How shiftable is the demand curve or the ordinal relation? With this objective in mind attention is concentrated on the dynamic
determinants of consumers' preferences. Information of this type
would permit prediction of consumers' preferences by deductive methods
ex ante, rather than continual resort to inductive method ox post.

3. To have a basis of appraising the market system as to how adequately
it functions in taking into account consumers' preferences and to
discover what changes would remedy its defects. Inasmuch as it
is the primary function of the market to inform both the market and
productive agents who determine the quality and type of product
consumers receive of consumers' preferences, any appraisal of the
market structure requires some judgment concerning the facilities
available for and quality of expression of consumers' preferences.
In this dissertation it is with respect to grading and grade
specifications, and, generally, of appraising the efficiency of
the market that a discussion of methods of investigating consumers'
preferences is undertaken. In the preceding discussion of grade
specifications, it was assumed that they should be based on con-
sumers' preferences.

Who Is Interested in Studying Consumers' Preferences?

Manufacturers, processors, marketing agents and basic producers are
interested in improving their product or in distributing it among the
various markets in order to maximize their net returns from its sale.
Sellers of branded products are likely to make their own market analysis.
Agricultural producers as a rule operate on such a small scale that they
cannot individually undertake profitably such studies. Marketing cooper-
atives directed by such producers have made investigations. Studies have been made by Federal agencies such as the United States Bureau of Agricultural Economics and the Farm Credit Administration, and by state agencies such as the Agricultural Experiment Stations and the state departments of agriculture.

The dynamics of consumers' preferences for various qualities are of interest to manufacturers, processors and farmers, insofar as they want continually to keep their products adapted to changing consumers' preference. Furthermore, they may be interested in the dynamics of consumers' preference inasmuch as they may wish to estimate the feasibility of altering consumers' choices in the market. In the case of branded produce a seller may seek to discover existing preferences in order to stress them in selling and thus to differentiate his product from other products on the market. He is interested in estimates of consumers' receptiveness to slogans and quality appeals which may be carried to the consumer through advertising and customary merchandising techniques.

The shiftability of consumers' demands and how to effect a shift in demand most economically are facts such sellers are interested in. Social workers and persons interested in changing consumers' consumption so as to improve their dietary habits, etc. should also be interested in such approaches. They may want to discover relation of quality factors to the amount of the product consumed.

Interest in the study of consumers' preferences for the purpose of appraising the market is likely to come largely from those concerned with
the public interest, believing that public welfare is promoted by a market system which functions in such a way that relative consumers' preferences, as expressed in prices, are a guide to producers in their allocation of resources. Individual sellers and buyers may also have reason to believe that the market fails to provide full and adequate expression for the quality of goods which they prefer either to supply or demand, and may be interested in over-all market appraisal to discover defects.

This dissertation is concerned with a general appraisal of the manner in which the market functions. Grades, a market device by which consumers' preferences are relayed to producers, are to be considered in terms of their ability to reflect consumers' preferences.

Types of Studies of Consumers' Preferences
Made with Reference to Grading

Studies of primary concern in this dissertation

This dissertation will be concerned with only two major types of studies: (1) studies intended to secure measures of the ordinal relation of the qualities of a product, including studies intended to discover not only what the existing relation is, but what factors influence the ordinal relation; the why of the relation; and (2) studies intended to secure measures of the intensity of the preferences, especially as expressed in market data in the form of prices and quantities, which measures may serve to interest producers in establishing grading and to
provide producers with information helpful to them in making decisions as to expansion or contraction of the production of specific qualities.

Other studies as aids to grade development

There are other uses to which surveys may be put for appraisal of grading. For instance, once grading has been instituted, surveys may be made to test the responsiveness of consumers to the grades. Not only is there a question of how adequately given grades represent consumers' preferences, but how well are the grades understood, that is, not only how acceptable, but how well are they being used by consumers. Grades may not provide a channel for consumers' preferences, however adequately they are designed for the purpose, unless the grades are recognized and recognizable by consumers. The following quotation taken from a study of consumers' reactions to graded and ungraded beef, brings this out quite clearly:

The Decatur survey showed definitely that most women purchasing beef know very little about either the grades or brands of beef. Only about one-fifth of those interviewed could name any Government grades, and very few could name any brands even the most of them purchased branded beef. Most of them did not know whether they purchased graded beef, and more than half did not know what class of beef they bought — whether steer, heifer, or cow.

All the surveys revealed that confusion usually resulted from the large number of packer brands used. Not only were most of the consumers unable to distinguish between them, but most of the retailers did not understand their significance. Many retailers felt that too many brands were being used.\(^1\)

This survey has concentrated upon the consumers' knowledge of the qualities and quality labels of a product. At every step in the process from production to consumption, where judgments are made relative to the quality of the product, surveys might be instituted to investigate whether the agents making the judgments concerning the qualities of product bought or sold understand fully the basis of the grading, and whether further standardization of market procedures and terminology would tend to promote market efficiency. Judgment is required at every step in the production and marketing processes: from breeding, raising, selling, shipping, processing, selling, retailing; and merchandising to consumers' buying and using. And at each step, the adequacy with which the market is organized to permit reasonably correct judgment, at a minimum of effort on the part of the agent, could be investigated.

It is reasonable to assume that the better established the grade system, that is, the more uniform and concise is the market terminology used by all agents, the more efficient will be tests devised to measure the adequacy of the grades. And once a grade system is established, it may be possible to design experiments applied in the market under controlled conditions, e.g., the number, qualities, and prices of grades may be varied in certain stores and checked against controlled stores of similar type; cities and entire areas may be used as an experimental plot. The possibilities are great but such specialized studies would not be found fruitful until confusing market grade terminology is cleared up.
Sources of Information on Consumers' Preferences

Sources of information on consumers' preferences are of two main types: (1) from individual consumers or consuming units such as families; and (2) from market data which registers the result of group behavior, or mass consumer action. These two types will be separately considered. Some examples of each will be described. Then the methods of each type of study will be appraised.

Consumer Surveys

Studies in which attention is focused on individual consumers are of many different types. One basis of classifying these studies is the

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1 Ralph Cassady, Jr., of the University of California, Los Angeles, states:

Actually, however, the basic methods utilized to reveal preferences are few in number, practically all techniques falling into one of several fairly clear cut categories:

First, there are those studies which are observational in character. Such would be the pantry studies made by various market analysts and the store sales analyses designed to find out what brands of merchandise actually are being acquired by consumers...

A second basic type of study is the survey method. In this case one analyzes not an actual sales situation at all, but instead probes consumers' opinions by means of questionnaires with the idea of predicting consumer market behavior....

Third, this is the experimental method which utilizes the 'guinea pig technique' in testing consumer reactions to an actual product or service....

Finally, there is the method of trial and error which is utilized in some instances in a quasi-scientific manner. Into this category must be placed the effort of one mail order institution which, from time to time, tries out price line changes in test stores, often with resulting tremendous increases in sales volume.

(p. 87-88)

extent of consumers' participation in providing the information. Three methods are commonly used: (1) observation of individual consumers in stores - in this case the consumers in no way consciously participate in providing information; (2) making inventories of products actually found in homes - in this case consumers' cooperation must be secured in order to get permission to discover what products are on hand; and (3) asking consumers what they did and what they think and feel about certain things. The last method calls for full participation of consumers and is one which is very widely used. Methods of making such studies might, in turn, be classified in many different ways. They might be classified according to use of a mail questionnaire or an interviewer, according to the location of the contact with consumers for questioning, for example, in home or in store; and according to the kinds of questions asked consumers and method of asking them. Some important issues bearing on different types of consumer surveys will be briefly considered, special attention being given to the nature of the information that can be secured and the sampling problems involved.

Observation of Consumers in the Market Place

One method is to interview consumers in the market place or simply to observe consumers in the market place as they make their choices. Some things which the observer may notice is the hesitancy with which consumers make their market selections, particularly when confronted with certain types and numbers of alternatives. He may also note the methods by which the consumer appraises the product; does he smell it, squeeze it, weigh
it, turn it over, etc.? The questions which the consumer asks of the clerk and such other remarks and queries which are raised may be secured. From such observation it is possible to secure a feeling for the number and variety of many of the considerations which arise in the mind of the consumer-buyer as market selections are made. These observations may help to discover what consumers are considering in choosing and the influence of certain merchandising techniques upon consumers' choices.

Inventories

The actual quality of a product which the consumer has on hand in the household may provide an accurate indication that the consumer has purchased a particular quality. This method may be used as a check against errors and biases that may arise when asking consumers what they purchase. The method also may be supplemented by questions which the investigator might ask the consumer, questioning her as to whether her previous purchase was of that quality, when she last purchased the goods on hand, why she purchased the particular quality, and other matters which can be asked in the consumer interview type of question. By itself, however, the inventory fails to indicate whether the selection was made by chance, because it was convenient, or low in price. One cannot conclude that it is the preferred quality.

Mail Questionnaire

This method attempts to secure written answers to questions sent the interviewee by mail. It has certain advantages:
1. The unit cost of such a survey is much lower than is that of a personal interview and, hence, it may be an economical method of securing wide coverage, geographically.

2. The questions are worded the same to all interviewers and are, therefore, uniformly presented. There is no assurance, however, that the question is uniformly interpreted by all persons. The matter of uniformity in form of question is important inasmuch as the reliability of the results depends in part on the same question being asked of all interviewees.

3. Since little is known about the variance of the items for which information is desired, the information necessary for designing an efficient sample is lacking. Wide coverage geographically may be an economical method of getting a picture of the variety of responses and of the degree to which persons respond to certain kinds of questions. Although the results may give a biased statement of the true picture because of persons' failure to respond, nevertheless, in recognition of the biases, the responses to certain questions may be helpful in getting at the many types of answers that may be given to certain questions. One bias encountered in this method is that persons more interested in expressing their preferences tend to reply.

The disadvantages of the method are:

1. The sample secured may be representative of no population other than that which the sample itself constitutes. All additional items such as size of family or farm acreage may be included in the
questionnaire so that by comparison with census and other check
data certain likely biases may be detected in the sample. But
only if the items for which the investigator wishes information are
related closely to the check items is the check method at all
reliable.

2. Although the questions as presented to the interviewee are worded
identically, there is no reason to believe that the questions are
received under identical conditions. In that the investigator may
be unable to read into the answers the spirit with which the inter-
viewee answered the questions, he is unable to interpret fully the
interviewee's response.

3. It is essential that the questions be worded in such a way that they
are somewhat self-checking and so that the editor may feel satisfied
that the interviewee is consistent and has answered the questions
with due care. A few questions covering scattered subject matter
do not permit checks for consistency and such questionnaires when
appropriately edited may yield results which support the invest-
igator's own notions, but are of little scientific value.

4. The length of the questionnaire may directly affect both the number
of persons who are willing to answer the questionnaire and the attitude
with which the respondents answer the questions. A long questionnaire
may cause the respondent to fail to answer certain questions which
either are near the end or which require some consideration.
Interviewing the Consumer

The characteristic of the consumer interview method is that contact is made with the consumer. One particular merit of this method lies in the ability of the investigator to describe the population to be sampled and to control the selection of the sample units. This means not only that the results can be interpreted with greater certainty and statements made relative to the population sampled, but that the sampling scheme may be made as efficient as foreknowledge and a priori reasoning permit. Many studies of consumers' preferences made may be undertaken not in order to secure a summary statement concerning the preferences of the entire population, but solely to test whether preferences are associated with certain factors, e.g. race, age group, education, etc. If a statement is desired relative to the entire population which is stratified, say by racial groups, the sample would be one composed of sample units which were drawn at random within each stratum in numbers proportionate to the size of the stratum. However, if one is interested in determining only whether differences of preferences exist as between the strata, then an equal number of sampling units may be chosen from each stratum, thus saving much effort in sampling the larger strata.

\textsuperscript{1}Sampling efficiency is measured in terms of the amount of information concerning the factors under investigation (measured) per unit of expense. Information is the reciprocal of the variance, the variability of the item. If the item is extremely variable, a larger sample must be taken to secure the same amount of information as could be secured by a smaller sample drawn from a population in which the item was less variable.

and devoting relatively more resources to sampling the smaller strata. This type of reasoning is implicit in the methods used by certain manufacturers and processors of food products in their use of consumer juries and of expert testers. These juries and testers may not be representative of consumers at large, but be composed only of persons whose tastes are acute. Their opinion provides an upper limit of responses which might be secured from consumers at large, and may be contrasted to responses from a group whose tastes are much less acute. The degree of sensitivity of tastes of both groups is known and may be taken into account when passing judgment as to the probable acceptability of the product to the general public.

An additional merit of the consumer interview method lies in having direct contact with the interviewee. Impressions and subtle expressions which can be secured only by direct contact with the interviewee may be noted. Also, displays, inventory studies and other techniques to supplement word questioning that cannot be used by the mail questionnaire method can be used in getting information.

The major feature of the interview method is the presence of the interviewer. It is therefore important to consider the way in which he participates in the investigation and the elements introduced by his participation.

Formal questioning method whereby interviewers are trained so that the manner in which the interviewee is approached, the order of the questions, the inflection of the voice, for example, are all completely
standardized. It is preferred that the interviewer knows nothing con­
cerning the purpose of the survey or the product, other than what he himself is to repeat to his interviewee. He becomes a walking gramophone and recorder. He may record the answers on a form visible to the inter­viewee, or he may wait until he is out of sight before he records the information. In any case he is supposed to use no judgment and is not to question whether the consumer really meant what he said.

This method is widely used by firms which must rely not on inter­viewers who are familiar with the product under investigation, but who have personality characteristics important for the successful conduct of the investigation. The prime characteristic required is that the individual be able to ask the questions in a uniform and prescribed manner. This does not require especially skilled personnel. The competence of the interviewer can be tested by his being asked to repeat the questions under conditions comparable to an interview. If special skills were needed, if the interviewer must be well acquainted with the subject matter bearing on the investigation, then the employment problem would be more difficult.

The informal-formal questioning method. The interviewer is equipped with a set of formal questions to ask the interviewee. But the inter­viewee's answers to the questions require a fair amount of interpretative transcribing by the interviewer. Some of the questions may be "open end" questions which permit the interviewee to give vent to all that is on her mind relative to the question asked, all of which must be condensed by the enumerator into a few words, and, later, by the editor into a
certain class of comments. Throughout the questioning the interviewer may take a rather informal attitude, to take an interest in the interviewee's random observations, but keep to the order and the strict wording of the questions. He may challenge the interviewee's answer if it appears inconsistent with previous answers and attempt to draw her out as to why she holds a particular view. Such comments he includes in the schedule to supplement the formal answer given.

This method is used in many of the Agricultural Experiment Station studies. Personnel is often drawn from the college staff who are familiar with the problem under investigation and who may be trusted to secure reliable results when they deviate from the formal questions.

A special technique used by some interviewing services is to require that the question be memorized by the enumerator so that the interviewee is not made aware when answering that his comments and answers are to be transcribed. Certain interviewees fear that their statements will not be held in confidence and tend to abhor the enumerator's writing down each statement made.

Informal questioning method. This is what might be called a conversational method. The interviewer should be clever in seizing the interviewee's interest by one manner or other, say, by noticing her collection of china dogs. And from this start, the interviewer turns the conversation in the direction of the subject being investigated. The interviewer takes an interest in the consumer's comments and leads her to answer one by one the questions to which the interviewer wants an answer. Upon completion of the conversation the interviewer takes leave and when out of sight writes the answers to the questions and the
significant comments. Such a survey relies heavily on the competence of the interviewer.

The essential merits of the consumer interview method are two: (1) the sample may be controlled, and (2) through personal contact with the consumer it is possible to use much greater latitude in methods for getting at the factors which lie behind consumers' preferences. "Why" and "open end" questions may be asked, and displays may be used to supplement the questioning.

Types of questions asked consumers

Questions to investigate consumers' preferences can usually be put into two categories, namely: "what" and "why" questions. The "what" questions may relate to actual behavior or to probable behavior under assumed conditions. The "why" questions may attempt to provide explanation of actual or probable behavior. Explanation of probable behavior can also be sought in terms of facts about size of income, race or national origin, size and composition of the family, prices of various foods prevailing in a market, etc.

The test of a successful question lies in its ability to reveal the circumstances bearing on the problem being investigated. Failure of studies to throw light on consumers' preferences may arise because of many conditions centering primarily on the types of questions asked. Some of the difficulties encountered, examples of the difficulties and some possible lines of action are briefly discussed. Experience in the egg surveys directed by the author is drawn on in this discussion.

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<th>Biases and difficulties encountered</th>
<th>Examples and references</th>
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<td>Vocabulary—Consumers are inarticulate and unable to describe likes and dislikes and attitudes.</td>
<td>What color of yolk do you prefer?</td>
<td>Use displays of the item and thereby avoid the necessity of hurdling language difficulties.</td>
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| Memory—Consumers fail to recall specific facts asked for. | What qualities have you found unsatisfactory? | 1. Break complex questions down into a number of small questions.  
2. Arrange question in logical order so that the consumer may find herself.  
3. List possible alternative answers. |
| Ignorance bias—Consumers are unaware of factors which influence them; others may be more aware of more factors than the impact of the influence warrants. They feel that a question calls for an answer. The answer given may seem honest to the interviewee. | Why do you eat more eggs in the spring than in the winter? | 1. Concentrate most questions on types which ask for actual behavior of the individual.  
2. Ask sufficient other questions so that the frame of reference with which the individual acts may be pictured, and against which may be cast the answers given to the behavioristic questions for formulating inferences respecting influences on consumer action. |
| Imagination bias—What consumers say they will do may not reflect what consumers may actually do. | Would you pay more for graded eggs? | 1. Avoid such questions, and ask questions concerning past or present behavior.  
2. Take due precaution when drawing conclusion based on the results of such questions. |
<p>| Colorful questions—Consumers may feel as though their social prestige is involved in the type of question asked. | Do you serve only good eggs to your family? | Test the question by asking questions which carry the same import, but are worded differently. |</p>
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<td>Complex questions--Consumers are unable to make calculations necessary for answering questions relative to usual or typical behavior.</td>
<td>What quality of eggs do you usually buy?</td>
<td>1. Break the question down into simpler questions.</td>
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<td>Leading questions--Questions may be phrased so as to suggest an answer.</td>
<td>Do you not have difficulty in purchasing the quality of eggs you want?</td>
<td>Test the question by asking it in different form.</td>
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<td>Terminological--Consumers may not freely understand the meaning of the question.</td>
<td>Do you prefer graded eggs to ungraded eggs?</td>
<td>1. If the term used is likely to have questionable meaning to the respondent, ask the respondent what the term means to him either in terms of words or in terms of action.</td>
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<td>Frustration of thought--Consumers may be unable to weigh the numerous alternatives.</td>
<td>Do you use the same quality of eggs for poaching and frying?</td>
<td>2. Avoid the word, and, instead, spell out its full meaning to the consumer.</td>
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<td>1. Do not repeat the alternatives to the consumer and use alternatives as a check list for the convenience of the enumerator and for the convenience of the editor. Hence, the answer is thrown into a code classification given in the schedule at the time of the interview.</td>
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<td>2. After the consumer has been permitted to list at liberty the alternative considerations, the</td>
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| Restricting an answer by presenting a list of suggested alternatives— If an incomplete set of alternatives is offered, consumers are inclined to confine their answers to only those alternatives presented; other alternatives not presented require initiative which may be lacking on the part of the consumer. | How do you like your eggs cooked? Boiled, poached, other? | 1. Complete the list of the alternatives.  
2. Mention no alternatives to the consumer and make the question an "open end" question.  
3. Include in statement of findings that only certain alternatives presented to the consumer and interpret results accordingly. |
| Consumers are inclined to be influenced by the position of the alternative - position of alternative bias. | Do you prefer white eggs? Brown eggs? No preference. | 1. Alternate the order of the alternative. |
| In listing factors influencing preference, or in stating existing preference, often no indication is given to the strength of the preference - measures of intensity of preference. | What yolk colors do you prefer? | 1. Counter a question asking for preferred qualities with one which asks for not preferred qualities.  
2. Establish a score system which enables the interviewee to rank the qualities in order of preference, and to give equal scores to qualities which are equally acceptable. |
| The position of the question in the schedule may influence the answers given-position of question bias. | Have you purchased any eggs you preferred not to use within last month? Followed by: Have you had difficulty in buying the quality of eggs you prefer? | 1. Test the order of the questions by reversing them. Nevertheless, keep them in an order which is logical to the respondent.  
2. If biased results are likely to result, account for them when analyzing the data. |
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<td>Illogical listing of the questions may disturb the consumer and influence the thought given by the consumers when answering the question. Confusing the consumer.</td>
<td>Ask question as to consumer’s buying practices, then as to preferences, then buying practices ....</td>
<td>3. Present the schedule of questions in the statement of findings to enable the reader to observe such possible influences.</td>
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<td>The question may not be asked in the same manner by all enumerators of all interviewees. The enumerator may make &quot;off-the-record&quot; remarks which may influence the consumer’s attitude when answering the question. Also the enumerator’s personal bias may influence the interpretation he gives to the consumer’s remarks. Enumerator bias.</td>
<td>1. Inflection in the voice of the enumerator. 2. Tendency for enumerator to exercise liberty in the wording of the question. 3. When a full answer is given by the respondent, the enumerator must for lack of space and time, condense it, selecting only those points deemed by him to be essential.</td>
<td>1. This should be one factor considered when the schedule is tested prior to use. 2. The questions should flow in a logical order so as to maintain the interest of the consumer in the subject matter under investigation.</td>
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<td>The introductory remarks should be well memorized by the enumerator so that all consumers are given the same reason for answering the questions.</td>
<td>I am representing Iowa State College ... I am representing the retail grocers' association ... We are conducting a study of consumers' problems in buying eggs ....</td>
<td>1. Require that questions be asked in exactly the same form as given in the schedule. 2. Pre-test the enumerators. 3. Employ experienced enumerators who can be trusted to use an informal approach. 4. Design experimental tests for securing an estimate of the enumerator differences. 2. Preferably the import of these introductory remarks should be given with the statement of findings to enable the reader to appreciate the understanding with which the consumer felt it worth her while to answer the many questions.</td>
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The use of displays of actual products or realistic pictures of them

One method used in conjunction with the consumer interview puts into concrete form the alternatives from which the interviewee might choose.

Essentially this method attempts to minimize difficulties encountered by consumers' inability to express fully their preferences in terms of words. In fact, consumers may lack the vocabulary with which to express their preferences explicitly. For instance, spurious results might result from requesting persons to describe the color of a product they preferred. Thus the display technique attempts to minimize language difficulties and provides a known standard in terms of which the respondent may express himself.

A display also provides controlled alternatives to all consumers interviewed, and enables the consumers to rate the order of their preferences as among the alternatives presented. If consumers have no particular preference within a certain range, but a dislike beyond that range, the display may be so constructed that the consumer can rate equally those samples within the equal-preference range and discount those outside of the range. Thus the display tends to set forth explicitly alternatives some of which the consumer momentarily may have forgotten when asked orally to state what quality was preferred.

One limitation of the display technique is that it may be impossible to present the samples in a completely realistic setting. Probably the reader has attempted to select wallpaper or has tried to purchase other home furnishings and has been disappointed when the article was placed in his home.
A second limitation is that preferences expressed may be greatly influenced by the number of alternatives and their arrangement in the display. The author experimented with displays of egg yolk colors and found that the yolk color preferred from 5 yolk colors ranging from light to dark, was lighter than that preferred when the same display plus an added yolk darker in color than any previously used was offered. Persons tended to reject the extremes as too light and too dark, yet to select toward the darker color by selecting the next to the darkest. When a darker color was added to the range, the dark color which formerly was rejected as too dark was selected as the one most preferred.1

Relating preferences to specific use and to market choices

A second supplementary method or technique is to include questions which can be answered in terms of practices or behavior; questions might be asked which relate preferences to specific uses made of the product. This may be gotten at by including questions as to what quality did you last buy? And what use did you make of it?

Consumers' preferences for certain qualities are directly related to the use the consumer wishes to make of the product. And consumer surveys should make inquiry as to how the commodity is used. Are different quality eggs preferred for poaching than for cake making? Do consumers prefer a different sized potato for baked than for mashed potatoes?

Also, it may be of interest to attempt to get some measure of the difference of opinion within the family with respect to preferences for particular uses. Questions may be included to secure a picture of the consumer buying practices. Since persons express their preferences in the market when they make their market purchases, it may be important to get facts about buying practices so that an understanding may be had of the forces which exist when a consumer makes her purchases. Is she accustomed to personal selection of items? Does some other member of the family do the selecting? Or does she order by phone and return the inferior or unacceptable quality merchandise?

Appraisal of Methods of Consumer Surveys

Methods in common use

The method most generally used by the state agricultural experiment stations and by other groups interested in preferences for agricultural products has been the informal-formal questioning method. The questions are mimeographed and students and college personnel are employed as enumerators. Usually the enumerator is encouraged to secure as full answers to the questions asked as possible, and to supplement the schedule of questions with the interviewee's impromptu remarks.

The samples usually have not been adequately or efficiently designed. The population is roughly stratified and usually the sample has not been drawn at random from within the strata. The samples are usually described
as representative samples; their "representativeness", however, is only as good as the investigator's knowledge of the population.

The use of displays to supplement the questioning has been limited. Some of the more recent studies have used them. In one\(^1\) conducted jointly by the Farm Credit Administration and the Maine Agricultural Experiment Station, trained potato inspectors who knew potato quality and potato grades were employed as enumerators. Their display was the potatoes which the consumer had on hand, and using this as a display the inspector was able to compare consumers' reactions to potato defects with the grade classification of the defects. And the display technique is known to have been employed in three studies\(^2-3-4\) of consumers' yolk color preferences.

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\(^3\)Morse, Richard L., Reid, Margaret G., and Oderkirk, A.D. Yolk color preference of some women attending Iowa Farm and Home Week, 1940. (S-7). (Unpublished data collected under Project 628, Mo. Agr. Exp. Sta.)

\(^4\)Morse, Richard L., Reid, Margaret G., and Oderkirk, A.D. Des Moines consumers' egg preferences, consumption and buying practices, 1940. (S-5). (Unpublished data collected under Project 628. Mo. Agr. Exp. Sta.)
Merits of the better type of consumer survey

Since a consumer survey circumvents the market and goes directly to the consumer it permits a fuller information of consumers’ preferences than is revealed by sales alone. It is restricted only to the extent of a person’s ability or willingness to express his preferences.

Inasmuch as the survey is conducted among consuming units, certain basic facts with which the preferences may be associated can be secured. In this way individuals whose preferences are studied may be classified according to income, race, age groups, family size, etc. Measures of covariability of factors thought related to preferences may be secured. It is by means of the consumer survey that one is able to go farthest in discovering the forces determining, affecting and associated with consumers’ preferences.

Limitations of the consumer survey

There are many difficulties experienced with the consumer survey approach. The usual criticism made is that the survey attempts, once it goes beyond actual behavior, to secure from the individual information which he doesn’t know or of which he is unable to express himself. And from this general criticism stem many varied criticisms from the psychologists concerning the techniques of interviewing and scheduling. It is recognized that answers may be biased by the method used in taking surveys and that one cannot be too careful when conducting them. Nevertheless, the consumer does make choices and is influenced by preferences. Hence,
what remains is solely a question of technique of how to get at these preferences.

A major limitation of the consumer survey lies in the inapplicability of the results for forecasting likely consumer action. It is possible for an interviewer to get a good deal of information bearing on the ordinal relation of the qualities in terms of consumers' preferences, and this is necessary for developing grades. But it is not possible to secure estimates which are of prime value to persons interested in the marketability of the various qualities. Sellers are not interested in how many consumers prefer one quality to another, but in how much a large number of consumers are willing and able to pay for one quality over another. Disregarding any effect arising from changes in supply, the consumer survey fails to provide market information for two reasons:

1. The consumer survey fails to measure the intensity of preference for one quality over another and, even if one can measure or gain an appreciation of one individual's intensity of preference, how can the preferences of several individuals be combined to get a measure of intensity that would express itself in the market? There is lacking a common denominator by which inter-personal comparisons of preferences can be made, and the preferences pooled or combined. Not only is one unable to measure intensity of preference at one time, but intensity over time, or "stability of preference" is even yet more difficult to measure.

2. Measures of the intensity of preference are not sufficient for estimating market actions; such measures must be weighted by the income
of the individual to secure an estimate of his willingness or ability to pay more for one quality than another. The preferences of persons with high incomes carry more weight in the market than the preferences of persons with low incomes. The person with a high income is likely to be willing to pay for what he prefers; the person with a low income may not be in that position.

Failure to supply these two measures sometimes yields anomalous results: ninety per cent of the persons interviewed may prefer one quality, while in the market other qualities sold at a premium over the preferred quality. To producers and market agents the results of the consumer survey would seem spurious. The apparent anomaly may be accounted for by the difficulties cited above.

It should be recognized, however, that for persons not interested in action involving the pricing system and willingness of consumers to pay, that is, persons not interested in "marketability of the product," but interested in acceptability of the product when offered free, the total number of consumers expressing a preference for a given quality may provide all the information needed. For instance, persons interested in improving the diet of the poor through free distribution of goods may be much concerned over the relative acceptability of the various qualities.

Market Data Surveys

Studies in which attention is focused on market data which register the results of group behavior or mass of consumers' action are essentially
of two types: those which focus upon the quantities of different qualities of the product taken off the market; those which focus upon the prices paid for the different qualities of the product. The first is called quantity-quality relationships; the second, price-quality relationships. The studies are generally concerned with data secured from markets from which consumers make their purchases, and to a lesser extent secured from markets in which the suppliers of consumers, retailers, hucksters, etc. make their purchases. Also these studies may relate the prices and quantities either to the quality of goods as labeled in the market or with the actual quality as measured by some uniform standard, usually the U.S. grade.

The interpretation of market data with respect to consumers' preferences first assumes an over-simplified situation in which price is assumed to be uninfluenced by differences in market services and in which perfect knowledge on the part of consumers exists as to the relative qualities of the various products offered for sale and on the part of producers and market agents as to consumers' preferences. Later these assumptions are dropped and the implications of departures from the simplified considerations are considered.

Quantity-quality relationship

Data giving the movement of different qualities of a product into and out of retail channels in particular markets may yield interesting information concerning their relative acceptability. Commercial organ-
izations use this technique especially when they are in position to alter the quality of the product. An example of the use of this technique is a study made by the Ohio Agricultural Experiment Station concerning the movement of different grades of apples at retail in selected types of stores in various cities in Ohio. The time period was restricted to avoid serial correlation and the stores were divided into control stores and test stores, each charging customary prices relative to wholesale quotations. Although a few studies may have been made with other commodities, no such studies have been made of eggs. If the grades in the egg market were more standardized and meaningful it would be advisable to set up experiments to test the relative acceptability of different grades of eggs under given price conditions. Sales of eggs packed uniform in size could be matched with sales of eggs mixed in size but of equal average weight and sold at the same price. The effect of an increase or decrease in numbers of grades offered on the sales of particular grades could be estimated. Also consumers' response to changes in price as well as in qualities offered could be estimated under such controlled conditions and constitute a price-quantity-quality relationship study.

**Price-quality relationship**

Data giving the prices paid for different qualities of the product sold at retail to consumers or sold at wholesale to suppliers of consumers

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yield information as to the ordinal relationship of the preferences for various qualities of at least some consumers. It is the relationship between price and quality which guides the suppliers of these markets as to the profitability of supplying one quality of product rather than another, in view of the relative costs of supplying them.

Few studies have been conducted for agricultural commodities which measure the price-quality relationship from data secured under experimental controls. The data used are usually actual market data for a specific time interval and at specific markets.

Appraisal of the market survey

The chief merit of the market survey is that it supplements the consumer survey by supplying quantitative data, weighted by consumers' actions. "Marketability of the product" answers are provided; that is, the needs of the market and the profitability of supplying these needs can be estimated better than by consumers' responses to questions about what they bought and why they bought it and what would they do if prices were different. Price and rate of consumption express implicitly those things for which measures were found difficult to secure for masses of individuals by the consumer interview method: willingness to pay a certain price differential for a given quality and to buy a certain amount.

It is important to consider the extent to which quality-price relationships reveal the preferences of consumers who appear in the market as buyers. Two things need to be examined: (1) Does the quality-
price relationship indicate the ordinal relation of consumers' preferences for various qualities? and (2) Does it indicate the intensity of their preferences?

If consumers' preferences are homogeneous in the sense that for all consumers the various qualities have the same ordinal relationship, the fact that one quality sells for a higher price than another indicates that the quality selling for the higher price is generally preferred over that selling for the lower price. But what if consumers' preferences are not homogeneous? The fact that one quality sells for a high price indicates that some consumers prefer it to the qualities selling at the lower price (assuming, of course, that marketing services are the same in each case). But it does not indicate that all consumers who are buying the lower qualities would have preferred the quality with the higher price. Some consumers may be buying the lower priced qualities even though they prefer those which are higher in price. Others may be buying them because they are indifferent about the qualities. Still other consumers may be buying the lower priced qualities because they prefer them. However, the more homogeneous the quality preferences of consumers, the more is high price a guide to the qualities that are most preferred.

In a market where consumers' preferences are homogeneous both in ordinal relationships and in intensity, the willingness of consumers to pay a given price differential is a measure of their willingness to pay which is related to their incomes and their desire for other things as
well as to the intensity of their desire for various qualities. The lower the utility of money to a consumer, the larger the sum he is willing to part with in order to satisfy a preference of a given intensity. A price differential paid to procure a given quality is a measure of the intensity of his preference, but is not a measure of mass intensity. However, information on the ordinal relationship of consumers' preference is more important than a measure of their intensity.

The explanation of the high price of one quality in contrast with another must be sought in the relative cost of producing the various qualities, as well as in consumers' preferences. If consumers' preferences were homogeneous and all qualities cost the same to produce and distribute (assuming, of course, that producers are fully informed concerning consumers' preferences), they might all appear in the market and sell at the same price. The relative quantities of each quality would indicate the proportion of consumers that rate each quality highest in their scale of preference. If costs differ with quality, price will differ. But the expensive quality will only find buyers if it is preferred by consumers in general or because some consumers have such a preference.

Higher price for any quality does not necessarily indicate that it would be profitable to expand its production. For increased production might be forthcoming only under higher cost conditions. Consumers' preferences for the quality may be entirely satisfied with the existing supply, or consumers who prefer it to other qualities may be willing to buy more only if the price differential between it and other qualities
is lessened.

In that the results yield a quantitative picture, measures of association between price and quality of product may be made. It is to be recognized, however, that such results do not measure causal relationship; that is, if high price is associated with a particular quality characteristic, it should not be assumed necessarily that that quality characteristic is the cause of the high price. Measures of association are not measures of causal relationship. Nevertheless, such measures of association together with judgments drawn from knowledge of market conditions may serve as a tremendous aid to the individual who wants to know what is responsible for price differentials.

A merit of the market survey is that the survey may be repeated over time and in several locations in accord with stipulated instructions. Comparable results can be secured almost independent of identical personnel. Once the method is established, subjective decisions are displaced by objective procedures and measures. Many consumer surveys permit considerable exercise of judgment by the interviewer when collecting the data. Additional subjective judgment is involved in the editing and classifying of the variously expressed responses. The techniques used in analyzing the data, when collected and edited, may permit of additional subjective influence. Much of this subjective influence cannot be standardized by means of over-all supervision. Proper supervision of editing and schedules taken over a wide geographical area is extremely costly, if at all possible. Also
a large survey must be involved to warrant a continuum of standards as formulated by the supervisor himself over time. The statistical market data survey, on the other hand, deals with objective data in standardized and widely acceptable procedures.

A major limitation of the market survey method lies in the oversimplified relationship which is commonly assumed between price and consumers' preference. Actually what is secured by the market data survey method is a picture of consumers' choices in terms of prices, and quantities and qualities taken. Such choices may reflect only roughly their preferences. The market may be so organized that it is difficult, if not impossible, for the consumers to express adequately their likes and dislikes in their market selections. Several conditions may interfere: (1) The range of products offered consumers may limit the extent of their choices. (2) The products may be labeled inaccurately as to their quality. Hence, the consumers in part are unable to compare satisfactorily the qualities offered on the market and intelligently to express their preferences in their choices, and in part are actually misled in their market selections so that their market choices reflect only a limited and perhaps a false picture of consumers' preferences. (3) Consumers' market selections of particular items are not solely a function of the price and the quality of the particular product; the selection is confounded by such other considerations as: store personnel, types of displays, proximity of the store, store services, volume of other goods purchased at the store, etc.
Further difficulties confront the investigator who attempts to relate consumers' preferences to particular qualities. These derive from the inability of consumers to compare satisfactorily the qualities offered on the market. Because many of the quality factors which the investigator wishes to relate to price can be distinguished and appraised by the consumer only when she uses the product in her home.\(^1\) In order to study price in relation to quality the investigator may buy the product in the market at the regular price consumers are paying, and he takes it to his laboratory where the qualities are measured. When this is done several questions confront the investigator: Is he measuring the qualities

\(^1\)A good statement of the problem faced in relating the interior quality factors of eggs to the retail price is given by Gans.

Since it is not common practice for the customers to candle the eggs at the store before deciding to purchase them, they have no way of determining the interior condition until the eggs have been taken home and broken. A question naturally arises, therefore, as to how consumer preferences for differences in the interior condition of eggs are translated into terms of the prices which they will pay for eggs.

The difficulty is rationalized away by the following:

It is probable that this adjustment is effected in somewhat the following manner: if the eggs are not satisfactory, the consumers are quite apt to voice objections to the storekeeper the next time eggs are purchased. Consequently, storekeepers learn to adjust their prices for eggs of various qualities so that customers will pay a premium for the eggs which they prefer or will accept eggs of a lower quality at the lower price. This explanation, of course, necessarily assumes some degree of regularity or uniformity in the quality of the eggs handled by the retailer. Under the circumstances one could hardly expect the process of adjustment of prices to wide variations in quality to be completed immediately. (p. 16)

of the characteristics important to consumers? Is he assigning to the qualities weights which are appropriate in the light of consumers' preferences? When he combines the qualities of several characteristics into one quality score, is he weighting each characteristic in accord with the consumers' preferences? Furthermore, he does not know the extent to which facts about quality which are apparent to him were taken into account by consumers. Market data of quality in relation to price thus does not go far by itself in revealing consumers' preferences among the various qualities.

The question of what should be the proper weights given to those qualities and characteristics which are measurable is a difficult one. Qualities which are measurable in non-numerical terms must be reduced to scores or rating if certain statistical procedures are to be used, e.g., if price is to be linearly correlated with yolk color score. The problem arises out of the fact that the way in which the scores are assigned affects the results. For example, suppose there are three qualities: A, B, and C, and scores are to be assigned. Should they be scored: 3, 2, 1; 5, 1.5, 1; or 4, 2, 1? That is, should they be equi-spaced? Or is A twice and three times C? Or is A to B as B is to C? Further complications arise if A, B and C are several characteristics and the above scores are considered as weights to be given the qualities of each characteristic. Various systems have been used in studies of egg price-quality relationships. Some investigators have confounded weight which does not vary directly with other egg quality factors; some have
assigned equi-spaced ordinal scores to composite of qualities which are jointly related, others have developed rather complicated scoring systems.

Gans\(^1\) developed a set of weights based largely on the gross regression of the price on the respective factor, (p. 28) and then correlated these weighted scores with price to measure the price-quality relationship.

Frequently the method used to combine the qualities of characteristics into a composite quality score is one which bases the measurements of quality on some established grade system, e.g., the U.S. grades. The merit of this procedure is that to the extent that the adopted grade system is used in the market, it represents the basis on which eggs are graded for sale to consumers, the basis upon which consumers make their market choice. However, what this measure of the relationship between price and grade score yields is in part a reflection of consumers' preferences and chiefly a reflection of whether the grade standards themselves are based on consumers' preferences. For example, if no relationship is found between price and the grade, it may merely mean that the grades do not reflect consumers' preferences and not that consumers do not have preferences.

Hence, what the investigator secures for his results is a far cry from a relationship between price and something which directly reflects consumers' preferences. What the investigator actually secures is a relationship between price paid for a product purchased in the market, where the choice is confounded by many considerations, and the measurable

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\(^1\)Gans, A.R. ibid. p. 28.
qualities of the product, measured in terms of an arbitrary standard which may not necessarily reflect consumers' preferences. And inferences drawn from such a relationship relative to consumers' preferences are, needless to say, quite tenuous. 

The type of market data survey that is needed is one which derives its primary data under experimentally designed conditions. It might then be possible to discover some fundamental laws which would not be as limited in their application as are the conclusions drawn from the customary market type of survey where the situation is so confounded by extraneous influences. For example, it should be possible to secure the cooperation of certain chain stores which have outlets in similar areas, and in these stores design experiments which vary the prices of the qualities offered, which vary the qualities, the numbers of the grades, the grade labels, etc. Such experiments, however, are not worth while unless grades carry more meaning to the consumer than they presently do. In fact, probably the first work that should be undertaken is to secure measures of the variability of the quality of a given grade of product as sold. Unless the quality is fairly consistent within the grade, there is little justification for supposing that the grade actually carries full import to the consumers and represents with sufficient consistency the qualities which consumers prefer.

Summary of Consumer Survey and Market Survey Methods

Neither procedure can provide all the information which is usually desired. The market survey does give an adequate picture of the market-
ability of the various qualities of important characteristics of a product. Insofar as it does this, it provides information which is an aid to producers and market agents, for it puts into concrete money terms the price differential which might have been had from the sale of various qualities that might be anticipated. In making application of the conclusions derived from such studies, due consideration should be taken of the fact that the results are those of a given market at a given time when certain other forces were at play and, hence, are of limited value for use in other market situations. Subject to certain limiting assumptions concerning the representativeness of the existing market conditions for other time periods and other markets, and subject to certain limiting assumptions concerning the extent to which market choices indicate consumers' preferences, the market survey may give a fairly adequate representation of the relative importance of the measured qualities of various characteristics and serve as a basis for appraising the relative importance of the characteristics in the formulated grades.¹

¹Waugh from a study of the relationship between vegetable quality factors and prices in the Boston wholesale market makes the following concluding statement to a chapter in which he appraises the grade requirements for the vegetable studied:

Studied of this kind on a number of the larger markets in the country might be of considerable value in determining the requirements for the United States grades, or in revising the present grades. It will probably never be possible to study all the necessary grade requirements by the methods used here. It will be necessary to rely on personal observation of market conditions and the comments of dealers and consumers in judging the importance of many factors. But, while this method is not adapted to the study of all kinds of quality factors, it has the advantage of providing a measure of the relative importance of those factors which are studied, and because of this, it is certain to be useful in determining grade requirements. (p. 76)

Further attention will be given to this study in Chapter IV.
If certain assumptions are made relative to the homogeneity of the ordinal relation of consumers' preferences, the market survey method gives a measure of the intensity of consumers' preferences. And dropping this assumption, the market survey method gives the ordinal relationship of qualities at least for some consumers, and particularly for those wishing to pay the highest price.

The consumer survey, on the other hand, while it does not yield results which permit the formulation of statements giving the money value of a quality production program, that is, does not permit expression of what preferences may mean in terms of sales value of production designed to supply those preferences, it does permit expression of the many and varied influences that affect consumers in their choice-making. Many considerations which may never become evident to the investigator who looks solely to the market manifestations of choice-making may be of considerable importance to one interested in the dynamics of consumers' choice-making. The consumer survey technique is essential for an insight into numbers of views and notions which people hold and the prevalence of those ideas and notions. It provides a feeling for consumers' reaction to new situations. For example, it provides some of the information necessary for one planning to estimate consumers' receptiveness to a slightly new and different product, that is, it gives the initiator a feeling for the multiplicity of bases for consumers' decisions. The consumer survey provides a basis for making judgments concerning the homogeneity of the ordinal relation of consumers' preferences. And for
the purposes of establishing grade requirements, the consumer survey should give results of help in determining the important characteristics and the ordinal relation of their qualities in terms of consumers' preferences, all of which is necessary for a logical approach to the formulation of grade requirements which will reflect consumers' preferences.
CHAPTER IV. SOME STUDIES OF QUALITY PREFERENCES
FOR FOODS OTHER THAN EGGS

The consumer survey and the market data survey are described and appraised in the preceding chapter. Two of the better studies which have been made, although of food products other than eggs, are cited rather extensively in this chapter to exemplify the applicability of the consumer interview and the price-quality relationship methods of measuring consumers' preferences. Both studies have been conducted under the direction of able men, and they represent a noteworthy effort to utilize the methods at hand in relating consumers' preferences to grade specifications.

A Market Survey of Price-Quality Relationship

A meritable discussion of the use of the price-quality type of study for the appraisal of grades is given by F.V. Waugh1 in a chapter entitled "Application of results to grading requirements". Waugh's dissertation is primarily concerned with methodology, and in this chapter he sets forth the application of price-quality relationship investigations conducted in the Boston wholesale market. Before turning to this chapter, however, it may be well to review the study with respect to its objective and methods employed.

"The object (of Vaughn's study) was to discover the quality factors—such as size, shape, color, condition, pack and other physical characteristics—which influence the prices of locally grown vegetables... and to measure quantitatively the influence of these factors on price".

(p. 15) Some of the problems for which such information may be helpful, according to Vaughn, are: (1) to supply information to the market gardener as to the premium he can expect in the market for the various qualities so that he can plan his business on a sound basis, and (2) to supply information concerning market preferences in order to appraise the grade requirements.

The data were secured in the Boston wholesale vegetable market. Samples were drawn before the market opened from "lots" which were typical of the quality of the particular vegetable on the market for that day, and inspected by investigators of the Massachusetts Department of Agriculture. The sale prices of the same lots were secured from the records of the commission houses which sold them. The records were tabulated and analyzed by multiple correlation methods. And the coefficients of determination were used as measures of the relative importance of the quality factors in their influence on prices, recognizing the intercorrelation of the independent variables. Tests for curvilinearity were made and the curvature in the relationship measured when it was found to be important. The standard error of estimate was calculated and used to measure the reliability of the statistics. Time was included as an independent variable.
Waugh has limited his investigation of quality factors to those which were measurable by the inspectors and recognized that other important quality factors may have been neglected.

He is mindful of the fact that the results of his investigations hold only for the Boston market and that he therefore can appraise the grades only insofar as they apply to the Boston market and not the entire country. He is also mindful of the fact that the results of his investigation hold strictly but for the one market year in which the investigations were made. Within these restrictions he finds useful application of his results.

Waugh's treatise is included in this chapter, however, not so much to exemplify the statistical procedures which can be used for this type of study as to exemplify the sort of statements which may be made from such a study.

The following quotations represent the sort of conclusions Waugh feels justified in making, having correlated price with several of the characteristics of asparagus, tomatoes and cucumbers. Brief reference will be given to the grade specifications only when it is felt that the quotation does not adequately contain the pertinent grade requirements.

**Asparagus.** Grades of asparagus are based on freedom from damage and on defects and on size and color.

It has been pointed out that the most important quality factors influencing asparagus prices in Boston were, first, green color; second, size of stalks; and third, uniformity of size. Provision is made in the United States grades for marketing a lot of asparagus as 'Green' in addition to the grade statement if the stalks show four and one-half inches of green color. Provision is also made for marketing a lot
according to the size (diameter) of the stalks in addition to the grade statement. Uniformity is not required. (p. 72)

Since uniformity of size was found to be a relatively important factor in the Boston market, the fact that the grades do not require uniformity is a serious drawback.

While green color is mentioned in the United States grades, it is not included in the requirements of the grade proper, and the only requirement for size in the grade proper is that the diameter of the stalk shall not be less than one-quarter inch. It is, therefore, allowable to mark a box of asparagus as "U.S. No. 1" even if it has no green color at all, and even if the stalks have a diameter of only one-quarter inch. (p. 72)

**Tomatoes.**

This grade (U.S. No. 1 for fresh tomatoes) covers, in a satisfactory manner, the quality factors which have been demonstrated to be important in the case of tomatoes. It is well adapted, without modification, for the use of New England growers who ship to Boston. (p. 74)

**Cucumbers.**

There is no special United States grade for hot-house cucumbers, and the only official grade in general use is the grade which applies to all cucumbers, whether grown in the hot-house or in the field.

This grade requires many quality factors (freshness, firmness, maturity and freedom from decay and damage) which were not considered in this study (length and diameter), but which are undoubtedly important and necessary. Nevertheless, it is apparent that New England growers of hot-house cucumbers would do well to increase the length requirements, and probably to make some additional requirement concerning diameter. All the hot-house cucumbers included in this study were over five inches long. Therefore, every lot inspected could have
been classed as U.S. No. 1 if it met the requirement of freshness, firmness, maturity, and freedom from decay and damage. Yet, this study has demonstrated that there was a great deal of variation in the prices received for these lots of cucumbers and that a large part of this price variation could be attributed to differences in the length and diameter of the cucumbers themselves. (p. 74-75)

Following the discussion Waugh ventures some suggestions as to the way in which grades might be adapted to particular market conditions.

In outlining such local grade requirements, it is well to use such standard grades as the United States grades as a basis. Whatever changes are made should usually be in the form of additions to the requirements of the United States grades. (p. 75)

This statement is in complete agreement with the proposals made in Chapter II for determining the number of grades to be instituted; that is, grades should be added (or subtracted) as market requirements dictate.

In view of the fact that consumers' preferences for eggs take into account many characteristics, it would seem that methods used by Waugh would be very useful in discovering the relative importance of the quality of various characteristics. The significance of the findings of such a study would of course be enhanced if inspection methods more fully revealed internal quality.

Consumer Survey

One of the better recent consumer surveys is that conducted by Gordon W. Sprague of the Farm Credit Administration in cooperation with
the Maine Agricultural Experiment Station.\textsuperscript{1}

This survey was a part of a comprehensive market survey made with special reference to the marketing of potatoes of Aroostock County farmers. The major part of the study, however, was concerned with the Boston and suburban markets in many of its aspects: its position as a terminal market, the types of dealers, the retailing methods used, consumers' buying practices, the grades used and extent of grading, and consumers' preferences.

In the consumer survey interviews were conducted in the home, the enumerators being licensed Federal-State fruit and vegetable inspectors, qualified to apply United States standards in classifying potatoes on hand in homes of Boston consumers." (p. 135)

The area sampled included the Boston metropolitan district. The family was considered the sampling unit. The number of sampling units selected in each of the cities and towns and in Boston proper was in proportion to the number of families in the entire area.

Locations were selected from the city directories by the use of 'Tippet's Random Numbers'. Each location was the nucleus of four consumer records. Eight records per day were considered a reasonable number for each enumerator on this basis. For each location there was a specific address; the enumerator then selected three additional addresses according to a definite pattern. Starting from the key location, he was instructed to take the second record two blocks north, the third two blocks east of the second, the fourth two blocks south of the third.

\textsuperscript{1}Sprague, Gordon W. \textit{op. cit.}
See also Hinks, Maynard A. \textit{op. cit.}

Whenever refused, the enumerators were instructed to take the next dwelling, etc., until a record was eventually obtained. These refusals, however, did not tend to move the enumerators out of the area set up in the pattern of contact. Each man was responsible for the selection of families to replace those where there was no response to his call or where the consumer would not cooperate in completing a record. Telephone contacts were made with a few consumers whose names appeared on the records, to check the activity of the enumerators. .... (p. 135)

Data were gathered in four complete and separate samples from the population. This procedure provided check data for both the sampling procedure and the results of the survey. Samples one and two were taken from March 4 to April 6, 1940. In most respects Chi Square tests indicated that these two samples could be considered homogeneous, and they were combined. Samples three and four were taken from June 1 to June 29, 1940. Although these two samples were homogeneous insofar as population characteristics were concerned, in many ways they were not so with respect to the product attributes being studied, and, therefore, were frequently presented in several parts showing these differences where they existed. The sampling method used was particularly adaptable to pointing out seasonal changes which occurred in the progress of the study. (p. 138-139)

The potatoes which the consumer had on hand were used as a display. "This served further to standardize responses, particularly with respect to preferences for sizes and the recognition of defects." (p. 135)

Below are given a number of quotations from this bulletin which reflect the sort of material which may be gathered by a consumer survey and the sort of conclusions which may be made therefrom.

1. Consumer preference for size versus grade specifications as to size

Consumer preference for size:

Outstanding among the preferences of consumers was that for uniform size. Over 71 per cent of those interviewed in March indicated that a wide range in size in an individual package was not desirable. Of about equal importance was the preference for certain sizes of potatoes. Of about 74 per cent of the consumers reporting a definite preference for size for baking, almost 63 per cent preferred them to be 2½ inches or over, whereas over 10 per cent preferred them less than 2½ inches in diameter.
Very few of the consumers reported a preference for potatoes for any use as small as 2 inches in diameter, and almost as few reported a preference larger than 3 inches. More consumers reported preference of size for baking potatoes than for any other use, and most consumers reported as satisfactory a range in size not exceeding \( \frac{7}{8} \) inch in diameter. (p. 132)

Although the U.S. standards have been improved so that the variability of size is some reduced, the size classes are still too wide. Concerning this range, Sprague writes:

The U.S. No. 1 grade for potatoes contains a minimum size requirement of 1-7/8 inches in diameter, unless otherwise specified. If more than 5 per cent of the potatoes in a lot are below this size requirement or any other specified minimum size, it cannot be accepted as U.S. No. 1 grade. In the potato grade, however, only a minimum size requirement is specified, whereas size in general is one of the most important factors contributing to differences in market price. It has been the general policy of the grading authority to leave the matter of size, except that of minimum size, to the contracting agents in any transaction. A contract for U.S. No. 1 potatoes may be fulfilled by delivery of a lot of potatoes none of which are much in excess of 1-7/8 inches, so long as not more than 5 per cent are smaller. Potatoes of this size are so small as to be unsatisfactory to most consumers. In recognition of this fact, various size classifications were provided in the U.S. standards to be used in connection with the grade designation.

One of these is U.S. No. 1, size A, in which 60 per cent of the potatoes of round varieties must be 2\( \frac{1}{4} \) inches or larger in diameter. In addition to such classifications, other minimum sizes may be specified, such as U.S. No. 1, 2-inch minimum, in which, as indicated, none of the potatoes can be below 2 inches in diameter, with the exception of 5 per cent allowed in the tolerance.

These subclassifications have materially improved the description of the sizes of potatoes included in any lot, since they indicate more clearly whether the potatoes are suitable for table use. But even these classifications include a very wide range of sizes, whereas most consumers prefer to buy potatoes classified within a rather narrow range of sizes but sized for baking, since, as a general rule, potatoes which are suitable for baking will be suitable for most other uses. The difficulty
in the use of the standards arises in the fact that the grade terminology for U.S. No. 1, size A, or for U.S. No. 1, 2-inch minimum, are equally satisfactory for the grade of U.S. No. 1, whereas potatoes in which a very large proportion are under 2 inches in size but still above 1-7/8 inches are also adequately described as U.S. No. 1, but much less satisfactory for use by the majority of consumers than the larger sizes.

This grading terminology when used in contractual relations between dealers who thoroughly understand it is satisfactory because an adequate description of sizes required is likely to be included in the trading contract. When this grading terminology is used to describe the quality within consumer packages or even in 100-pound bags sold to the retailers or to consumers who are much less familiar with the problems of grading, deception may arise. Instances have been noted in which potatoes of small size but meeting the minimum size requirements for U.S. No. 1 have been placed in pack packages marked U.S. No. 1. When sold to consumers, considerable criticism with the sizing has resulted. (p. 127-128)

2. Consumer recognition of defects in contrast to inspector's classification.

Since grading should be done with the consumers' preferences in view, an attempt was made to find out how closely consumers' reactions to the defects found in potatoes corresponded with the interpretation of these defects by the grading authorities. When potatoes were being reviewed in the households of consumers, therefore, the consumer was asked to separate from the lot at hand those potatoes which, in her estimation, contained defects sufficient to make them undesirable.

When the consumer had made this classification, the inspector characterized the lot on the basis of defects according to the standards for U.S. No. 1 potatoes... In more than 40 per cent of the cases in which branded packages were being inspected, the consumer and the inspector were in agreement as to the number of potatoes which contained identifiable defects. In about 30 per cent, the consumer found fewer defects than the inspector. The combination of these two shows that the interpretation of defects in the standards was satisfactory to more than 70 per cent of the consumers. In 28.7 per cent of the cases, the consumer found more defects than the inspector in branded packages. In the inspection of bulk stock, the inspector and
the housewife were in agreement on 43.7 per cent of the lots. The inspector was the more critical in 36.9 per cent of the lots, and the consumer, or the housewife, was more critical in 19.4 per cent. The data indicate that consumers who purchase branded packages may have been more critical than those who purchased from bulk stock. This may also reflect the reason why bulk stock was purchased instead of branded packs. Consumers who purchased from bulk by their own selection were more likely to be satisfied. (p. 129-130)

3. Consumer preference for cooking quality versus grade.

In the matter of cooking qualities, consumers prefer potatoes that are dry and mealy. This is probably directly related to the strong preference for potatoes for baking. Dryness and mealiness are largely variety characteristics, and producers should take account of them insofar as practical by producing varieties in which these characteristics are inherent .... (p. 133)

Potato grades and standards are based largely on quality concepts in which defects in individual potatoes or the percentage of these defects in a lot play an important part. Grades also include such classification concepts as size and variety. (p. 126)

4. Sprague, following his study, made the following recommendations with respect to factors to be considered in grade specifications:

The research showed a lack of standardization in consumer packages, both in sizes and in defects. It also showed many consumers making personal selection from bulk lots of potatoes to satisfy their family requirements. It indicated that consumers prefer a package closely sized and that most of them prefer potatoes from 2 1/4 to 3 inches in diameter. It further indicated that careful removal of potatoes having defects as described in connection with the U.S. No. 1 grade would increase consumer satisfaction. Consideration of a grading program should take these preferences into account. Such a program would embrace the following ideas:

1. Sizing of table stock for use in brands for sale in large volume from a minimum of 2 1/4 inches to a maximum of 3 inches in diameter, using the present definition for damage under the U.S. No. 1 grade, but packing to a lower tolerance limit in order that the 6 per cent tolerance would rarely be exceeded in any bag at destination.
2. A grade sized under $2\frac{1}{2}$ inches in diameter for sale where dictated by price competition.

3. The packing separately of potatoes over 3 inches in diameter for sale to restaurant trade and in cases in which special demand recommends them.

4. The packing of "Bakers", sized from $2\frac{3}{8}$ to 2-3/4 inches or from $2\frac{1}{2}$ to 3 inches, and removing all defects possible from these two premium grades. (p. 133-134)

This writer should suggest in addition Sprague's recommendations that perhaps some index useful to the consumer in appraising the qualities of the potato, particularly "mealiness" should be included as a grade classification in view of the fact that consumers have shown a preference for certain cooking qualities. Consumers may be able to secure this quality by using the variety as a guide when making their purchases. The cooking quality of a potato is somewhat related to the variety. But this is an indirect route for the consumer to channel her preference, and a route with which many consumers are not familiar.¹ And, even if consumers were familiar with the varieties, surely either because the variety strains are somewhat mixed and are not pure or because of weather conditions which affect maturity and ripening, etc., these cooking qualities are not uniform. Could a consumer be certain of securing the desired quality by selecting her potatoes in the market by variety only?

¹Consumers are apparently not well acquainted with varieties of potatoes as witnessed by the following quotation:

Since consumers could not identify the varieties giving satisfaction, they could not indicate preferences for individual varieties. However, their preferences for cooking qualities were definitely stated, and these should be considered by growers and marketing agencies as indicating the varieties which would be most acceptable. (p. 6)

Hinoks, Maynard A. *op. cit.*
The manner of adopting grades recommended by Dr. Sprague is somewhat similar to that recommended in Chapter II and corroborated by Dr. Waugh. In this bulletin Dr. Sprague is more concerned with how a farmer organization might revise its selling program, than he is in the general question of grading. His recommendation to the producers is that they start with the Federal standards, but "tighten" them up insofar as is found profitable:

One of the more important adaptations in the United States standards is that producers in an area may set up specifications for grades, using the definitions and interpretations of the Federal standards, but reducing the tolerances and variations in size. Refinements, such as these, would result in better quality and greater standardization in lots and in packages, and the inspection certificate issued under these conditions would provide a better description of the potatoes. When this use of the service is made in connection with brands or trademarks and inspections are made by the trained employees of the Federal-State Inspection Service, the brands will gain character and standing throughout the industry. Producers of potatoes in Maine and their cooperative marketing associations should investigate the possibility of the development of such a procedure for their crops. (p. 131-132)

Integrating a consumer survey with a study of price-quality relationship

In the survey of potato marketing Dr. Sprague, in addition to the consumer survey also conducted two price-quality studies, one using the consumers' purchase price and the other the retailers' purchase price. The conclusions are as follows:

Retailers were aware of the preference on the part of consumers for potatoes of medium size and for potatoes sized closely around an average of 2½ inches in diameter. Retail prices, however, did not show a close relationship between the price paid by the consumer and the percentage of the potatoes
which were under 2½ inches in diameter. Neither did retail prices reflect any close relationship between the price paid by the consumer and the percentage of defects as interpreted under the standards for U.S. No. 1 potatoes. To the consumer, therefore, retail price was not a valuable guide to quality as described by these inspection characteristics.

Retail margins varied from very low ones to margins as high as 15 cents or more per peck. They averaged 7 cents per peck, or about 15 to 20 per cent of the retail price. Judging from margins taken for other fresh fruits and vegetables and for some other food items, 17 per cent was not an unusually large margin.

The wide range in margins taken by retailers suggested that the lack of relationship between the retail price and the percentage of various qualities found within the retail package might be due to the retailer’s method of applying margins. The retailer’s cost was correlated with the qualities found in the packages, and this correlation indicated that some retailers do take into consideration the percentage of small potatoes in the package when they purchase for redistribution to their consumer-patrons. The range of variation, however, still indicated that retail cost was not a very reliable guide to the sizing of the potatoes in the package. Retail cost as compared with the percentage of various defects found in the packages indicated that when the retailer purchased U.S. No. 1 potatoes, no further attempt was made to hold the percentage of defects at a low figure. .... (pp. VII-VIII.)

Price, therefore, was not a reliable guide to quality and was less reliable at retail than at wholesale. (p. 126)

The combination of two such studies makes it possible to check one study against the other. If the price-quality study shows little relationship while the consumer survey presents an impelling picture of consumer preference for certain quality characteristics, then either (1) the surveys do not adequately represent the actual situation, or (2) the surveys reflect extreme ineptness of the market to permit consumer expression of preference in the market.
CHAPTER V. CONSUMERS' EGG PREFERENCES

What Egg Qualities Are Preferred by Consumers?

Consumers' preferences have long been the subject of much discussion. Experts appear to be in agreement as to what a good egg is like. And they have widely discussed their judgment concerning consumers' preferences for the qualities of the various characteristics of the egg. Also, implicit in the laboratory methods of measurement of the characteristics of eggs lies a presumption that consumers' preferences are known. Their breeding, feeding and other flock management programs when appraised in terms of effect on egg quality are in part appraised implicitly in terms of the type of egg which the market demands.

The opinion of experts of high quality for various egg characteristics as indicated in specific statements and their professional attitudes are summarized below:

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Experts' judgments as to contributing influences on characteristics and its relation to internal quality of egg</th>
<th>What consumers consider to be high quality in experts' opinion</th>
</tr>
</thead>
<tbody>
<tr>
<td>External</td>
<td>Not necessarily related to internal quality</td>
<td></td>
</tr>
<tr>
<td>1. Shell</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Color</td>
<td>The hen</td>
<td>Some have definite preferences, brown or white; usually want uniformity of color in dozen.</td>
</tr>
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</thead>
<tbody>
<tr>
<td>b. Texture</td>
<td>(1) Hen (2) Feed (3) Treatment given eggs in markets</td>
<td>Want an egg with a dull appearance, not one that is shiny, glossy or uneven.</td>
</tr>
<tr>
<td>c. Soundness</td>
<td>Same as texture</td>
<td>Want eggs that will not break until purposely broken.</td>
</tr>
<tr>
<td>d. Shape</td>
<td>Hen</td>
<td>Don't want misshapen eggs, long or bulging; prefer uniform shape.</td>
</tr>
<tr>
<td>e. Cleanliness</td>
<td>(1) Hen (2) Care in flock management (3) Treatment in the market</td>
<td>Prefer clean eggs.</td>
</tr>
<tr>
<td>2. Size of egg</td>
<td>(1) Hen (2) Season</td>
<td>22–24 oz. per doz.; not too large and not too small; uniformity of size within dozen.</td>
</tr>
<tr>
<td>Internal</td>
<td>(1) Most directly affected by age and conditions under which eggs are held after laid. (2) Somewhat affected by feed and season (3) Trait of individual hen</td>
<td></td>
</tr>
<tr>
<td>3. White</td>
<td>Clear and colorless white</td>
<td>Favor firm white supporting the yolk; dislike watery or runny white.</td>
</tr>
<tr>
<td>a. Color and clearness</td>
<td>(See &quot;internal&quot; above)</td>
<td></td>
</tr>
<tr>
<td>b. Proportion of thin white</td>
<td>(See &quot;internal&quot; above)</td>
<td></td>
</tr>
<tr>
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</tr>
<tr>
<td>---------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
<td>-------------------------------------------------------------</td>
</tr>
<tr>
<td>c. Presence of foreign objects</td>
<td>Trait of hen only</td>
<td>Prefer none; small removable meat spots not objectionable; dislike bloody white, rots, etc., and conspicuous foreign objects.</td>
</tr>
<tr>
<td>4. Yolk</td>
<td>(See &quot;internal&quot; above)</td>
<td></td>
</tr>
<tr>
<td>a. (Depth of) color</td>
<td>(1) Feed (2) Age — turns darker</td>
<td>Some prefer light and some prefer dark; darker, tastier; nutritive value of darker yolks greater unless feed supplemented with fish oils.</td>
</tr>
<tr>
<td>b. Evenness of color</td>
<td>Changes in feed</td>
<td>Do not want mottled appearance.</td>
</tr>
<tr>
<td>c. Uprightness</td>
<td>(See &quot;internal&quot; above)</td>
<td>Do not want flat yolks; want yolks that stand up high and round.</td>
</tr>
<tr>
<td>d. Strength of membrane</td>
<td>Age and holding condition</td>
<td>Do not want yolks that easily break and mix with the white.</td>
</tr>
<tr>
<td>e. Freedom from foreign objects</td>
<td>Trait of hen</td>
<td>Prefer none; small meat spots or blood clots not objectionable; large objects and those not removable are disliked.</td>
</tr>
<tr>
<td>5. Germ development and chalazae</td>
<td></td>
<td>The two are confused by consumers.</td>
</tr>
<tr>
<td>a. Size of germ spot</td>
<td>Fertility, temperature and age</td>
<td>(1) Prefer infertile eggs (2) Prefer no germ development (3) Development to blood ring size repugnant</td>
</tr>
<tr>
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<td>---------------</td>
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<td>----------------------------------------------------------</td>
</tr>
<tr>
<td>b. Chalazaea (a cord of twisted white holding yolk in center of egg)</td>
<td>Accepted as a necessary part of egg</td>
<td>Don't know; often confused with germ development.</td>
</tr>
<tr>
<td>6. Flavor and odor</td>
<td>(See &quot;internal&quot; above) Eggs absorb odor and flavor from surroundings</td>
<td>Don't like strong or foreign odor or flavor, e.g., &quot;fishy&quot;, &quot;oniony&quot;, &quot;kerosene&quot;, &quot;moldy&quot;, &quot;strawy&quot;; prefer mild flavor and sweet smelling.</td>
</tr>
</tbody>
</table>

**Preferences vary by uses**

The expert tends to think of desirable qualities as those ordinarily found in freshly-laid eggs. These are the qualities particularly desirable for eggs, served either in shell or poached or fried. Variation in qualities are most noticeable in such uses. It is with respect to these qualities that experts are well in agreement. However, experts are at variance in their opinions and recognize that more information is needed concerning the qualities of eggs best suited for specific culinary uses. "The performance of eggs in cookery may or may not be associated with their state of 'freshness'" (p. 711)\(^1\) Watery whites may be preferred for some

\(^1\)Stewart, George Franklin. Poultry products research. op. cit.
uses, particularly where whipping quality is important. Deep yolk color is unquestionably preferred for the making of those products for which color is an important characteristic, for example, in the making of custards, cakes, noodles and mayonnaise. None of the external characteristics except size is important for culinary uses.

Consumers' prejudices

Certain misconceptions in the minds of consumers affect their preferences for eggs. Many of these misconceptions may be justified in view of the consumers' experiences. For instance, they may have good reason to associate brown or white eggs with better or poorer eggs because of the nature of the quality of such colored eggs found historically on the market. Nevertheless, consumers' preferences for shell color are also based in part on certain misunderstandings as to the necessary relationship between shell color and certain internal characteristics such as yolk color. Brown eggs do not necessarily have yolks of darker color although many consumers think that they have. Likewise, misunderstandings have arisen with respect to cold storage eggs, and, more generally, with the reliability of age as an index of quality. Fully as important as the age factor in affecting the quality of the egg are the conditions under which the eggs are held; temperature, humidity and surrounding odors. In fact, they are so important eggs properly handled may at the end of a six months' period be of better quality than eggs a week or even three days old.
Consumers' prejudices also arise from skepticism of products which have been handled "unnaturally", that is, put into cold storage or processed. This skepticism is confirmed in the consumers' minds especially if they encounter difficulties with the product. For example, they may tend to call poor eggs cold storage eggs. They may also feel that "farm" eggs are better than "store" eggs. And even that eggs ungraded or country run are preferable to graded or sorted eggs. Eggs which are shell treated to preserve the internal quality have not received wide acceptance by consumers for similar reasons.

Many of these misconceptions or half-truths would be allayed if the eggs were graded reliably on the bases of consumers' preferences. In lieu of reliable grading the consumer is left to grasp onto indexes which are only partially reliable and misconceptions arise.

The Major Purpose of This Chapter

This chapter will be concerned with studies which have been conducted to investigate consumers' preferences, the relation of these preferences to uses of eggs and, what is more important, the interrelationship of these preferences.

As a matter of convenience for presentation each consumer survey will be outlined as to its purpose, source of data and method of interview and preferences sought. The investigations will be listed in order of publication date or the time the study was made. The market studies will be discussed in a later section.
Consumer Survey Investigations: Their Purpose, Sources of Data, Method of Interview and Preferences Sought


Purpose of the survey. The investigators announce that their purpose is to secure data on Pennsylvania consumers' preferences. This they feel is necessary because an adequate production program can be planned only if producers know the wants and preferences of the market for which they produce.

Source of data. Records were obtained in 1926 from 2,404 families living in six Pennsylvania cities, five of which ranged in population from 15,000 to 93,000, and Pittsburgh had 631,000 inhabitants. Approximately 275 records were obtained in each of the five cities, and 1004 in Pittsburgh. The cities were selected to represent "the different sections of the diversified population and of the varied commercial interests in Pennsylvania." No reference is given as to the manner in which the sample units were selected.

Method of interview and preferences sought. Records obtained from housewives by interview. The only preference question asked was on shell color.

Purpose of the survey. "... to determine the actual preferences on the part of consumers in New York City for shell color and yolk color of eggs." (p. 6) The investigators state: "... there is every indication that an average premium of around four cents per dozen is paid for eggs of otherwise comparable quality which have light yolks and white shells." (p.5) Missouri and midwestern eggs in general are best adapted to produce heavier meat breeds of chickens which produce brown shelled eggs. Also, the economical feeds, yellow corn and green feed, result in darker yolked egg production.

"... No definite facts have been available, however, to indicate that New York City consumers actually prefer eggs of this type (eggs of light yolks and white shells). The preference has been largely in the minds of various types of dealers handling eggs." (p.6)

Doubt is expressed as to the correctness of dealers' presumption as to consumers' preferences.

Source of data. A total of 10,358 individual customers were interviewed in 87 chain grocery stores, so located as to obtain a representative sample of the population of New York City. "Locations were designed to furnish a cross section of the population of New York City from the standpoint of nationality, purchasing power, and geographical distribution." (p.8) Expert counsel was sought for the selection of the stores.
Nationality and purchasing power of stores' customers were also noted, although "... questioning individual store customers as to their nationality or purchasing power was obviously impracticable. Since it was desired to know consumer preferences according to these factors an attempt was made to include sufficient stores having substantially homogeneous clienteles." (p. 9)

It is to be noted that at best only the chain store buying population of New York City was sampled, and not the total population of New York. The title of the bulletin is misleading.

Method of interview and preferences sought. Three eggs of "light", "medium", and "dark" yolk colors were displayed in white porcelain dishes. The displays in various stores and from day to day were uniform in every respect, except that the order in which the colors appeared was changed often so that the medium color was the middle color only one-third of the time. The colors, defined in terms of Munsell color readings, are shown by color pictures in the bulletin. In addition one dozen each of brown and white shell eggs of comparable size and uniformity were placed in cartons on display.

Care was taken in conducting the interview:

The consumers were interviewed by women selected for this work on the basis of previous experience and other qualifications designed to insure integrity of the results. The wording of the questions asked was carefully prepared to avoid the possibility of suggesting a possible answer or the purpose of the study. The customer was first asked: 'Which one of these three eggs do you prefer?' After recording the answer, inquiries were made to determine if yolk color was the basis of the selection made, and in practically all instances this was found to be the case. The customer was then asked to express her or his preference for the eggs of white and brown shell color as displayed. (p. 8)
Corbett, R.B. A study of consumers' preferences and practices in

Purpose of the study. "The purpose of this study has been to learn
the practices of certain groups of Rhode Island consumers in buying eggs,
and their knowledge of and preferences in egg quality. To determine the
changes caused by varying economic conditions and by shifting beliefs,
two surveys were made in the same areas. The first was made in 1928, a
period of prosperity, and the second in 1932, a period of acute depression."
(p. 5)

Sources of data. Two surveys are reported: Summer of 1928, data
obtained by personal visits to 589 housewives in Providence, Rhode
Island and 44 housewives in the villages of East Greenwich and Wakefield,
Rhode Island; summer of 1932, 588 housewives in Providence and 45 in
the villages. The city of Providence was divided into five sections,
according to differences in wealth. One section contains people of
southern European origin. The city average was obtained by weighting
each section, giving each a weight in proportion to total population.
The housewives in the villages were "visited at random". Likewise,
presumably were the housewives within each section in Providence.

Method of interview and preferences sought. Women were employed as
enumerators to interview the housewives. The schedule used is given in
the appendix of the bulletin. Many of the questions of the "how", "why",
"where" and "open end" type were asked. The preference questions used
concern: shell color, yolk color, size, identification of fresh egg, defects of inedible eggs, many of which were related to use made of the egg by the housewife. Other questions which are not of direct concern here were asked concerning consumption, consumers' purchasing habits and the substitution of eggs for other foods.


**Purpose of the study.** To secure information on consumers' preferences from consumers and from retailers, wholesalers and hotel and restaurant operators in order that producers may better know their markets and be able to adjust their production programs.

**Sources of data.** Tampa, Florida was chosen as a representative market in which to make the study. The data were obtained in September, 1936, and cover the preceding twelve-month period. A total of 1,235 housewives, 144 retail stores, 18 hotels and restaurant operators and 14 wholesale dealers was contacted. In the consumer survey an attempt was made, the investigators state, to get a representative sample of each of three income classes of white families, and of the Latin and Negro families. The other surveys are not of direct concern.

**Method of interview and preferences sought.** The enumerators employed to interview the consumers were county agricultural agents, home demonstration agents and persons from the National Youth Administration. Both white and colored persons were employed. The preference questions
asked consumers concerned shell color and yolk color. The other questions pertained to egg consumption, where the consumer purchased her eggs, whether or not the consumer knew what was meant by graded and classified eggs, the sizes of the eggs purchased, whether the consumer purchased different qualities of eggs for different uses and whether she purchased different qualities at different seasons. Questions which bore on some of these same matters were asked of the storekeepers, hotel and restaurant operators and wholesale dealers. In this way it was possible to secure an appreciation of what those agents thought were the consumers' preferences and how their ideas were reflected in their marketing practices.


Purpose of the study. The investigator states:

The present study, the first in a contemplated series of projects in the field of household buying, was undertaken with a view of determining what qualities household buyers demanded in each of a few specific foods, how these characteristics were identified and products possessing them obtained, to what extent homemakers were familiar with established grades and standards and what their opinions were concerning the need of official grading of sundry Vermont-grown foods. Those who set up standards for the grading of food products need to know what quality factors are most important in preparation, serving and/or preservation. The statements of experienced housewives concerning the characteristics of the products which they habitually buy should be indicative of the importance which they attach to various quality factors. The methods by which they identify foods possessing desired qualities manifest their efficiency as buyers and their knowledge and use of existing buying guides. The effectiveness of these guides — official grade names, trade labels, brand names — is measured in turn by the extent to which they are used in purchasing. (p. 3)

Eggs were only one of 7 commodities on which information was secured.
Source of data. Burlington, Vermont.

Selection of strata:

Six residential areas were arbitrarily chosen for study; two to represent homes at a relatively high income level; two those of professional and business people of average income; two of wage earners of fairly low income. (p. 5)

Procedure for sampling within the strata was as follows:

Within each of the six areas the writer visited each successive home on given streets until usable records had been obtained from 20 families which met four eligibility requirements, as follows: a household of two or more individuals, one of whom was an adult woman who managed the home; a native-born American household head, not a member of a religious cult which teaches unusual food habits; habitual home preparation and serving of at least two daily meals; no boarders. (p. 6)

The information secured from the housewives was supplemented by interviews with owners and managers of selected food stores. Also actual purchases of consumers were observed.

Method of interview and preferences sought. A definite and significant technique was employed in questioning household buyers:

"... They were asked to describe in their own words the characteristics which they deemed essential in each food; then, following these unguided statements, they were asked to respond with "Yes", "No", or "Uncertain" to each of several questions concerning desirable and undesirable quality factors of these foods. Whenever possible, these questions were related to specific uses. Thus, for example, the housewife was asked whether she bought cheaper eggs for cake-baking than for boiling or poaching. If her answer was "Yes", she was questioned in detail concerning each class; if it was "No", the queries dealt with eggs for all cooking purposes.

Perhaps the unguided statements may have been more indicative of desired qualities than of those which actually were obtained; on the other hand, all direct questions referred to products commonly purchased. For example, when inquiries were made
concerning the eggs the buyers were asked, 'Are the eggs which you generally buy free of dirty shells?' By thus relating questions and answers to actual purchases, findings were obtained which were representative of real quality demands rather than of preferences which might have tended to portray higher standards than were warranted by actual buying habits. It is thought that the accuracy of the responses was increased by questioning about both desirable and undesirable quality factors and by encouraging the buyers to express uncertainty when they could not readily answer "Yes" or "No". The list of quality factors for each of the seven foods was based on State and/or Federal definitions of standards for grades. (p. 3-4).

The list of quality factors of eggs which the consumers were asked whether they considered when purchasing for table, for cooking or for general use were:

- Fresh or storage: January, July
- Of known age - if so, what age
- Uniform size - if so, large, medium, small
- Uniform in shell color - if so, white, brown, either
- Light, medium or dark yolks
- Rounded or flat yolks
- Thick or thin whites
- Fertile or infertile
- In cardboard cartons
- Kept in refrigeration by seller
- Free of dirty shells
- Free of cracked shells
- Free of misshapen shells
- Free of enlarged air cells
- Free of visible germ
- Free of blood spots
- Free of meat spots

Purpose of study. The purpose is to secure an empirical picture of the flow of eggs into Baltimore and through the market channels to the consumers of Baltimore, and to secure a picture of the market processes. Also included in the statement of purpose of the study is to determine the relationship between retail prices and the quality of eggs and to determine consumers' preference for eggs in Baltimore. No reason is given as to why the consumer study should be made and the recommendations made in conclusion of the bulletin offer no clue since the only recommendation made which could have derived from the consumer survey is:

"An educational program on egg quality should be conducted in Baltimore for the benefit of consumers and retailers." (p. 163)

Sources of data. Baltimore, Maryland. Upon the advice of Dr. Fales of the Vital Statistics in Baltimore, 14 districts were selected. "They represented as nearly as possible all classes of people living in Baltimore." (p. 152) and "During July and August, 1933, a door-to-door canvass was made of 1,075 families in Baltimore ..." (p. 152). No indication is given of the manner in which the sample units were selected within the specified districts. However, through personal correspondence with S.H. De Vault an outline of the sampling procedure was secured:

1De Vault, S.H. Personal letter to Richard L. Morse.
We had a map of Baltimore on which 79 districts were laid out. Certain districts were selected as being representative of a definite locality. Within the districts selected for our sample study, we interviewed every other family on both sides of the streets within the boundaries of those districts. The districts selected were representative of the different income levels of the families, and included all racial groups. We believe that the sample represents a good cross section of the consuming population of Baltimore City.

Retailers were also questioned concerning their customers' consumers' preferences.

Method of interview and preferences sought. Mimeographed schedules of questions to be asked of the housewives were used by the enumerators who made house-to-house contacts. The preferences of consumers sought were preferences for shell color, yolk color, size of egg and package. Consumers were also asked whether they could tell a fresh egg and, if so, how. Other questions asked concerned egg consumption, consumers' purchasing habits, their attitude toward government graded eggs, purposes for which eggs were purchased and factors that influence their purchase of eggs. Many of the questions asked "why" or "how", or were of the "open end" type, but the report of the results fails to spell out the multitude of answers usually given to such questions. The analysis in this study is relatively poor as compared with that presented by Corbett.

Purpose of the study. This sample survey was made at the request of the Iowa State Farm Bureau Federation by the Agricultural Trade Relations, Inc., a chain store financed public relations agency. The Farm Bureau at this time was considering Des Moines as a market outlet for eggs of the now defunct Iowa Poultry Producers' Marketing Association, Ottumwa, Iowa. This cooperative association was seeking as a local market for graded eggs and plans for initiating U.S. grades were in the offing.

In the foreword is expressed the fundamental purpose of the survey. "The thought in mind is that if eggs were sold on a graded basis of quality, the money returns to farm producers would be appreciably increased."

The survey attempts to measure consumers' satisfaction with the present methods of egg marketing and not their preferences for egg quality. The opinion of the merchants were secured to supplement consumers' statements.

Source of data. Des Moines, Iowa.

The survey covered 100 merchants, representing as nearly as possible a fair cross-section of all classes of stores in various city districts, and 100 housewives representing a weighted average of all income groups. (p. 6)

Method of interview and preferences sought. A professional surveyor who was employed at times by a leading advertising firm and by a leading
public opinion poll service to conduct surveys was employed to select the sample and conduct the interviewing for this survey. The interview was conducted in an informal manner. The questions were included in the conversation which the surveyor conducted with the housewife or merchant. In many cases the merchant may have been unaware that he was being questioned at all. The housewife, of course, did know that she was being interviewed since some reason had to be given for intruding into her house. After the interview was completed the surveyor returned to her car. There she filled in the answers to the formal questions printed on a form, and on the reverse side of the form she quoted significant comments the housewife had made.

This is a limited survey of consumer preferences. Primary consideration is given to questions concerning the consumers' satisfaction with present methods of merchandising eggs. In contrast is given the merchant's estimate of how well satisfied consumers are with the market. However, included as an appendix are quoted the pertinent comments made by the interviewees. They provide interesting reading in the sense that they provide a somewhat personalized picture of the consumers' attitudes.


Purpose of the study. To secure information as to yolk and shell color preferences of women attending Farm and Home Week at Iowa State
College to note differences, if any, in stated yolk color preferences between producers and non-producers of eggs; to note differences in results secured by changing the display models; to measure what association if any existed between the preference for yolk color and preference for shell color; to observe any differences in the above relationships between persons stating that they tend to judge yolk color by shell color and persons stating that they do not tend to judge yolk color by shell color. The color chart used to get shell color preference was not satisfactory. Hence, no attention will be given to the shell color preference part of this study.

Source of data. Women attending the women's sectional meetings of Iowa Farm and Home Week, on Tuesday and Thursday afternoons. Of this group the women included were limited to those who passed through the south foyer of the building and who were interested in cooperating.

Method of interview and preferences sought. Eggs of different yolk colors were broken out into covered petri dishes and arranged in order of color, from light to dark, on a table covered with black cardboard. The display was arranged so that all eggs were similar except for differences in yolk color. Next to each egg was placed a letter to identify the color.

The women viewing the display were presented with a pencil and a card on which were printed a short list of questions. Letters were

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1The card is presented in the Appendix.
printed on the card so that any difficulties involved with identifying and checking the colors preferred were minimized.

An attempt was made to secure not only the ordinal relation of the preferences as between the eggs presented, but also to discover where the floor of the preferences lay, that is, what colors were definitely disliked. This was done by first asking whether all the yolk colors in the display were equally acceptable for poaching and frying. If they were not equally acceptable, the woman was asked to indicate her preference by placing a "1" for first choice, "2" for second choice, etc., next to the letter corresponding to the display letter. If any of the yolk colors were definitely disliked, she was asked in a third question to encircle the identifying letter. When the cards were edited, these distinctions were found unsatisfactory, and a combined score was developed which took into consideration all the information that was given. That is, if a woman identified her dislikes, they were edited in the second question by assigning a high number to the colors in question, and the results of the edited second question were used.

On Tuesday five colors were displayed; on Thursday the same five colors were used and a darker color was added to the display.

Morse, Richard L., Reid, Margaret G., and Oderkirk, A.A. Egg preferences of 1378 rural women in Iowa, February-May, 1940. (Q-1-W-40); January-February, 1941. (Q-1-W-41). (Unpublished data collected under Project 623, Iowa Agr. Exp. Sta.)

Purpose of the study. The purpose of this study was to secure information on the farmer-consumers' egg preferences. In addition the
study sought information on farmers' egg consumption and their egg production and marketing practices.

Source of data. Data were secured from 15 counties in Iowa. In 1940 the survey was conducted in 10 counties with 1168 returns being secured, and in 1941 five counties and one duplicate county were surveyed with 710 questionnaires being returned. The first survey was conducted in the months of February to May; it shall be referred to as (Q-1-W-40). The later survey was made during the months of January and February; it shall be referred to as (Q-1-W-41).

Data were collected through the cooperation of the home demonstration agents or extension nutrition specialists in the respective counties. These representatives of Iowa State College met with the so-called "leaders" in the counties and conducted training schools. When the leaders returned to their townships and met with the women, called "non-leaders", they carried forward to them the information that had been received at the training schools. At the training school the college representative passed out one questionnaire to each leader to fill in that day. Those completed forms were returned to Ames by mail and were classified as "leader" returns. The leaders were then provided with additional questionnaires to take back to their townships for the women in the township meeting. Self-addressed envelopes were provided so that the leaders could return the completed forms directly and easily to Ames. These returns were classified as "non-leader" returns.
In some counties it was possible to keep separate the returns from the "leaders" and the "non-leaders"; for others, it was not possible.

The counties selected were those in which "Foods and Nutrition projects" were currently being conducted. Also an attempt was made to secure a scattering of the counties around the state. The returns from the counties range from 0.44% in Appanoose to 10.7% in Palo Alto of all farms in the county (1940 census). The modal average was 6% returns.

It is recognized that this method entails some bias. How important this bias is, is not known. In any case, it was possible by this method to secure returns from the more active farm leaders. The size of the sample and the stability of certain check items, such as size of flock and family size, in the questionnaire indicate that statements based on this survey have some significance to the state as a whole.

Method of "interview" and preferences sought. This survey may be classed as a semi-mail questionnaire since a representative of the investigator was at hand to interpret the questions and present the questionnaire in person to one of the groups replying. The questionnaire form used is presented in the appendix. Most of the questions asked in the two surveys were the same, although in the second year some new questions were added and some were revised or dropped, depending on the quality of the answers received the first year. They were asked to give their yolk and shell color preferences, how they could tell the freshness of an opened egg, what eggs they considered unfit for home use, the kinds of eggs they preferred for particular uses, and to describe
causes for differences in the flavor and odors of eggs that they had noticed. Many of the questions were of the "why", "how", and "open end" type.


Purpose of the study. This survey was undertaken to secure information concerning the egg preferences of Des Moines consumers and some of the factors affecting these preferences. Also an attempt was made to secure information as to the consumers' egg buying practices and as to the consumers' attitudes toward the egg merchandising methods of retailers. The consumer survey was one of a number of surveys made in the City of Des Moines. The other surveys were made of retailers, wholesalers and restaurants and hotels.

Source of data. Des Moines, Iowa, including Fort Des Moines and West Des Moines. Records were secured from approximately 800 or 1.5 per cent of the households, representing 1.7 per cent of the population of Des Moines. The sample was selected by counting every 7th household in the street and address section of Des Moines City Directory, omitting the business district. The enumerator was given the address and sometimes the name of the head of the household, the household being the sampling unit. If he failed to make the contact, he was required to proceed to the next household, in the direction he had been doing, and inquire as to why the selected housewife was not at home. If a reason
such as shopping, or visiting was given, this neighboring housewife was interviewed. However, if the reason was not of this sort and there was reason to believe that the housewife was consistently away in the daytime, the interviewer was requested to make a return call, perhaps a night or Saturday afternoon call if necessary. Substitutions were made by the enumerator in 28 per cent of the selected households. And it was found necessary to make evening or Saturday afternoon calls for 6 per cent of the selected households.

Later the sample was distributed among the 44 census tracts and the per cent of dwelling units (1940 census) sampled was calculated. These percentages range from 0.25 to 2.40 per cent with a mean value of 1.52 per cent. One census tract in the business district was not included in the sample, and another tract which was primarily a business district was only partly included in the sample. Only 0.25 per cent of the dwelling units in this tract were included in the sample. In the 43 census tracts sampled between 1 and 2 per cent of the dwelling units were included in the sample. In 5 tracts over 2 per cent of the dwelling units were sampled and in 3, less than 1 per cent. Hence, by this sampling procedure, wide and fairly uniform geographical coverage of the city was secured.

Method of interview and preferences sought. The interview was conducted at the house. The enumerators employed were two undergraduates of Drake University, recommended by the Dean of the Business School; a Drake University law school graduate; an Iowa State College undergraduate, experienced in taking schedules; and the writer. The enumerators were
relatively inexperienced in enumeration work, but otherwise were well qualified for this type of work. The supervisor, however, was inexpen-
siced and he spent too little time with the enumerators either in the field or in preliminary training to insure that the enumerators had a common understanding of the issues involved in the questions and that they asked the same questions in the same manner. In recognition of this defect, however, the data collected by each enumerator were tabulated and analyzed separately so that major differences in interpretation as between enumerators are perceptible. Another error in the method of securing the data and in controlling the interview lies in the fact that the schedules were not carefully edited and checked at the time of the survey. Hence, only gross errors in the method of interview employed by the enumerator were caught during the course of the survey. And when the schedules were finally edited, many questions arose and were left unanswered, but which could have been answered by the enumerator shortly after the schedule had been secured.

The schedule\(^1\) required from 15 to 20 minutes to complete. It was well received by the interviewee, however, once a rapport had been estab-
lished. This was surprisingly easy to establish by mentioning merely that the study was being conducted by Iowa State College. Less than 2 per cent of the schedules were rejected as unsatisfactory or unusable. The number of schedules rejected as unusable had the types of household to be chosen had been clearly defined. The schedule was designed for the interviewing of consumers who lived a fairly normal home life. It

\(^1\)The schedule used is presented in the appendix.
was not designed for interviewing single persons and persons who ate most of their meals at restaurants. Nevertheless such persons were included in the sample.

With a few exceptions the questions were asked in the order they appeared on the schedule. However, it was found advisable to reserve till the end one of the first questions which required the housewife to inventory the family's egg consumption of the past week. This was too difficult a question with which to confront the consumer at the start of the interview. Also certain minor changes were made necessary because of stenographic errors made when composing the form. But none was serious.

The preference questions concerned yolk color and shell color, how the consumer could tell if an egg was fresh and what egg defects consumers had noticed that caused them to reject certain eggs for poaching or frying. The consumers were also asked what qualities of eggs they purchased for certain uses and whether all yolk colors were equally suitable for specified uses. Certain other information thought to be related to the preferences of the consumer was secured: quality of eggs purchased, source of eggs, uses made of eggs, weekly income, occupation and race.

A novel technique for securing consumers' yolk color preferences in a home-to-home survey was employed: The enumerator carried with him a well finished wooden box, size $2\frac{1}{2}'' \times 5'' \times 18\frac{1}{2}''$, in which were displayed six yolk colors. Instructions were given to the enumerator to hold the case in daylight so as to maintain as uniform a display as possible.
Considerable difficulty was had in securing eggs of the desired colors of yolk with the result that the displays were not as well preserved as they might otherwise have been. The gelatin in which the eggs were set began to crack and air bubbles appeared under the watch glasses. The yolks which had been darkened by an aeration process tended to crack. Also, it was impossible to secure for the display eggs with as dark a yolk as is fairly common in the spring. The enumerators found the box a handicap when approaching the housewife in that she quite often mistook them for salesmen. However, tricks were devised whereby the box was kept out of the sight of the housewife until it was needed. Considerable interest was quite generally expressed in the display.

Summary appraisal of the consumer surveys.¹

The studies which have been summarized have had a variety of purposes and used various techniques. Most of the studies have been concerned with securing a static picture of consumers' preferences. They have been undertaken not for the purpose of understanding and analyzing the factors affecting consumers' preferences but with the intent of discovering what the preferences are so as to enable producers to find the best market for the eggs being made available or to modify the type of egg produced. A notable exception is found in the study made by Corbett, in which study a definite attempt was made to get at the "why" of preferences. Liston

¹One published and two unpublished surveys have not been summarized because of their very questionable value:
also asked for the "why" of purchases in order to get at the "why" of preferences. Although other studies may have made the rather customary classification, e.g. income or nationality in analyzing their data, this has been done primarily to discover the character of the existing markets.

Many of the studies are concerned with market appraisal, the inter-relationship of consumer, retailer and producer in their functioning in the market. The customary conclusion drawn therefrom is that the consumer, retailer and other market agents should be educated to appreciate the qualities of the egg and that the producers should become aware that there exists a quality egg market, generally among the high income bracket consumers.

None of the studies has been conducted in a market in which eggs are sold on the basis of standardized grades. The eggs may have been labelled or branded in some of the markets, but standardized terminology and standards of quality were not used. In such markets consumers were unable to make comparisons among various qualities of eggs offered for sale. Hence, nearly all studies consider the shell color and the size of the egg, the obvious egg characteristics. Language and concept difficulties impede attempts to get at the more important characteristics. The only techniques used to get at consumers' preferences for the qualities of the yolk and the white, other than yolk color, have been to ask the consumer how she determined the freshness of an egg or what the defects were of an unusable egg. The display technique has been used for
measuring consumers' yolk color preferences with some success, although it needs further experimentation.

A description of the sampling procedures used is regrettably neglected in the reports of most of the studies. The better studies have selected from the total area under consideration certain specific areas, "strata", as representing different income, racial and nationality and occupational groups which when added together would yield a representative picture of the total. The chief limitation (as for informing the reader) of such investigations is that they fail to state the procedure by which the sampling units were selected within each stratum. Notable exceptions to this criticism are the study made in Baltimore where a stratified random sampling procedure was employed, and the study in Des Moines where a randomly selected sample was chosen,\textsuperscript{1} in that a precise statement of sampling procedure is given.

\textsuperscript{1}It is to be recognized that neighboring families were rarely admitted to the sample as selected in the Des Moines survey (S-5). Hence, if neighboring families are assumed to be more alike than non-neighboring families living within a block or two, this artificial dispersion of the sampling units may be expected to increase the variance of the items. Such an arbitrary dispersion of the sample units, on the other hand, may yield a good measure of the central tendency. Cf. Snedecor, George W. Statistical methods. 3rd ed. Ames. The Iowa State College Press. 1940. p. 388-389.
Findings of Consumer Surveys of Egg Preferences

In this section will be given the findings of studies of the consumer survey type which have been conducted to gain information concerning consumers' egg preferences and factors affecting them.

The findings are presented mainly in topical order. However, because of the diversity of procedures in collecting and presenting these data, it will be impossible to itemize the egg characteristics together with the findings as to quality preferences. The procedure shall be to discuss the more inclusive type of material first, reporting those particulars to which special attention has been given in the studies.

How many consumers know what a fresh egg is? What are consumers' criteria of freshness?

Many studies have investigated consumers' attitudes toward and knowledge of "fresh" eggs. In appraising the findings of these studies it is important to recognize certain facts:

1. The word, "Fresh" as used in connection with eggs is a peculiar sort of word. In some states, by law, a fresh egg is one which has not been held under refrigeration more than 30 days and which is not inedible. In other states, by law, fresh eggs are eggs which grade U.S. Grade Extra or Specials. Many states fail to define what a fresh egg is. Freshness is quite frequently defined in terms of

age of the egg. Yet the quality of certain characteristics of a freshly laid egg may not be that considered essential to a desirable egg. Some fresh eggs may be as repugnant to consumers as other quite old and decidedly stale eggs. A freshly laid egg may have a watery white, an off flavor or an unusually colored yolk. As a result the technician is more inclined to omit the word "fresh" from his vocabulary and refer to the specific qualities for which standards of measurement have been set up. These standards are based quite generally on "what is ordinarily found in fresh-laid eggs."  

2. All surveys made to date which consider the manner in which consumers express themselves in the market when selecting the better eggs conclude that the vocabulary of consumers is generally limited to such words as: "fresh", "strictly fresh", "country fresh", sometimes together with terms descriptive of the egg's shell color, area of production and even size; e.g., fresh white, nearby white, large white nearby, Jersey white, etc. Likewise, retailers are also found to have either a limited vocabulary or a limited appreciation of the quality characteristics of a "fresh" egg.  

3. Hence, freshness must be taken to mean a bundle of qualities which are thought to be desirable.

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Several studies have been made in which consumers were asked, "Can you tell a fresh egg?"

Corbett reports that in answer to this question, for the years 1923 and 1932, 18 and 24 per cent respectively of the women in Providence and 12 and 7 per cent respectively of the women in the two villages answered they could not tell the freshness of an egg. Holt asked the same question in Illinois and reports that 72 per cent of the women could not tell the freshness of an egg. Cron, et al., in response to this question found that 14 per cent of the housewives — 30 per cent of those in colored families, as in contrast to 11 per cent of those of white families — reported that they were unable to tell a fresh egg.

In interpreting the findings several things should be noted:

1. Many persons either because of income or proximity to the source of supply are not able to secure satisfactory eggs, and hence feel that they have not had an opportunity to become acquainted with fresh eggs.

2. Consumers may say that they do recognize a fresh egg when such is not the case. The reasons for such a reply are many. In the first place stale eggs in many instances are sold as fresh and consumers purchasing and using the eggs may not be aware of the misrepresentation. Many consumers may be aware of their lack of knowledge of fresh eggs but may be unwilling to admit their ignorance. Pride may be a factor in their reluctance.

3. Unless the question is asked with some qualification some consumers may reply "yes" because they think that
the question refers to the eggs removed from the shell, and some may answer "no" because they think the question refers to the egg in the shell.

Another question asked of consumers is: "How do you tell a fresh egg?" This question involves two concepts: Freshness as determined from the egg in the shell, and freshness as determined from its broken-out appearance. The two considerations are at times confounded.

In a trial question used in study (Q-1-W-40) the above question was asked of the farm women in one county (Appanoose). Of the 87 women returning questionnaires, 58 replied to this question satisfactorily; 34 replied that they could tell the freshness of the egg by its external appearance, the roughness of the shell, its shiningness, dullness, the way it broke; 21 reported that they could tell by the condition of the white and the appearance of the yolk; 3 mentioned both internal and external characteristics of the egg as indexes of freshness; In continuing the survey in other counties the question was changed to read: "How do you judge the freshness of an opened egg?", and the answers given were almost completely in the form of references to the yolk and the white. The answers to this question will be discussed later.

Corbett, Holt and Cron, et. al. followed their question: Can you tell a fresh egg? with the "How" for those persons who said that they could tell a fresh egg. The responses are of interest inasmuch as they reflect proneness of a significant proportion of consumers to think of freshness in terms of external rather than internal appearance of the
egg when asked this type of question. Corbett states that in Providence in 1928, although 47 per cent replied they could tell after opening the egg, 35 per cent of the consumers replied that they could tell the freshness of an egg before opening it; 18 per cent reported that they could not tell. In 1932 a smaller percentage, 40 per cent, said they could tell only after opening the egg; again 35 per cent reported they could tell before opening the egg, and 24 per cent reported they could not tell freshness. Persons gave several techniques for determining the freshness from external appearance. The results stated in order of techniques most frequently mentioned are: shaking, water test, candling, appearance, weight and others. The villagers were more inclined to judge freshness from the opened egg.

Cron reports that 71.7 of the white families as in contrast with 40.5 of the colored families stated methods of determining freshness which require internal inspection of the egg. Whereas 14.7 per cent of the white and 26.0 per cent of the colored families used methods which required only external inspection. The remaining reports, 15.6 per cent of the white and 33.2 per cent of the colored families could give no method or gave miscellaneous methods. It is interesting to note that a higher percentage of the colored families either were unable to judge freshness or stated methods by which at best only very poor eggs could be discerned.

In some studies the question has been narrowed down to: "How can you tell the freshness of an opened egg?" This question presumes that the respondent believes that he can tell a fresh egg and proceeds directly to ask how.
It has been mentioned above that this question was used in the (Q-1-W-40) survey. The findings — those of a questionnaire — were of little significance other than that they showed that the women considered the yolk and the white in determining freshness. Those replying did not take the time to spell out fully what characteristics of the yolk and the white were considered to be indexes of high or low quality.

The same question was repeated in the (S-5) survey, but this time was asked by an enumerator, who was able by means of additional questions to get some answers having greater preciseness. In spite of this opportunity, however, many of the replies were very vague. The responses were as follows:

<table>
<thead>
<tr>
<th>Items</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewives questioned</td>
<td>798</td>
</tr>
<tr>
<td>Housewives indicating some method of telling freshness of unopened egg</td>
<td>783</td>
</tr>
<tr>
<td>Those referring to yolk only</td>
<td>329</td>
</tr>
<tr>
<td>Stated yolk stands up or is firm</td>
<td>217</td>
</tr>
<tr>
<td>Stated yolk breaks if egg is stale or sticks</td>
<td>38</td>
</tr>
<tr>
<td>Yolk merely mentioned</td>
<td>74</td>
</tr>
<tr>
<td>Those referring to white only</td>
<td>44</td>
</tr>
<tr>
<td>Stated white firm around yolk, not runny, or watery if stale</td>
<td>25</td>
</tr>
<tr>
<td>White merely mentioned</td>
<td>20</td>
</tr>
<tr>
<td>Those referring to a combination of white and yolk</td>
<td>205</td>
</tr>
<tr>
<td>Yolk stands up and white firm around yolk, not runny</td>
<td>50</td>
</tr>
</tbody>
</table>
From these responses it would appear that consumers much more frequently judge freshness of an opened egg by the condition of the yolk than by the white.

For the quality of most foods consumers have an area of tolerance. Below a certain quality eggs are not acceptable. Since many consumers look upon freshness as a contributing to satisfactory quality, their notions concerning what constitutes a stale or inedible egg may indirectly reflect their notions concerning freshness of eggs.

Corbett asked the housewife if she had found any inedible eggs in her purchases, the number of them and the defects. In 1928, 56 per cent, and in 1932, 32 per cent reported having purchased inedible eggs.
The relative frequency with which defects were mentioned for the years 1928 and 1932, respectively are:

<table>
<thead>
<tr>
<th>Defect</th>
<th>1928</th>
<th>1932</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bad odor</td>
<td>40</td>
<td>24</td>
</tr>
<tr>
<td>Blood spots or meat spots</td>
<td>22</td>
<td>30</td>
</tr>
<tr>
<td>Rot</td>
<td>18</td>
<td>11</td>
</tr>
<tr>
<td>Old</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Watery whites</td>
<td>4</td>
<td>13</td>
</tr>
<tr>
<td>Off color (of yolk)</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>Dark or spotted yolk</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Bad flavor, fertile, etc.</td>
<td>4</td>
<td>6</td>
</tr>
</tbody>
</table>

100% 100%

In study (S-5) a similar procedure was followed. In this case the consumer was asked to give the defects which made the eggs unfit for use for poaching or frying. The responses were as follows:

Frequency with which defects in eggs were mentioned by 155 persons who declared eggs unfit for poaching or frying

<table>
<thead>
<tr>
<th>Defect</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yolk</td>
<td>104</td>
</tr>
<tr>
<td>Yolk merely mentioned</td>
<td>47</td>
</tr>
<tr>
<td>Blood clot or meat spot</td>
<td>21</td>
</tr>
<tr>
<td>Bad color, dark spot</td>
<td>13</td>
</tr>
<tr>
<td>Mottled yolk</td>
<td>11</td>
</tr>
<tr>
<td>Yolk broke</td>
<td>10</td>
</tr>
<tr>
<td>Would not stand up</td>
<td>1</td>
</tr>
<tr>
<td>Stuck to shell</td>
<td>1</td>
</tr>
<tr>
<td>White</td>
<td></td>
</tr>
<tr>
<td>Runny, watery</td>
<td>30</td>
</tr>
<tr>
<td>White merely mentioned</td>
<td>26</td>
</tr>
<tr>
<td>Odor</td>
<td></td>
</tr>
<tr>
<td>Taste</td>
<td>35</td>
</tr>
<tr>
<td>Germ development, fertile</td>
<td>12</td>
</tr>
<tr>
<td>Rotten</td>
<td>3</td>
</tr>
</tbody>
</table>
From these responses it would appear that consumers are much more aware of defects of the yolk than they are of defects in the white.

In study (Q-1-W-40) the farm women were asked not only how they judged the freshness of an opened egg, but immediately following were asked: "what kind of eggs do you consider unfit for home use?" In many cases the answer was the converse of the previous answer. The most frequent answers given were: old eggs, or eggs which are stale or smell bad. Next, in order of frequency, were: broken yolk, blood clot eggs, white runny and cloudy, dirty eggs and others.

Taste and odor

These qualities in eggs are extremely important to consumers in spite of the relatively low number of consumers mentioning them in connection with freshness or staleness of eggs. Although flavor and odor standards have been developed for some foods, measures for shell eggs have not developed for other than laboratory use. Since the shell must be broken for the measurement of flavor and odor of shell eggs, only if lots of eggs are relatively homogeneous would it be advisable to sample eggs for flavor and odor commercially.

From the above discussion may be observed the frequency with which consumers mentioned odor and flavor when describing the freshness of

unfitness of eggs. In both cases, odor was mentioned more frequently than flavor.

Cornett asked housewives to describe the flavor which they preferred. And as might have been expected, language difficulties rendered the results quite meaningless:

Flavor seemed rather difficult to describe. In 1928 there were 237, or 59 per cent, who described the desired flavor as mild; 23, or 6 per cent, stated they preferred a strong flavor; 28, or 7 per cent, used the word "sweet"; and a number of other terms were given. In 1932 there were few who expressed an opinion on flavor. Only 16, or 33 per cent, desired a mild flavor; 2, or 4 per cent, stated they preferred a strong flavor; 4, or 8 per cent, used the word "sweet"; and 17, or 35 per cent, preferred a "fresh" flavor. In the villages, in 1928, 17, or 57 per cent, gave mild as the desired flavor. In 1932 no mention was made of flavor. (p. 18)

Since flavor and odor are in part a result of the feed of the hen, it seemed appropriate to ask the farm women who would have some information on this matter whether they had noticed differences in flavor of eggs which might have been caused by feed. In study (Q-1-W-40), 1168 farm women were asked these questions: (1) Have you noticed any difference in flavor of eggs which may have been caused by green or other feed? Yes - No. (2) What flavors? (3) What other things have you noticed that cause differences in flavor of eggs? Of the number (81 per cent) who replied to the first question, one-half, or 474, reported that they had noticed flavors in eggs traceable to feed, and half had not. Of the 474 reporting that they had noticed flavors traceable to feeds, 347 women in answer to the next two questions reported noticeable flavors.
Since the flavor is most easily described in terms of its likely cause, e.g., an onion taste is probably caused by onions, the flavors were so described by the women. The frequency with which the women mentioned each flavor or cause of flavor is given below:

<table>
<thead>
<tr>
<th>Flavors</th>
<th>Frequency reported</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onions</td>
<td>111</td>
</tr>
<tr>
<td>Stronger (because of green feed)</td>
<td>83</td>
</tr>
<tr>
<td>Greens or grassy flavor</td>
<td>66</td>
</tr>
<tr>
<td>Tankage</td>
<td>57</td>
</tr>
<tr>
<td>Sweet clover and soybeans</td>
<td>23</td>
</tr>
<tr>
<td>Feed</td>
<td>20</td>
</tr>
<tr>
<td>Dip</td>
<td>19</td>
</tr>
<tr>
<td>Potatoes with sprouts and vegetables</td>
<td>10</td>
</tr>
<tr>
<td>Cold storage</td>
<td>7</td>
</tr>
<tr>
<td>Age</td>
<td>5</td>
</tr>
<tr>
<td>Mash</td>
<td>4</td>
</tr>
<tr>
<td>Cod liver oil</td>
<td>3</td>
</tr>
<tr>
<td>Sulphur</td>
<td>2</td>
</tr>
<tr>
<td>Stagnant water</td>
<td>2</td>
</tr>
<tr>
<td>Spray in hen house</td>
<td>2</td>
</tr>
</tbody>
</table>

Suspecting that persons' preferences for shell color may in part be related to the flavor thought to be associated, (in study Q-l-N-40) 1166 farm women were asked specifically: "Have you noticed any difference in taste between white, cream or brown shelled eggs? Yes, No." Of the 1011 women reporting only 13 per cent reported that they had noticed any difference. (In Johnson county, 38 per cent of the leaders reported they had noticed a difference. This group was highest in percentage of persons with preference for shell color (66 per cent), with 94 per cent of those with a preference preferring brown shelled eggs.
The women were also asked: "Have you noticed any difference in taste between yolk color of these eggs?" To this 860 or 74 per cent of the women replied. Thirty per cent of the women replying reported they had noticed a difference. The Johnson county leader group was again atypical, with 56 per cent reporting a noticeable difference. They expressed a higher percentage of dislikes for light colored yolks (73.3 per cent), and a high preference (44.7 per cent) for a darker yolk, medium dark, than any other county group. This question was repeated in study (Q-l-W-41) and of the 710 women asked, 79 per cent or 559 women reported. The division was half and half as between persons noticing a difference and those not noticing a difference in taste.

In support of the suspicion that yolk color and shell color preference is indirectly and in part an expression of preference for eggs of desirable flavor and odor, Corbett reports that in Providence of the 53 persons who in 1928 stated a preference for white eggs, 13 gave as reasons for their preference that white eggs are fresher and 5 that they taste better. In 1932, 44 preferred white eggs and 11 gave "better taste" and 1, "fresher" as their reason. In 1928, 206 preferred brown eggs, 15 giving "better taste" and 6 "fresher" as their reason. In 1932, 246 preferred brown eggs, 19 giving "better taste" and 2 "fresher" as their reason. These data are more significant if it is realized that the individuals may have been considering "taste" when they gave as their reasons for certain shell color preferences:
"yolk color," "better egg", or "richer" and even "appearance" and "preference", the other more frequent reasons given.

Ballow reports:

The egg with a light colored and milk flavored yolk is in demand in New York for table use. This is especially true of housewives who have children; unless the yolks are mild, it was stated, children object to them and will not eat them. Many housewives apparently will pay almost any price rather than serve eggs that will be unpalatable to children. The light colored and mild yolks are associated with white shells in the opinions of many New York housewives. (p. 48)

Cron reports:

Brown shelled eggs were preferred because they were richer or because they were believed to have a darker yolk and stronger flavor that was greatly desired "in cakes". (p. 157)

Preferences as related to uses for eggs

Corbett reports that Providence housewives used 44 per cent in 1928 and 40 per cent in 1932 of the total eggs for cooking and baking purposes. Holt reports that consumers interviewed used 40 per cent of their eggs for cooking and baking. Cron asked: "Do you use eggs mainly for eating or cooking?" Only one-third reported "eating" as a major use of eggs. The proportion of colored families using eggs mainly for cooking was double that of the white families.

These data give a rough picture of the proportion of eggs used for cooking purposes. Qualities desired for table eggs may not be the same as the qualities desired for cooking eggs. And certainly the type of egg required for poaching is much more restricted than that required
for scrambling. Do consumers have different preferences for different uses?

Do consumers buy and use the same quality eggs for all purposes? Corbett asked the women in Providence: "Do you buy less expensive eggs for cooking?" In 1928 29 per cent and in the depression year of 1932 36 per cent said they did purchase less expensive eggs for cooking purposes. Also, in 1932 the responses ranged from 21 per cent for the high income group to 39 per cent for the low income group, and 47 per cent for the persons of southern European origin. While in 1928 there was no relation of response to income, and the lowest response of 20 per cent was given by the persons of southern European origin.

It may be expected that replies to this question will be influenced by three factors: (1) Whether or not the market offers consumers a choice of quality. If many grades are offered in stores, consumers can choose from among them the qualities desired; if one quality only is offered, choice is limited to at best "between store" choices. (2) A related point, if the eggs are not graded and labeled, use of consumers' discretion and judgment in purchasing is inhibited. (3) The income of the individual relative to the general level of egg prices should influence consumers' proneness to make distinctions as to qualities. If prices are low and incomes high, consumers may not be expected to purchase a lower quality egg simply to save on price, and (4) a related point, if the price differentials as between qualities offered are not great, consumers will be less inclined to make a distinction and tend to buy for cooking the eggs found satisfactory for table use.
A similar question was asked by Timmons and Sowell in Tampa: "Do you buy one quality for one purpose?" to which 76 per cent replied "no", 11 per cent failed to answer and only 13 per cent said "yes". The "yes" replies were distributed as follows: low income, 10 per cent; medium income, 17 per cent; Negro, 13 per cent; Latin and high incomes, 3 per cent each. And in response to the question: "Do you buy different qualities at different seasons?" 94 per cent either failed to answer or said they did not. The exception was the Negro families, 23 per cent of which reported purchasing different qualities at different seasons.

In study (S-5) the following questions were asked: "Do you buy the same quality eggs for poaching and frying as for baking? If not, what distinction do you make when buying? If not, what distinction do you make when using?" Of the 713 consumers asked the first question, 1

1In a previous question the housewife had been asked to itemize the qualities of eggs the retailer had on hand, and from these answers it is evident that either most retailers in Des Moines handled but one grade of egg (generally country run) or the housewife was unaware of qualities of eggs the merchant did handle. As a result, these questions were not found suitable for Des Moines consumers. From a random sample of 10 per cent of the Des Moines stores (S-4) it was found that 60 per cent had no label, sign, or statement giving any sort of description of the eggs offered for sale. The terms used by the remaining 40 per cent generally did not give much information. It was also found that in November when prices are generally the highest, when there exists a greater demand for a lower priced egg, only 27 per cent of the stores sampled carried 2 or more qualities and only 5 per cent carried 3 grades; no stores carried four grades of eggs.
732 persons reported that they purchased the same eggs for poaching and frying as for baking or failed to give sensible replies when asked what distinction they made in buying or using different quality eggs. The distinctions were being made by the 51 persons either in buying or using. These were, in order of frequency: "Best for poaching and frying, poorer for baking"; "country eggs for table use, store eggs for cooking"; "large for eating, small for baking"; "higher price for baking, cheaper for baking"; "shell color"; "yolk color".

Liston followed a similar procedure by asking household buyers if they usually bought different eggs for different uses. The results are equally unsatisfactory. Of the 117 reporting, 20 housewives well distributed among the three income levels, said they bought different eggs for boiling or poaching than for cake-baking. These persons were asked to describe these qualities of eggs: "Fresh, large, brown eggs were preferred for the table but not necessarily for cake baking. About one-half of those who bought for two purposes commonly used Western fresh eggs for baking. Descriptions of cooking eggs were vague and no one quality factor was outstanding." (p. 14) The description given by the 97 persons, who bought eggs for all purposes, was equally vague: over two-thirds used the term "fresh" or "strictly fresh"; one-third said theirs were "large"; brown shell color was preferred; such terms as "stood up well", "beat up well", "graded", "candled", "local", "yolk deep yellow", "infertile" and "no spots" were also mentioned.
After the housewife had been permitted to describe in her own words the qualities she considered when making her egg purchases, the enumerator directed attention to certain specific quality factors and asked the housewife the qualities she preferred for specific uses. The responses are tabulated by Liston showing frequency of response to the various quality factors as between persons who purchased eggs for table use, for cooking, and for general use. The important results are as follows:

**Age** - most persons mentioned one week or less for table use, while for cooking use, they were uncertain. **Size** - Large eggs were referred to most frequently, although "medium" and "any size" were most frequently mentioned for cooking. **Shell color** - "Either color" was most frequently mentioned, although brown was much more referred to than white for general use or for table use. **Yolk color** - "Medium" was referred to most frequently, although a large number were uncertain for eggs purchased for general use or for cooking. **Whites** - Chiefly thick white was referred to for general or table use, while a thin white was mentioned most frequently for cooking. **Infertile** - Most persons were uncertain. **Yolk** - Eggs used for table use were most frequently referred to as "rounded" while some persons were uncertain and some said "flat" for cooking. These answers are fairly well in agreement with other reports.

In study (Q-1-W-40) the farm women were queried relative to their discrimination in use of eggs. They were asked: "Do you use the same eggs for poaching and frying that you use for baking? Yes, No. If not, what kind of egg do you prefer for poaching? for frying? for custards?"
It is to be recognized that rural women are extremely fortunate in that they are close enough to the source of supply that most eggs are fresh, or the reason why they are not fresh is known to them. Hence, because of the favored position the farmer is in, such a question has limited usefulness. The results, however, are quite interesting. Of the 1168 questioned, 1071 replied to the first part of the question and of these only 114 (or 11 per cent) stated that they did not use the same eggs for poaching or frying. Fresh or 1-day-old eggs were preferred for poaching and frying, but for custards a much smaller number preferred fresh or one day old eggs and the largest number preferred 2-3 day old eggs or simply "older" eggs, and a fairly large number preferred dark or darker yolk (to give color to the custard).

Presuming that persons close to egg production and with an understanding of eggs might be less squeamish relative to such objects as blood spots or meat spots occasionally found in eggs, in study (Q-1-W-40) the 1168 rural women were asked: "How many eggs delivered to market were rejected and returned to you because of blood clot or meat spot last week? Do you ever use such eggs for poaching or frying? Yes, No. For baking? Yes, No." Only 1 per cent reported that such eggs were returned, nevertheless 72 per cent (or 826) reported on the second part and 68 per cent (or 800) on the third part of the question. Of these persons reporting to the last ten parts of the question, only 19 per cent said they used such eggs for poaching or frying, while 33 per cent said they used them for baking.
In a similar vein, 710 producers in study (Q-1-W-41) were asked: "Do you try to use all cracked and dirty eggs at home?" (rather than sell them on the market), to which question 575 reported. Of these 96 per cent said they did try to use such eggs.

Yolk color preference and use. In two studies the consumer has been asked specifically whether their preference for yolk color is related to the use which is made of the eggs. In study (S-5) 783 Des Moines consumers were asked: "Have you ever noticed much difference in the color of the yolk? Yes, No." Most of the consumers replied that they had noticed a difference in yolk color. They were then asked a series of three questions: "Are all yolk colors equally suitable for poaching and frying? Yes, No. For custards? Yes, No. For baking? Yes, No." Yolk colors were found equally suitable for poaching and frying by 53 per cent; for custards, by 57 per cent; for baking, by 69 per cent. This gives further evidence of consumers' greater sensitivity to quality factors of eggs for use in poaching or frying. Although there were a number of persons who commented that they generally wanted dark yolks for cake and custards, apparently the eggs purchased by the majority of them were dark enough, in that consumers were less concerned with yolk color for these uses.

In study (Q-1-W-40) a similar question was asked of the 1168 rural women in Iowa: "Are you particular about shade of yolk color for baking eggs? Yes, No; for frying and poaching? Yes, No." Of the women
asked, approximately 70 per cent answered both questions. And of those answering, one-third said they were and two-thirds said they were not particular about the yolk color of eggs used for baking. Approximately the same proportion respectively said they were or were not particular about the yolk color of eggs used for poaching or frying. Either the question as worded had no meaning or farm women are equally particular with their baking as they are with their table eggs. It seems highly probable that they prefer dark colored yolk for both uses. The following will tend to support the latter statement. "What color of yolk do you like? Light, Medium light, Medium, Medium dark, Dark," was the next question asked. Most of the women answered "medium". Inasmuch as there is a tendency for persons to prefer things which are mild and medium and dislike the extremes it may be appropriate to discount the fact that 41 per cent stated that they preferred the medium color and place more emphasis on the fact that 80 per cent of the preferences were distributed between medium and dark. The next section will be concerned with further studies of yolk color preferences.

Yolk color preferences

The difficulties involved in attempting to measure yolk color preferences have already been discussed. First, there is the language difficulty, and an absence of absolute standards by which concepts of color can verbally be transferred from one person to another. While conducting the Des Moines survey the author proved to himself the existence

1Following this question concerning their likes, consumers were asked (228) to designate those colors they disliked. And 89% stated a dislike for the extremes, "light" and "dark" with "light receiving the larger number of dislikes.
of this difficulty by asking persons to state their color preference, first in words, and then by selecting the preferred color from an actual display of yolk colors. Persons who said that they preferred light yolks selected from the display as the preferred color every color from light to dark. The second difficulty lies in the arrangement of the items from which the person is to choose. Reference has already been given to the experimental display used at Iowa Farm and Home Week (S-7); which demonstrated that it is possible to show an apparent change in preference by changing the display model. And in the discussion immediately preceding this section it was demonstrated that persons tend to select the middle and avoid extremes when giving their preferences. The discussion here will no longer concern the difficulties involved in attempts to measure yolk color preference, but will be restricted to presenting forthrightly the results secured from the studies made.

Yolk color preferences as expressed in words

Corbett asked housewives what yolk color they wished, permitting the housewife free range of expression. The answers were then edited: "Such replies as 'medium' and 'bright' were placed in the light and medium class, while 'red', 'rich yellow', 'orange' and 'golden yellow' were placed in the dark class." (p. 18) The results secured are as follows:

<table>
<thead>
<tr>
<th>Population</th>
<th>Year</th>
<th>Light &amp; medium color</th>
<th>Dark color</th>
<th>No preference</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Providence</td>
<td>1928</td>
<td>43</td>
<td>36</td>
<td>21</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>1932</td>
<td>75</td>
<td>12</td>
<td>13</td>
<td>100%</td>
</tr>
<tr>
<td>Villages</td>
<td>1928</td>
<td>25</td>
<td>43</td>
<td>32</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>1932</td>
<td>70</td>
<td>27</td>
<td>3</td>
<td>100%</td>
</tr>
</tbody>
</table>
Corbett attributes the increased preference for the light to medium class in part to the increased emphasis given in advertising and educational work to the desirability of light yolks. "These figures show that the recognition of light yolks as an indication of good quality in eggs had advanced considerably in the four-year period 1928 to 1932." (p. 18)

Timmons and Sowell concluded from their investigation in Tama that 15 per cent preferred light; 32 per cent "medium"; 43 per cent "dark"; while 9 per cent had no preference. The Latin and Negro showed the highest preference (60-70 per cent) for "dark" yolk; 25 per cent of the high income group stated they had no preference. The hotels and restaurant managers indicated a preference (44 per cent) for "dark" yolk eggs, while 25 per cent indicated a "light" yolk color, 17 per cent a "medium" and 11 per cent no preference. Retail store managers "indicated that only a small proportion of the customers specified definitely any yolk color." (p. 7).

Cron, et al. found in Baltimore that among the white families 37 per cent preferred "dark yolk", 31, "light yolk", 28 per cent had no yolk color preference, and 4 per cent stated that they eat the light and cook the dark yolked eggs. Whereas among the colored families, 65 per cent preferred the dark yolks.

The results of study (Q-1-W-40) have been cited above. (See p. 44) There it was stated that 80 per cent of the rural Iowa women who have a preference, preferred a "medium" to "dark" yolked egg.
Yolk color preferences as expressed in terms of color standards

Thomsen and Winton of the Missouri Agricultural Experiment Station conducted an investigation of consumers' yolk color preferences in New York City. They presented to chain store customers three broken out eggs of defined yolk colors.

The yolk colors used were: "Light" yolked eggs produced in Pacific Coast states and Utah and purchased in New York City; "Medium" and "dark" yolked eggs produced under controlled feed conditions by the Missouri Agricultural Experiment Station and shipped to New York City. The colors are defined in terms of Munsell color readings. However, color readings on the Sharp scale have been taken by this writer from the color photographs of the eggs used in the display. The readings were: Light, 40; medium, 55; dark, 75. These colors are given in terms of the Sharp scale here because this scale was used in the other two investigations to be cited.

The findings are as follows: "Slightly more than one-third of the consumers interviewed expressed a preference for light yolks, one-quarter for dark yolks, one-fifth for yolks of medium color, and the remaining fifth had no preference." (p. 23)

The Scandinavian, Polish, German and Irish expressed the highest preference (Table 3) for the light yolks; the Negro, the highest for the dark yolk color. The Jewish and Italian did not show as high a preference for the light yolks as might have been expected.2

1 For "Methods of measuring egg yolk color which have been developed." Cf. Wilhelm, L.A., op. cit. p. 590.

2 Cf. quotation from Ballow. p. 170, this thesis.
Little, if any, relationship existed between the yolk color preference and the estimated purchasing power of the individuals making the choice.

It has been mentioned above that the title of this study is misleading. Also the conclusions drawn from the study are likewise misleading. Actually the study sampled at best only the chain store customers. Chain stores quite likely have standardized their merchandise to sell to masses of people and it may be presumed that the chains were not in position to cater to the few or many persons who have an extreme preference and who have the means for searching for a source of supply to satisfy their atypical demands. Hence, these persons were, by force of circumstances, excluded from the population sampled. It is quite probable that these are the persons who are willing to pay the premium which this bulletin concludes from its findings as being unjustified. Had the bulletin included information concerning the relative quantities of these varied colored yolked eggs being supplied the chain store customers say, the volume of Pacific Coast and Utah eggs supplied through the chain, the criticism may have been found unwarranted. Also it is questionable what biases are involved in this type of display used and how important the biases are.

Of the women attending Iowa Farm and Home Week (S-7) 132 selected from a color range measured in Sharp scale units of 25, 35, 45, 55, and 65, yolk color 55 as the most preferred color. And 101 selected color 65 from a color range of 25, 35, 45, 55, 65, and 75. Of the 132 women, 62 per cent stated they produced all their eggs; 55 per cent of the 101
women were producers. There was no significant disparity in the preferences of the "producers" and "non-producers".

Women in the city of Des Moines (S-5) when presented with a yolk color display containing 6 yolk colors of approximately 20, 30, 40, 50, 60, and 70 as measured in Sharp scale units, selected colors 50 and 60 as the preferred colors.

What do these colors mean in terms of normal egg production?

Wilhelm in a personal letter referring to a color chart of 24 colors given in "Poultry Pointers" No. 29, published by the Washington Extension Service, states:

"... At the present time many of the Pacific Coast eggs will range in color from "4" to "6". I believe the average color produced out here is between "10" and "12", as compared with "14" to "16" for the Middle West. Eggs produced under general farm conditions where the birds are allowed to run at large and eat as much green feed and yellow corn as they desire may range in color from "18" to "24"."

In terms of Sharp scale units, as read from the color charts presented in the bulletin referred to, this means that spring Pacific Coast eggs are color 25 or lighter; the average Pacific Coast egg is between 35 and 40; the average Middle West egg is 50 to 55, but in the spring Midwest eggs of colors 70 and 75 are not unusual, and may range as dark as 80 or 90.

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Yolk color has commercial significance not only because of consumers' preference, but also because of the method used commercially for determining egg quality. This method tends to discredit the dark yolk eggs. Visibility of the yolk of the egg as it is twirled before the candle is one of the bases for determining the grade of the egg. The shadow which the yolk casts is in part related to the deepness of the color of the yolk, which in turn is in part a function of the hen's feed. In the Midwest green feed and yellow corn is the economical feed. Commercial producers on the Pacific Coast and, later, those on the Atlantic Coast recognized that eggs of otherwise equal quality but of darker yolks are lowered in grade as seen before the candle and have substituted other feeds which produce a lighter yolked egg. The Midwestern interests have argued on the one hand that consumers do not prefer the light yolked egg but prefer a golden yolked egg, and on the other, that the grade specifications should be changed.

\[1\] Stewart, Cans and Sharp. The relation of the color of yolk to the interior quality as determined by candling and from the opened egg. U.S. Egg & Poultry Magazine, Vol. 39, no. 10. Oct. 1932. "It is probable that discrimination has been made against eggs of deeper yolk colors, even when equivalent changes in interior quality are not present." (p. 5)

\[2\] Almquist, H.J. Relation of candling appearances of eggs to their interior quality. Calif. Agr. Exp. Sta. Bul. 561. Nov. 1933. "Correlation coefficients indicate that there is a strong trend of yolk shadow with yolk color and that yolk color in normal fresh eggs can be estimated with moderate accuracy by candling." (p. 3)

\[3\] Thomsen, F.L. and Winton, Berley, op. cit. Cf. p. 8-9. Yolk visibility most capable of objective determination before the candle.


\[5,6\] Thomsen and Winton, op. cit. p. 22-23. Summary and conclusions.
Shell color preferences

Shell color preference is the subject of much popular discussion. It is a quality factor for which the consumer can well express himself in the market. It is a visible factor which, together with shell condition and size, constitutes one of the few judgments the consumer can exercise when purchasing eggs. For this same reason, perforce, it is not a quality factor which needs much study to determine its eligibility for inclusion in grade standards. The studies which have been conducted have found what appears to this author to be a sufficiently large number of persons with either a brown or white egg preference to warrant consideration of a separate grade classification for shell color. In Des Moines, 58 per cent of the housewives stated they had no shell color preference, but studies conducted in the east show a larger percentage of persons who have either a white or a brown shell color preference. If eggs were graded as to other factors so that the consumer would feel that her choice of shell color was not also a choice of some interior quality factor, it is questionable whether the preference for shell is sufficiently strong to warrant a premium price. Corbett reports that only 4 per cent of the housewives either in Providence or in the village would pay a premium for shell color.

Of interest is the "why" of shell color preference. Cron in Baltimore, Thomsen and Winton in New York City, and Timmons and Sowell in Tampa report a Negro preference for brown eggs. Corbett and Liston in the east (Providence, Rhode Island and Burlington, Vermont) found that those who had a
preference predominantly preferred brown eggs. Likewise, Timmons and Sowell discovered a brown shell color preference among all groups in Tampa, Florida except in the high income group. And in studies (3-5) and (Q-1-W-40 and 41) it was found that consumers in Des Moines and rural women in Iowa preferred brown eggs to white in a two to one ratio, although most persons expressed no preference.

Thomson and Winton conclude from their investigations in New York City that slightly less than one-half of the consumers interviewed expressed a preference for white shells, although 30 per cent preferred a brown shell and only 21 per cent expressed no preference. Cron in Baltimore found that among the white families there was a greater preference for white eggs. The retail merchants, however, estimated the white shell color preference of consumers to be much higher. The white shell color preference by race or nationalities in New York City is most intense for the Scandinavian; the Polish, Jewish and German and Irish are above average for the city. The Italians and American expressed less preference, while Negroes expressed least preference for white shell color. These findings fail to corroborate the generalizations made by Ballow, however reasonable they may sound:

The reason why housewives pay more for white eggs than for brown apparently are many and varied. Some of them do not know why; others seem to associate freshness with white shells. The Jews, especially orthodox Jews, prefer white eggs for religious reasons. And the Italians prefer white eggs largely because of custom, since in their native country, where the Mediterranean breeds of chickens are found, only white eggs are produced. The Italians also use large quantities of eggs in drinks where the pale yolk, common to white eggs commercially produced, is a factor in their demand. Other nationalities do
not appear to be particularly prejudiced in favor of white eggs, but in Metropolitan New York the Jews and Italians make up a very large part of the population. (p. 47)

Corbett asked the consumers who stated a shell color preference what was the reason for their preference. Of the 206 persons in 1928 who gave a reason for preferring brown eggs, 43 stated because the yolks were darker and richer, 36 said brown eggs had more food value and 15 reported they taste better. In the next year, the largest proportion of reasons given were "preference", "appearance", or other personal reasons, the full meaning of which is nebulous. A sufficient number failed to express a preference for white eggs, or give reasons for their preference to warrant a more detailed summary than that approximately one-half based their reason on taste, food value, and yolk color.

Summary of consumers' egg preferences indicated in consumer surveys

1. Sufficient number of consumers express a shell color preference to warrant the consideration of a separate grade classification for shell color. (A similar classification is also needed for egg size and for shell cleanliness).

2. The Midwest preference for yolk color is for a color similar to that of eggs produced in that area, while one-third of the New York City consumers interviewed in chain stores preferred a much lighter yolk.

3. Consumers are aware of the thinness of the white, the shape and condition of the yolk, and the presence or absence of foreign objects such as blood clots and meat spots as criteria for discerning
the desirableness of eggs. Tests of quality and grade specifications based on these quality factors will reflect reliably consumer preferences. Also the ordinal relation of the preferences of the qualities of the egg characteristics is relatively homogeneous.

4. Consumers are more particular concerning the freshness (as measured by the laboratory technician) for poaching and frying than they are for cooking uses. There is evidence that the color of yolk is considered by many consumers for cake making and for use in custards and in such other uses which transmit the color of the yolk into the final product.

5. It is questionable, however, whether yolk color preference for eggs used in table uses is different from the color preferred for eggs to be used in cooking. There is evidence that the color of the yolk tends to discredit the acceptability of the egg as presently measured commercially, and new measures should be developed which will permit distinguishing the causes for yolk visibility when candling; yolk color or watery white.

6. There is reason to believe that existing preferences are in part a result of misinformation on the part of the consumer and market agents, and in part because consumers interested in purchasing a desirable product must grasp whatever criteria are available, despite their inadequacies. And that if more reliable measures of the qualities preferred become available, certain of the preferences of consumers will lose significance, e.g., shell color preferences, attitude toward storage eggs and processed eggs.
7. Preferences stated for storage eggs, held eggs, processed eggs, shell treated eggs, etc. have not been discussed in that these are but means by which eggs of desired qualities may be supplied. The terms are colorful; the words have been abused in commercial usage. The results which would be secured by asking consumers directly about these processes would be of little value.

Market Data Surveys of Consumers' Egg Preferences

No studies of the quantity-quality relationship type of market data survey to the knowledge of the writer have been made for eggs. The market data surveys which have been made of eggs concern price-quality relationships. These are essentially of two kinds: one which measures the association of price and quality of eggs sold at retail; the other, a study of the price premiums paid for different qualities of eggs sold at egg auctions.

Both the method and the findings of the market surveys which investigated consumers' preferences for eggs will be summarized.

Auction Surveys

Auction surveys are of significance in that the majority of the buyers at these auctions buy for retail stores, hotels or restaurants or are jobbers or hucksters who sell directly or indirectly to consumers, and thus tend in some measure to reflect consumers' preferences.
"Factors affecting prices at two Connecticut egg auctions" were studied by E.A. Perregaux, B.C. Wright and R.G. Bressler. The price data were selected at random from sales data of two cooperative auctions for the first four sales in the months of July, October, January and April, 1935-36. The information considered was: price, the gross weight per case of eggs, shell color, number of cases per lot and the grades under which the eggs were sold -- "Specials", "Extras" and "Connecticut Gathered". The Connecticut Gathered eggs were ungraded, but were identified by the producer's number so that the source of supply was known. And the majority of the eggs in this grade were of the "Extra" grade or better.

For each period prices paid were correlated with weight, designated grade and color of the eggs. Prices were found to be highly associated with weight, varying in degree of association by the seasonal shifts in supply; quality and to a lesser extent color was also associated with price. It is not surprising that most of the variation in price was found attributable to weight because the eggs handled by these auctions were generally of high quality.

Other studies of auction sales have shown that weight and, to a lesser degree, quality of eggs have an important bearing on the price. The studies to be cited have secured their data from published U.S.D.A.

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reports of prices paid at the various auctions. The eggs at these auctions are graded according to U.S. Government specifications, the quality grades being U.S. Extra and U.S. Standard and the size grades being large and medium.

Cray\(^1\) concludes that the premium paid for egg size at three Ohio egg auctions during the year September 1, 1939 to August 31, 1940 was approximately twice as great as the premium paid for interior quality. He also reports similar results from studies made at the Wooster egg auction, Wooster, Ohio, in 1935 and later at the Doylestown Egg Auction, Doylestown, Pennsylvania.

Gusler\(^2\) using data of prices paid at the auctions of Wooster and Versailles, Ohio and Yorkville, Illinois, also concludes that the largest premiums were paid for size. He also states that the premiums for size were greater for eggs of the better quality and that they were also greater during the fall months when larger eggs are less plentiful. The premiums for egg quality were higher in summer and fall when the average quality of eggs is lower and higher quality eggs are scarce. The premium for white over brown shelled eggs was greater during most of the year than was the premium of "extras" over "standards". Gusler writes:

"The fact that quality premiums were not greater probably is because standards are relatively good eggs and because grading is less certain as to interior quality than as to shell color." (p. 2) Also, farmers


who sell through these auctions are known to take good care of their
flocks and the eggs after laid.

From these studies have come advice to suppliers of the market.
Both Gray and Gusler conclude that farmers should give serious consider-
atation to their breeding program, in that egg size is primarily an inherited
characteristic. Concerning advice to farmers as to their quality program,
Gray concludes that farmers should follow management practices in the
handling of their eggs so as to insure the least amount of deterioration.
Gusler, on the other hand, rests judgment as to the economic advisabil-
ity of such effort upon the farmer himself:

The fact that premiums for interior quality as between
extras and standards are no greater explains why some producers
who sell through auctions, especially farmers with the smaller
flocks, say that the price difference hardly warrants the
extra work, care, and cost required to produce the top grades.
Concerning this point, each producer probably is in the best
position to judge for himself. (p. 11)

These studies are designed merely to inform producers as to what
possibilities lie in store for them in terms of price gains they may
expect to receive if they alter their farm management practices and produce
the quality of egg preferred. These data serve to summarize for the
farmer a type of outlook material which enables him to allocate his
resources more intelligently to produce what consumers are willing to
pay for.

They represent the manner in which economic educational work may
be undertaken with farmers once a grade program and better market statistics
are made available. Gray's advice reflects the general type of extension
service advice, "produce for quality whether it pays or not," while Gusler's remarks reflect another attitude. He reports: Here is what the market will pay. The Extension Service recommends the following practices which you must adopt if you wish to supply this quality of egg. The estimate of cost for changing your production and marketing practices would be ? And how does this compare with the increase in revenue you might expect in view of these premiums? Would it not pay you to change your production and marketing practices?

They also present proof that grade, size and shell color are distinguishing egg quality factors to buyers of eggs for resale to consumers. Hence, it may be concluded that classifications based on these quality factors would be defensible.

Retail Store Surveys

Introduction

Several surveys have been made which relate the retail price charged for eggs to the quality of eggs sold. None of them, however, are particularly informative since major limitations confront such surveys.

Some of the surveys concern the price-quality relationship for eggs purchased from a group of stores sampled at a certain date; others consider the relationship over a time period. Those studies which relate price to quality over time secure somewhat spurious results. The variables are jointly related inasmuch as they all tend to vary considerably
over time. Hence, the data are not independent, and the use of statistical measures of relationship which are applicable for independent data cannot be used without making certain adjustments for this serial correlation.

It has been mentioned above, in pages 93 to 97, that one of the serious limitations of the market data survey lies in the fact that in some markets it is difficult for consumers to express their preferences at the time of their market selections. This limitation applies to the studies which have been made of eggs. In contrast with the auction data cited above which were based on prices and established quality grades which were the basis for trading on those markets, the retail store data are secured from markets in which there is little or no uniformity of grading. The one possible exception to this statement is the study made by Gans in New York City in the years 1931 and 1932. In this market a compulsory egg grading law had been in effect since 1929, antedated by a compulsory egg grading law of 1927 which had permitted an "unclassified" grade in addition to the "A", "B", "C" grades. Despite the law, however, as large a proportion as 35 per cent of the dozens of eggs bought in the market and analyzed in this survey carried no grade mark whatsoever.

Another limitation mentioned above is that the quality measures used by the investigator may differ from those made available to or used by the consumers. For special reference to the egg surveys the Gans study may again be cited. Gans reports that in one year only 20 per
cent of the eggs examined, which carried a grade mark, agreed in
grade with the grade as determined by the inspector. (p. 48) And
"As far as the price which the consumers paid for the eggs was concerned, 
the grade on the container was a much more important factor than the 
grade of the inspector." (p. 49)

The other limitations outlined in the earlier section are applicable
to the studies which have been made of eggs. But since they are com­
monly recognized, and no problems peculiar to eggs appear which have 
not been mentioned elsewhere, there is no need to cite them with refer­
ence to the egg market studies which have been made.

Summary of studies

Since the reliability of the results is so dependent on the 
methods used in obtaining and analyzing the data, the studies will be 
summarized separately and in chronological order. No attempt will be 
made to summarize them by subject matter.

Benner, Claude L. and Gabriel, Harry S.  Marketing of Delaware eggs.  

This study is the earliest made of the relationship of price to 
various quality factors. The purpose was to discover to what extent 
quality was receiving recognition in the retail market in Wilmington, 
Delaware. The wholesalers in this market were buying eggs on a current 
receipt basis.
An attempt was made to secure one dozen of every grade of eggs sold in the city in every type of store. The investigators purchased 54 dozen of eggs on the same day in March, 1927. The eggs were graded, using U.S. grades, and numerical values were assigned to each grade.

Only 23 per cent of the variation in the retail price of the eggs was accounted for by weight of the egg, cleanliness, quality and type of store. And only 18 per cent of the variation in price was accounted for by shell cleanliness, weight, and quality, in the order of their importance. The authors speculate that other causes for differences in retail prices are shell color, the carton or package in which the eggs are sold, and probably most important, the margin certain merchants charge for handling eggs.


This study was undertaken to answer the question as to what quality factors consumers are willing to pay for. The need for the study purportedly grew out of discouraging attempts by the extension services of the New England States to carry the idea of quality to the consumer through building up consumer recognition of grades and their identifying marks such as labels and trade names. The authors had come to feel that either consumers "fail to understand the factors entering into a good grade of eggs versus a bad grade," or that "the factors which the supervisory authorities have considered in making up the grades are not the
factors really considered by consumers in buying eggs. Hence, this study attempts to discover whether any relationship between quality and price exists, and if there is a relationship to "determine the extent to which these quality factors affect price and the relative importance of each, if statistical measures are applied."

Eggs were purchased at retail from a selected sample of stores representative of the consuming areas in Massachusetts at three different times of the year (1928-29). Eggs were then scored as to external quality factors, e.g. cleanliness of shell, color, soundness of the shell, weight and range in weight; and as to internal quality factors, specifically, 5 classes of air space, 3 classes of yolk visibility and 3 classes of white condition. Each of these factors was given a score in order to permit of statistical analysis. The data for each time period and for each major type of store were analyzed separately.

In summary, the findings agree with what might be expected from results of other studies. Price was more directly associated with weight than with any of the other quality factors; and that this relationship varied in strength by seasons. The condition of the white and the yolk were relatively unimportant while air cell was more important as related to price. The air cell was more directly associated with price in November when storage eggs were on the market. The relative importance of the air cell arises not from consumers' preferences directly but from the emphasis commercial graders place upon it when judging the internal quality of the shell egg. The average quality
of "eastern" eggs was higher than that of "western" eggs, a result which arises out of the practice of selling good western eggs as "eastern" eggs. Branded and unbranded eggs were equally variable as to quality and price which signifies that consumers did not have available reliably graded eggs by which they could express their preferences.


The purpose of this study was to determine some of the quality factors which influence the consumer demand for eggs; to measure quantitatively the relationship of these factors to the retail prices actually paid for eggs in the market; and to determine the extent to which the present New York grade requirements reflect the consumer preferences for various quality factors. (p. 3)

The data were collected in the New York Metropolitan area by official inspectors of the Dairy and Food Bureau of the State Department of Agriculture and Markets. In the years 1930 and 1931, 2060 records were obtained, half of which were collected in January and the others in the months of December, February, March and April. In the following year, 1932, 886 records were obtained evenly distributed through the months of February, March and April.

The retail prices were found to be serially correlated and to follow wholesale price quotations rather closely in 1930-31. This was adjusted by expressing price as a deviation from a wholesale quotation. There was no trend found in the external quality factors to which these adjusted price data were related. No statement is made, however, relative
to the change in internal quality factors over this time period, a period in which it might be expected that quality could change decidedly. (Such a trend was found the following year) During the following year (1932) Gans did not find as close a relationship between the retail price and wholesale quotations. Hence, no adjustments for serial correlation were made in the data of the second year. The downward shift in retail prices he attributed in part to the downward trend of a composite index of interior quality of eggs.

A tremendous amount of energy and care was taken in the statistical manipulation of the data. Numerous linear and curvilinear regression equations have been solved and plotted. Multiple correlations have been computed and curvilinear and joint-correlation surfaces have been constructed. No statistical tests of significance have been made, however. Furthermore, there is some question as to what the number of statistically independent observations actually is.

Many of the more important limitations of this study have been presented; namely, the large percentage of eggs which carried grade marks, the inadequate relationship between the grade mark and the grade as determined by the official inspector, the inadequacy of candling as an accurate means for measuring the specific quality factors of eggs as broken out and as viewed by the consumer, the general variation of store services and margins, and serial correlation which persists in most egg data. Hence only those findings which seem to make sense to this author will be presented.
Pertinent findings of Gans' study:

1. Although consumers paid a premium for white eggs over brown or mixed eggs, when differences in quality were accounted for, approximately the same price was paid for eggs regardless of shell color.

2. Eggs with dirty shells were discounted in price.

3. Eggs of uniform shape received a premium over those lacking uniformity in shape, but no premium was paid for uniformity in size.

4. Eggs labelled as Grades B and C sold at a lower price than eggs of equal quality but unlabelled as to grade.

5. The grade mark contained on the package of the egg was more highly associated with price than the quality as measured by the official inspector. Consumers without doubt would be influenced in their market selection by the grade designation whether or not it was accurate.

6. All measures of interior quality were highly intercorrelated and all were related to price in the same direction. Hence, there is reason to believe that there is general conformity of opinion among some consumers as to what constitute desirable interior qualities.

7. The relationships between the weight, interior condition and price of eggs were both curvilinear and joint. In general relatively little premium was paid for size if the interior quality was low (signifying that some consumers have imposed a ceiling price per dozen above which they will not pay for weight unless quality was
up to a given standard. As both the weight and the interior quality increased, the rate of increase of the premiums decreased, signifying a ceiling price per dozen above which consumers would not pay as freely for increased weight or quality.

Wiseman, Ray C. 1937 study of the relationship of egg quality to the retail price of eggs in eight Ohio cities. (Division of Markets, Ohio Department of Agriculture, 1938.)

This publication presents the unanalyzed data of dozens of eggs purchased at specified dates in specified cities in Ohio. The grades used are the U.S. grades. The tabulation gives the distribution of eggs by price by grade for each dozen purchased. It also gives the average of eggs bought in each city the preceding two years.

Wiseman concludes from inspection of these data that there is a relationship between price paid and the quality received, "yet price is no insurance of either high quality or large size when used as a criterion in buying eggs."

These data as presented are not of much value, but are included here because the publications have been featured publicly in the development of government grading in Ohio.


The purpose of this study was primarily to apply a specific statistical method to the type of problem under discussion. The data
were collected in the City of Baltimore in connection with an egg market survey.¹ Once each month for 12 months in 1938 one dozen of each grade of eggs offered by 50 stores was purchased at retail. The eggs were eggs weighed and graded on the basis of U.S. grades. A score was developed for each grader, a system of premiums and penalty scores were developed for eggs which were larger or smaller than average. Thus, weight and quality factors are confounded.

Cron subjects these price and quality score data to an analysis of variance and covariance, considering as sources of variability: season, store and residue. The data by their very nature do not conform to the assumptions implicit in the method of analysis used by Cron. The data are not independent. And it is questionable whether the relationships measured are linearly related. The serial correlation in the data does not permit as full use of the tests of significance as was used by Cron, while an incorrect assumption of linearity merely means that a lower correlation coefficient was secured than had the data been fitted curvilinearly.

The results from Cron's analysis are of limited usefulness. After eliminating variation in the price and quality due to differences in season, the correlation between price and quality for all stores was .6853. That is, 47 per cent of the variation in quality is associated with the prices charged by all stores, the effect of season held constant. Hence, there is some relationship between price and quality in the Baltimore market.

It is interesting to note that when only the effect of season is held constant the correlation between quality and price was -.0293. This negative relationship reflects the situation that when the supply of eggs is most plentiful, in the spring, the quality is higher and the price lower than in the winter when the prices are generally higher and the quality lower.

These results serve to confirm the general belief that higher quality eggs are generally associated with higher prices.
CHAPTER VI. GRADING WITH RESPECT TO THE MARKETING OF IOWA EGGS

The purpose of this chapter is two-fold: (1) to give sufficient description of the grading and marketing of Iowa eggs to indicate the way the market functions in indicating consumers' preferences to producers; and (2) to include with such description an analysis of attitudes and influences which bear upon the development of grading in the market in Iowa and which must be considered when formulating a positive program for market reform with respect to grading.

Who Consumes Iowa's Eggs?

Well over 50 per cent of Iowa's eggs are marketed outside of the state. It is estimated that for 1940 only 31 per cent of all eggs produced in Iowa were consumed in Iowa; 5 per cent were used for hatching, while 48 per cent were shipped to the 4 major markets, New York, Chicago, Boston, and Philadelphia; and the remaining 16 per cent were shipped probably to southeastern states or accounted for as loss. These data are presented graphically in the pie chart, Figure 1 and in tabular form with references in Table 1. Also the importance of Iowa's production as a source of supply to the eastern markets is shown by the following data for 1941: 27 per cent of the eggs received at New York City, 26 per cent of those received at Chicago, 23 per cent at Philadelphia and 9 per cent at Boston were from Iowa. That is, in 1941 Iowa supplied 25 per cent of the eggs received at these four markets.

---

Table 1. Disposition of Iowa's Egg Production, 1940

<table>
<thead>
<tr>
<th>Destination</th>
<th>Millions of eggs</th>
<th>Per cent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consumed in households of producers</td>
<td>436^a</td>
<td>17</td>
</tr>
<tr>
<td>Consumed in Iowa (other than producers)</td>
<td>356</td>
<td>14</td>
</tr>
<tr>
<td>30.5^b consumed in households of rural non-producers</td>
<td>325.3^c consumed in households of urban consumers</td>
<td>16</td>
</tr>
<tr>
<td>Used for hatching</td>
<td>128^d</td>
<td>5</td>
</tr>
<tr>
<td>23^e used for farm hatching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>105^f used for commercial hatching</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shell egg receipts at 4 markets^g</td>
<td>1236</td>
<td>48</td>
</tr>
<tr>
<td>556 Chicago</td>
<td></td>
<td></td>
</tr>
<tr>
<td>548 New York</td>
<td></td>
<td></td>
</tr>
<tr>
<td>110 Boston</td>
<td></td>
<td></td>
</tr>
<tr>
<td>42 Philadelphia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other markets and loss^h</td>
<td>410</td>
<td>16</td>
</tr>
<tr>
<td>Total egg production, Iowa, 1940</td>
<td>2566</td>
<td>100%</td>
</tr>
</tbody>
</table>

Source:

b. Only 93% of farms report poultry on hand as of April 1, 1940 (1940 census). Therefore 7% of rural population were non-producers consuming approximately 300 eggs per capita.
c. 1940 Iowa urban population at 300 eggs per capita.
d. Assume 5% of production used for hatching.
e. Residual figure of Table 26, ibid.
f. Residual.
g. Tables 30 and 31, ibid. h. Residual.
Further evidence that Iowa's eggs flow toward eastern markets is shown in Figure 2, which presents a picture of the per capita egg production in the United States, by states, for 1940. The supporting data are given in Table 2. Using 300 eggs per person as a norm, all but 5 states directly east of Iowa are "deficit" states and must be supplied by states west of the Mississippi, many of which are "surplus" states. Iowa ranks in the top group in per capita production of eggs.

What Are Consumers' Preferences in These Consuming Markets?

The four major markets of Iowa eggs, in order of importance, are New York City, Chicago, Iowa non-farm communities, and Boston. Consumers' preferences as reflected in dealer's attitude as well as those revealed by scattered studies of consumers' preferences would indicate that for some characteristics consumers' preferences for eggs are relatively homogeneous in the various markets in which Iowa eggs are sold. There is a premium for large eggs and for clean eggs. Those consumers who profess to know the characteristics of a good in contrast with a stale egg identify it in terms of such things as the upstanding character of the yolk, how easily the yolk membrane ruptures, its freedom from a mottled appearance, color, freedom from germ development, large blood clot, or meat spots and blood; by the thickness of the white; by the absence of off-odors or off-flavors.

Iowa eggs are sold in some markets where eggs are bought by the wholesalers on a graded basis, and in some of the markets eggs are sold also
PRODUCTION OF EGGS PER CAPITA

Fig. 2 PER CAPITA EGG PRODUCTION, BY STATES, 1940
Table 2. Per Capita Egg Production by Geographic Divisions and States, 1940

<table>
<thead>
<tr>
<th>State</th>
<th>Eggs produced (1,000)</th>
<th>Population (1,000)</th>
<th>Eggs per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>New England</td>
<td>1,378,000</td>
<td>8,437,290</td>
<td>163</td>
</tr>
<tr>
<td>Maine</td>
<td>250,000</td>
<td>847,226</td>
<td>295</td>
</tr>
<tr>
<td>New Hampshire</td>
<td>172,000</td>
<td>491,524</td>
<td>350</td>
</tr>
<tr>
<td>Vermont</td>
<td>129,000</td>
<td>359,231</td>
<td>359</td>
</tr>
<tr>
<td>Massachusetts</td>
<td>432,000</td>
<td>4,316,721</td>
<td>100</td>
</tr>
<tr>
<td>Rhode Island</td>
<td>51,000</td>
<td>713,346</td>
<td>71</td>
</tr>
<tr>
<td>Connecticut</td>
<td>344,000</td>
<td>1,709,242</td>
<td>201</td>
</tr>
<tr>
<td>Middle Atlantic</td>
<td>4,868,000</td>
<td>27,539,497</td>
<td>165</td>
</tr>
<tr>
<td>New York</td>
<td>1,920,000</td>
<td>13,479,142</td>
<td>155</td>
</tr>
<tr>
<td>New Jersey</td>
<td>661,000</td>
<td>4,160,165</td>
<td>166</td>
</tr>
<tr>
<td>Pennsylvania</td>
<td>2,042,000</td>
<td>9,900,180</td>
<td>205</td>
</tr>
<tr>
<td>East North Central</td>
<td>8,785,000</td>
<td>26,626,342</td>
<td>330</td>
</tr>
<tr>
<td>Ohio</td>
<td>2,250,000</td>
<td>6,907,612</td>
<td>326</td>
</tr>
<tr>
<td>Indiana</td>
<td>1,612,000</td>
<td>5,427,796</td>
<td>441</td>
</tr>
<tr>
<td>Illinois</td>
<td>1,924,000</td>
<td>7,897,241</td>
<td>244</td>
</tr>
<tr>
<td>Michigan</td>
<td>1,295,000</td>
<td>5,256,106</td>
<td>246</td>
</tr>
<tr>
<td>Wisconsin</td>
<td>1,804,000</td>
<td>3,137,587</td>
<td>575</td>
</tr>
<tr>
<td>West North Central</td>
<td>10,010,000</td>
<td>13,516,990</td>
<td>741</td>
</tr>
<tr>
<td>Minnesota</td>
<td>1,886,000</td>
<td>2,792,300</td>
<td>675</td>
</tr>
<tr>
<td>Iowa</td>
<td>2,556,000</td>
<td>2,538,288</td>
<td>1011</td>
</tr>
<tr>
<td>Missouri</td>
<td>1,994,000</td>
<td>5,784,664</td>
<td>519</td>
</tr>
<tr>
<td>North Dakota</td>
<td>352,000</td>
<td>641,935</td>
<td>564</td>
</tr>
<tr>
<td>South Dakota</td>
<td>555,000</td>
<td>942,961</td>
<td>907</td>
</tr>
<tr>
<td>Nebraska</td>
<td>1,289,000</td>
<td>1,315,834</td>
<td>858</td>
</tr>
<tr>
<td>Kansas</td>
<td>1,520,000</td>
<td>1,801,028</td>
<td>844</td>
</tr>
<tr>
<td>South Atlantic</td>
<td>3,532,000</td>
<td>17,823,151</td>
<td>198</td>
</tr>
<tr>
<td>Delaware</td>
<td>116,000</td>
<td>286,505</td>
<td>435</td>
</tr>
<tr>
<td>Maryland</td>
<td>351,000</td>
<td>1,921,244</td>
<td>193</td>
</tr>
<tr>
<td>Virginia</td>
<td>960,000</td>
<td>2,677,773</td>
<td>359</td>
</tr>
<tr>
<td>West Virginia</td>
<td>419,000</td>
<td>1,901,974</td>
<td>220</td>
</tr>
<tr>
<td>North Carolina</td>
<td>670,000</td>
<td>3,571,623</td>
<td>188</td>
</tr>
<tr>
<td>South Carolina</td>
<td>235,000</td>
<td>1,899,804</td>
<td>150</td>
</tr>
<tr>
<td>Georgia</td>
<td>535,000</td>
<td>5,123,723</td>
<td>171</td>
</tr>
<tr>
<td>Florida</td>
<td>196,000</td>
<td>1,897,414</td>
<td>103</td>
</tr>
</tbody>
</table>
Table 2. (continued)

<table>
<thead>
<tr>
<th>State</th>
<th>Eggs produced (1,000)</th>
<th>Population (1,000)</th>
<th>Eggs per capita</th>
</tr>
</thead>
<tbody>
<tr>
<td>East South Central</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kentucky</td>
<td>839,000</td>
<td>2,845,627</td>
<td>295</td>
</tr>
<tr>
<td>Tennessee</td>
<td>707,000</td>
<td>2,915,841</td>
<td>242</td>
</tr>
<tr>
<td>Alabama</td>
<td>487,000</td>
<td>2,832,961</td>
<td>172</td>
</tr>
<tr>
<td>Mississippi</td>
<td>414,000</td>
<td>2,183,796</td>
<td>190</td>
</tr>
<tr>
<td>West South Central</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arkansas</td>
<td>581,000</td>
<td>1,949,387</td>
<td>296</td>
</tr>
<tr>
<td>Louisiana</td>
<td>232,000</td>
<td>2,363,860</td>
<td>119</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>931,000</td>
<td>2,356,434</td>
<td>198</td>
</tr>
<tr>
<td>Texas</td>
<td>2,137,000</td>
<td>6,414,824</td>
<td>333</td>
</tr>
<tr>
<td>Mountain</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Montana</td>
<td>209,000</td>
<td>659,456</td>
<td>374</td>
</tr>
<tr>
<td>Idaho</td>
<td>260,000</td>
<td>524,873</td>
<td>495</td>
</tr>
<tr>
<td>Wyoming</td>
<td>75,000</td>
<td>250,742</td>
<td>299</td>
</tr>
<tr>
<td>Colorado</td>
<td>370,000</td>
<td>1,123,296</td>
<td>329</td>
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<tr>
<td>New Mexico</td>
<td>100,000</td>
<td>531,818</td>
<td>188</td>
</tr>
<tr>
<td>Arizona</td>
<td>53,000</td>
<td>499,261</td>
<td>116</td>
</tr>
<tr>
<td>Utah</td>
<td>286,000</td>
<td>556,310</td>
<td>485</td>
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<tr>
<td>Nevada</td>
<td>25,000</td>
<td>110,247</td>
<td>227</td>
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<tr>
<td>Pacific</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td>723,000</td>
<td>1,736,191</td>
<td>416</td>
</tr>
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<td>Oregon</td>
<td>356,000</td>
<td>1,039,684</td>
<td>326</td>
</tr>
<tr>
<td>California</td>
<td>1,810,000</td>
<td>6,937,387</td>
<td>262</td>
</tr>
<tr>
<td>United States</td>
<td>38,879,000</td>
<td>131,689,275</td>
<td>295</td>
</tr>
</tbody>
</table>

to consumers on the basis of grades. The grade specifications, in
general, take into account the above characteristics that are rather
generally associated with good eggs. In some markets where Iowa eggs
are sold without the benefit of grading, as is the case in many cities
of Iowa, for example, there is considerable dissatisfaction among con-
sumers concerning the quality of eggs made available. This fact will
be brought out later in this chapter.

For some characteristics there is some evidence that preferences
are not homogeneous. The majority of consumers in some markets, for
example, appear to favor white shelled eggs and in other markets they
appear to favor brown shelled eggs; and in still others they appear
to be indifferent to shell color. There is also some evidence that
there are differences in preferences among the markets into which Iowa
eggs move with respect to yolk color.

Since the existence of a grading system has an important bearing
on the preferences expressed by egg buyers in markets where grades are
used, it is of interest to note the egg legislation of the various states.
(See Figure 3). Whether these laws reflect consumers' demands or not
they are significant inasmuch as they seem to designate the quality of
eggs which may be sold as of given grades in those states. New York
State requires that all eggs be sold at retail on grade, and the remain-
ing states in New England together with Pennsylvania, Indiana, Michigan,
New Jersey, Ohio and Maryland have enacted "Fresh Egg Law", laws which
require that only eggs which meet the standards of U.S. Grade A or
Fig. 3 TYPES OF EGG LAWS IN THE UNITED STATES, 1942

/ See Fig. 3 continued
Figure 3. (continued)

Types of state egg laws in the United States, 1942--classified largely on the basis of emphasis.

1. **A compulsory retail grading law** is one which requires all eggs to be sold at retail on the basis of grades which are promulgated in the law or the law sets up the basis for promulgation.

2. **A permissive retail grade law** is one which provides that eggs may be sold at retail, either graded or ungraded but the grade must be designated or the fact that the eggs are ungraded made known. Some of these laws also have "fresh egg law" provisions.

3. **A fresh egg law**, a type of permissive grade law, is one whose major object is to define eggs which may be sold as fresh to the consuming public.

4. **Candling laws** provide that eggs must be candled at the time of purchase -- usually from the producer -- and paid for on a loss off basis.

5. **No laws** -- some of the states which have been placed in the "no law" class have cold storage laws, but for all practical purposes these states have no egg laws. Cold storage laws as applied to eggs are so outmoded that few states attempt to enforce them. Also included are laws which require only that eggs be labelled as to their state of origin, or labelled as "shipped" if eggs originate from out of the home state.

Source: In. Ag. Ext. Service 15-577, A brief on state egg legislation in the United States. Revised from Figure 2, Types of egg laws in the United States, 1940, p. 3.
better may be marketed as Fresh. The bulk of Iowa's eggs are sold in markets whose legislation goes beyond requiring candling to sort out only the distinctly "bad" eggs.

Many states also require labelling as "cold storage", eggs which have been held in storage over 30 days. Many states have a provision which bars from the top grade or Fresh eggs, eggs which have tremulous air cells. Both the cold storage and the tremulous air cell provisions¹,² may be held by Iowa producers as just grounds for complaint inasmuch as they do reflect a grading specification not based on consumers' preferences.

¹The cold storage laws are practically unenforceable in that there has been developed no accurate method for determining whether an egg has been in cold storage. A general practice is to sort the eggs which have been in storage, selling the better eggs as fresh and the poorer eggs as cold storage. Hence, cold storage eggs, as sold, are generally eggs of lower quality.

²In some states, including New York, eggs with a tremulous air cell are excluded from the top grade. The air cell is the space at the large end of the egg between the outer membrane which adheres to the shell, and an inner membrane which encases the albumen. These membranes are close together and do not become separated except for the air space which develops as the fresh egg cools and as it ages and loses moisture and gases escape. If the egg is shaken, such as it very likely is as it travels by rail or even truck from West to East, these membranes are liable to become partially if not totally separate, thus causing a tremulous or free air cell. A tremulous air cell is discreditable only insofar as it might become a free air cell. And a free air cell condition means that the candler is unable to judge such factors as the mobility of the yolk and the firmness of the white in that these are generally observed from the response of the yolk and white when the egg is twirled. When the two membranes are separate, the interior of the egg is semi-isolated from the shell and the twist applied to the shell does not twirl the egg's contents (any more than does the twirling of a pan containing water and a floating cork, twirl the cork).

The discrimination at the retail level against eggs with tremulous air cells is unwarranted because the significant quality factors are measurable and in effect constitute a trade barrier against eggs from distant regions. Nevertheless discrimination against such eggs at shipping
Preferences expressed for eggs vary among buyers. But the demands of their markets are changing rapidly. An increasing number of Iowa's eggs are sold in dried, frozen or liquid form. Dried, liquid and frozen egg consumption in 1935 was estimated to constitute 9 per cent of the total eggs used in the United States. The frozen egg industry has developed because of their lower storage costs as compared with shell eggs, because of the elimination of spoilage during storage and because of their economy in the making of baked products, noodles, salad dressing, mayonnaise, confections, etc. Dried egg production received its initial impetus when imports were curtailed in 1927 with the outbreak of the China civil war; with the tariff increase in 1931 the industry expanded further; while the present war has made it a booming industry. It is quite possible that the war-time expansion of egg drying in the United States may give rise to new processing techniques and a better understanding of the uses to which dried eggs may be put, and that in post-war years an increased percentage of Iowa's eggs may be marketed as dried eggs for domestic consumption.

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The significance of this factor is made evident from the results of an Illinois study. Eggs shipped from Southeastern Illinois to New York City increased in per cent of eggs with tremulous air cells from 4% at shipping point to 22% at New York City.


The preferences of commercial users of frozen, dried, and liquid eggs differ somewhat from consumers' preferences for eggs in the shell. The color of the shell of the eggs is not a factor. Yolk color, accurately measurable in this form, is an important quality factor because manufacturers of noodles,\(^1\) baking products and mayonnaise generally want the color of the darker yolk so that their product will be "richer" in appearance. Rots, odoriferous eggs and eggs containing blood rings can be eliminated by candling before breaking, and during the breaking operations, while meat spots and pieces of shell can be eliminated by straining the liquid product. Techniques will be developed so that the eggs with dirty shells can be handled so that they will not contribute importantly to the bacterial count of the final product. And until more conclusive evidence is presented to the contrary, dried, frozen or liquid eggs made from eggs of generally lower quality (watery whites and flat yolks) will be considered equally acceptable for most purposes as dried, frozen or liquid eggs made from eggs of better quality. Admittedly, further research is needed, but findings to date seem to indicate that for some uses eggs which if sold in the shell would be rated as low in quality may yield even a better product than eggs rating high in quality.

Of probable significance to Iowa producers are developments which have been made in techniques for shell treating or processing of eggs. By this method the pores of the egg shell are sealed, or quality deterioration

\(^1\)U.S. Dept. of Agriculture. Eggs and egg products. Circ. 583. 1941.
checked. If no stigma similar to that attached to storage eggs comes to be associated with such processed eggs, producers distant from the market and with sufficiently large flocks to warrant the effort, may find such processing a means of merchandising quality eggs. Protection of consumers could be achieved by certification of producers' processing methods and techniques so that the eggs will have a "known" history.

Techniques in the egg market are such that it is almost impossible to predict what eggs will find acceptance in post-war years. Conceivably shell-treated eggs may supply the "table-egg" market with quality eggs certified on a history basis. Conceivably frozen, and particularly dried eggs may supply the market with eggs for domestic culinary uses and commercial uses. Standards for these products will undoubtedly be developed with wider use of the product and as needs for specifications arise. For many product uses, however, frozen and dried eggs will provide an economical outlet for lower quality eggs.

In time, as researches in techniques for drying, processing, breaking and freezing continue; as researches in the culinary and commercial uses of eggs and egg products develop; and as consumers and commercial users learn more about the new products and to adapt themselves to them, the relative preferences for eggs may undergo considerable change.

Satisfaction of Consumers in Des Moines, Iowa with Eggs Purchased

Consumers' satisfaction with the quality of the product secured is an important method of appraising a market. Several questions bearing on
consumers' satisfaction with eggs purchased were asked in a consumer survey made in that city.

In study S-5, 783 consumers were asked during September, 1940 "Did you buy any eggs last month you preferred not to use for poaching or frying?" Of these, 571 said they had had no difficulty in the past month while 137 replied that they had. Of these 137 who had made unsatisfactory purchases, 121 had purchased eggs at retail stores. Only half of the consumers questioned had made their last purchase of eggs at stores; the others had purchased from farmers or direct representatives of farmers. It would appear in many cases that consumers in Des Moines have found it necessary to buy from farmers in order to get eggs of a satisfactory quality.

Iowa Egg Production

Scale of production of individual farms has an important bearing on the interest of farmers in improved techniques.

Iowa owes its importance as an egg producing state to large numbers of farm flocks (187,866 out of 213,318 farms in 1940). Eggs are produced on more farms than is any other livestock product. At the time of the 1940 census, 89% of the farms produced eggs. While there is some commercial production, there is no specialized egg producing area in the state. For the most part, Iowa poultry flocks are classified as "farm
flocks" which are supplementary to other major farm enterprises, the average size of flock being about 150 hens.¹

A survey of the egg marketing practices of Iowa farmers revealed only approximately 20 per cent selling more than a 30-dozen case in the previous week in March (Q-l-W-40), and only 14 per cent selling more than a 30-dozen case in the previous week in January and February (Q-l-W-41).

Although Iowa is the leading egg producing state, egg production in Iowa is not considered by most farmers as the major farm enterprise. In 1941, a larger cash income was received by egg producers in Iowa than by those in any other state. Yet cash income received from eggs in the period 1935-39 was only 5.06 per cent of the total cash farm income. The value of the egg crop to the Iowa farmer is exceeded in income by hogs, cattle, milk and corn. In contrast the poultry industry in Connecticut constitutes the second largest agricultural business in the state. Large-scale commercial egg production has been developed largely on the Pacific Coast and in the North Atlantic.

Historically the "farm flock" has been considered as a "pin money" enterprise for the farmer's wife to run.² The egg money quite often purchased the groceries and the hens and eggs supplied the dinner table.

In the spring the hens are turned out to range in the green grass and are confined only when the cold weather requires that they be housed. During the early laying season the farmers may feed mash and prepared feeds to the flocks, but when other farm enterprises make demands upon the farmer's time, the hens are given little attention. The need for expansion of the poultry enterprise is being greatly stressed in the agricultural goals of 1942. It may be that good flock management and feeding practices will be more widely used.

It is estimated that over 80 per cent of Iowa egg production which is marketed, is marketed in the six-month period March through August. This is significant in that those and eggs from other Midwestern states constitute the major supply of cold storage eggs to be sold in the fall, high-price months. Hence, cold storage laws which require the labeling of cold storage eggs tend to put Midwestern eggs at a special disadvantage.

The General Pattern of the Marketing Process

Producers in Iowa sell the major part of their eggs to grocery stores, other buyers being of much less importance as initial receivers of eggs from the farm. Most eggs are eventually handled, however, by carlot

---


shippers who concentrate them into those market channels which direct
the eggs to the larger consuming centers. In diagramatic form, these
market channels may be presented as in Figure 4.

An estimate of the relative numbers of buying agencies and their
relative importance as initial buyers of eggs is presented in Table 3.

Table 3. Where Iowa Farmers Sell Eggs

<table>
<thead>
<tr>
<th></th>
<th>Per cent of</th>
<th>Number</th>
<th>Per cent of</th>
<th>Number</th>
<th>Per cent of</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>eggs sold</td>
<td>of</td>
<td>eggs sold</td>
<td>of</td>
<td>eggs sold</td>
<td>of</td>
</tr>
<tr>
<td>by farmers</td>
<td>dealers</td>
<td>total</td>
<td>by farmers</td>
<td>dealers</td>
<td>total</td>
<td>dealers</td>
</tr>
<tr>
<td>1929</td>
<td>1929</td>
<td>1942</td>
<td>1929</td>
<td>1942</td>
<td></td>
<td></td>
</tr>
<tr>
<td>To stores</td>
<td>70-90</td>
<td>5287</td>
<td>70.33</td>
<td>60-80</td>
<td>5000</td>
<td>71.02</td>
</tr>
<tr>
<td>To buying stations</td>
<td>5-20</td>
<td>1584</td>
<td>21.15</td>
<td>5-20</td>
<td>1200</td>
<td>17.04</td>
</tr>
<tr>
<td>To carlot egg</td>
<td>0-5</td>
<td>201</td>
<td>2.69</td>
<td>0-8</td>
<td>196</td>
<td>2.78</td>
</tr>
<tr>
<td>shippers b</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shipping to large</td>
<td>0-5</td>
<td>437</td>
<td>5.83</td>
<td>2-10</td>
<td>645</td>
<td>9.16</td>
</tr>
<tr>
<td>markets, hatcheries c</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>and miscellaneous</td>
<td>7489</td>
<td>100.00</td>
<td></td>
<td>7041</td>
<td>100.00</td>
<td></td>
</tr>
</tbody>
</table>

aData derived from two sources:
W.D. Termohlen and G.S. Shepherd. Marketing Iowa's poultry products.

bOderkirk, A.D. and Morse, Richard L. Transportation Memo No. 2, p. 11.
The term "carlot shipper" refers specifically to large scale plants
which can ship in large quantities and command economies of freight
costs by so doing. With expansion of trucking to market such a designa-
tion has lost some of its former meaning but is used to refer to large
volume plants as opposed to small local buyers.

cHatcheries are not licensed as egg buyers when eggs are used only for
hatching. However, when engaged in also buying for market purposes
such buyers are required to obtain licenses. About 800 hatcheries are
in operation in Iowa. While they are an important specialized outlet
for eggs, their transportation problems are integrated with feed and
special services which have not been considered here.
Fig. 4. MAJOR TRANSPORTATION CHANNELS FROM FARMS, BETWEEN LOCAL MARKETS AND TO PRINCIPAL MARKETS FOR IOWA EGGS

Source: Oderkirk, A.D. & Morse, R.L. — Transportation Memo No.2 (Revised) op.cit. cf. Fig.5
The data indicate the dominance of store buyers as initial receivers of eggs in Iowa, followed, to a markedly lesser extent, by buying stations.\(^1\)

**Carlot shippers**\(^2,3\)

Carlot shippers warrant special attention although probably less than 10 per cent of the farmers sell directly to them or their truckers. Nevertheless they ultimately are the receivers of the bulk of the surplus eggs which are sold in eastern consumption markets\(^4\). This is true in

\(^{1}\)Substantial agreement is found between these data and data from other Midwestern states.
- Cotton, W.P. and Wilson, W.C. Poultry and egg marketing in South Dakota, unpublished. in mss. for publication. The following percentages of producers reported that they marketed more than 75\% of their eggs through specified outlets; groceries and meat markets, 65\%; cooperatives, 7.5\%; produce houses 5.7%.

\(^{2}\)Cf. Oderkirk and Morse. op. cit. p. 11.
There are "carlot shippers" in 59 of the 99 counties of the state. Of the 193 plants listed as handling eggs, 133 are equipped with refrigeration, there being only 15 counties where there is no refrigeration for holding eggs for indeterminate periods. There are approximately 60 cooperatives engaged in marketing poultry and eggs in the state, most of which are departments of purchasing associations, stores, creameries or elevators. Cooperatives are important in a few communities but handle less than 2% of the total farm egg sales in the state. Cooperatives of importance ship their eggs to eastern markets and assemble their receipts largely from farmer deliveries.

\(^{3}\)Due to the war, processing plants in Iowa are of increasing importance. Processing facilities are available in 19 counties of the state for breaking shell eggs and freezing them for bakery or other demands, or for dried egg processing. In June, 1942, eight drying plants were in operation in 7 counties with likelihood of future expansion. There
part because stores, the primary buyers of farmers' eggs, cannot sell all the eggs received "over the counter" to their customers and very often do not purchase a sufficient volume to perform efficiently the assembling and sorting necessary for shipment to distant markets. The store must then dispose of its "surplus" eggs by selling to a local buying station or, more typically, to a carlot shipper.

Thus the carlot shippers serve as the major focal point within the state, receiving the supplies of eggs of the farmers and satisfying the demands of the consuming markets.

(Footnotes continued)

are 30 egg breaking plants operating (spring of 1942) in connection with egg drying plants or separately. Oderkirk and Morse, ibid. p. 15.

4 Store and buying station outlets for eggs. Stores located in large urban communities sell either all or the bulk of their eggs to their customers. In surplus seasons, eggs are sold to produce buyers or itinerant truckers. In rural areas, stores sell only a small per cent to customers and serve as the primary assemblers. In a study made in July, 1940, half the stores reported that 50 to 100% of the eggs handled were sold direct to produce plants and more than 50% reported sale of less than 25% of their egg receipts to consumers. Thus the most important ultimate outlet for eggs from stores in urban areas is the consumer, and in rural areas direct sales to carlot shipper plants or their truck buyers.

Buying stations reporting in the 1940 survey indicated that 70% sell 75% to 100% of their receipts to carlot shippers. The buying stations are thus closely identified with the carlot shippers and a small percentage of their egg receipts go to other individual outlets. Oderkirk and Morse, ibid. p. 13.
The Extent of Grading by Various Market Agents

The grading of eggs is far from universal in Iowa markets. Some grading does occur. A dealer who must sell on a grade basis is much more likely to buy on a graded basis than one who sells ungraded eggs. Eggs sold into eastern markets must in many cases be graded. It is not strange, therefore, that much of the interest in grading centers in dealers who ship large quantities of eggs outside the state.

Farmers' reports of grade selling to the various agencies

In 15 counties of Iowa 1,878 rural women were asked to report the agency to which they sold their eggs "last week" and to report as to whether they sold their eggs on a grade basis. These data are presented in Table 4.

<table>
<thead>
<tr>
<th>Agency sold to</th>
<th>Do you sell on grade?</th>
<th>Failed to answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stores</td>
<td>63</td>
<td>632</td>
</tr>
<tr>
<td>Produce plants and buying stations</td>
<td>201</td>
<td>117</td>
</tr>
<tr>
<td>Hatcheries</td>
<td>53</td>
<td>16</td>
</tr>
<tr>
<td>Truck buyers</td>
<td>22</td>
<td>40</td>
</tr>
<tr>
<td>Others and combinations</td>
<td>61</td>
<td>106</td>
</tr>
<tr>
<td>Agency unknown</td>
<td>17</td>
<td>77</td>
</tr>
<tr>
<td>Total (1556)</td>
<td>422</td>
<td>1000</td>
</tr>
</tbody>
</table>

(322 were not selling eggs)

Of those selling eggs, roughly two-thirds reported they were not selling on a grade basis. Of those who trade with stores, the proportion selling on a no-grade basis is ten times the number selling on a grade basis. Of those who trade with produce plants and buying stations, the proportion is in the other direction; approximately twice as many report selling on a grade basis as on an ungraded basis.

When the survey was repeated the following year, the women were asked not only whether they sold on a grade basis, but if selling on a grade basis, to give the quantities and prices received by grade for their last week's egg sales. Only 140 out of 570 reported selling on a grade basis and one-fourth of these failed to indicate how their eggs were graded.

Many of the replies made to the questionnaire were highly unsatisfactory. For example, somewhat more than one-fifth of those reporting how their eggs were graded stated that eggs were classed into only one grade. Such a reply is obviously meaningless. A very small proportion (26 per cent) of those reporting that the agencies to which they sold used grades stated that three or four grades were used.

**Dealers' reports of grade buying**

Further data on number of grades are available from licensed buyers secured in another survey conducted by the Iowa Agricultural Experiment Station.\(^1\) These data were obtained by means of mail questionnaire sent

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\(^1\)Ia. Agr. Exp. Sta. (Q-3 and Q-4). Unpublished data collected under Project 628.
to the 7,284 licensed egg dealers. The questions were printed on a self-addressed postcard.\textsuperscript{1} Returns were secured from 28 per cent of the licensed dealers. The range of returns was from 25.2 per cent in Crop Reporting District No. 9 to 33.0 per cent in Crop Reporting District No. 1, showing fairly uniform geographical distribution of returns.

The licensed dealers were asked the following questions: "What per cent of the eggs which you handled last week did you buy as current receipts? What per cent on a grade basis? How many buying grades do you have?" The pertinent data are presented in Table 5 classified by the type of business the respondent claimed. These data corroborate the data secured from the rural women; few stores bought on grade, while buying stations and produce plants more frequently bought on a grade basis.

A reflection of the tendency for grading to increase as eggs are concentrated and as eggs flow toward the primary suppliers of consumers is given in Table 6. These data were derived by asking the same questions as above, with the words "sell" or "selling" substituted for "buy" and "buying". The data show a general increase of grade selling over grade buying by these agencies.

\textbf{Special report from carlot shippers.} Carlot shippers were sent a special questionnaire\textsuperscript{2}, one which was longer and more nearly fitted

\textsuperscript{1}Presented in the appendix.

\textsuperscript{2}Presented in the appendix.
Table 5. Grade Buying and Number of Buying Grades Employed

<table>
<thead>
<tr>
<th>Buying agency</th>
<th>:Failed:</th>
<th>:to:</th>
<th>No</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stores</td>
<td>8</td>
<td>1121</td>
<td>57</td>
<td>41</td>
<td>10</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>1241</td>
<td></td>
</tr>
<tr>
<td>Buying station and produce plant</td>
<td>2</td>
<td>132</td>
<td>28</td>
<td>24</td>
<td>7</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>257</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Truckers and other</td>
<td>0</td>
<td>17</td>
<td>0</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>1330</td>
<td>57</td>
<td>72</td>
<td>36</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>1523</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Table 6. Grade Selling and Number of Selling Grades Employed

<table>
<thead>
<tr>
<th>Buying agency</th>
<th>:Failed:</th>
<th>:to:</th>
<th>No</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stores</td>
<td>26</td>
<td>999</td>
<td>109</td>
<td>84</td>
<td>15</td>
<td>4</td>
<td>1</td>
<td>2</td>
<td>1</td>
<td>1241</td>
<td></td>
</tr>
<tr>
<td>Buying stations and produce plant</td>
<td>12</td>
<td>169</td>
<td>3</td>
<td>27</td>
<td>18</td>
<td>8</td>
<td>9</td>
<td>4</td>
<td>7</td>
<td>257</td>
<td></td>
</tr>
<tr>
<td>Truckers and other</td>
<td>0</td>
<td>14</td>
<td>1</td>
<td>3</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td></td>
<td>38</td>
<td>1182</td>
<td>113</td>
<td>114</td>
<td>35</td>
<td>15</td>
<td>11</td>
<td>6</td>
<td>9</td>
<td>1523</td>
<td></td>
</tr>
</tbody>
</table>

to the complicated nature of their business. Only 50 of the 187
carlot shippers reported, yet there was reason to believe\textsuperscript{1} that these
data presented a representative picture of carlot shipper operations.
The questionnaire requested that the shipper itemize by source of supply
the total number of cases bought "last week". He was also requested
to estimate the percentage of eggs bought from each source as current
receipts and as graded. The data are presented in a two-way relative
bar chart in Figure 5. The height of the bar represents the percentage
of eggs bought on grade from the designated source with the remainder
showing the proportion bought ungraded and the width of the bar
represents the relative volume from the designated source. Hence, the
mass of black relative to the total square represents the relative
volume of eggs bought by carlot shippers as graded. This is also
presented linearly in the column to the right of the square. The
absolute data from which the bar chart was derived are presented in
Table 7. From these data it is evident that carlot shippers have pur-
sued a policy of grade buying from farmers, current receipt buying from
stores and other current receipt buyers.

In conclusion, grade buying has not been very extensive in Iowa.
The chief buyer of eggs from producers, the stores, rarely buys eggs on
grade. The carlot shippers generally buy eggs from producers on a grade
basis, but the largest percentage of their egg receipts are from store

\textsuperscript{1}Opinion of A.D. Oderkirk, Extension Poultry Marketing Specialist.
Fig. 5  RELATIVE VOLUME OF EGGS BOUGHT BY SELECTED IOWA CARLOT SHIPPERS AS GRADED & UNGRADED FROM DESIGNATED SOURCES: JULY 1940
Table 7. Volume of Eggs Bought by Selected Iowa Carrot Shippers as Graded and Ungraded from the Designated Sources; One Week in July, 1940

<table>
<thead>
<tr>
<th>Bought from</th>
<th>Number of cases bought</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Graded</td>
<td>Ungraded</td>
<td>Total</td>
</tr>
<tr>
<td>Farmers</td>
<td>6595</td>
<td>1948</td>
<td></td>
<td>8543</td>
</tr>
<tr>
<td>Store</td>
<td>413</td>
<td>9432</td>
<td></td>
<td>9845</td>
</tr>
<tr>
<td>Truck buyer</td>
<td>728</td>
<td>2265</td>
<td></td>
<td>2993</td>
</tr>
<tr>
<td>Produce station</td>
<td>2597</td>
<td>5008</td>
<td></td>
<td>7605</td>
</tr>
<tr>
<td>Others</td>
<td>404</td>
<td>2031</td>
<td></td>
<td>2435</td>
</tr>
<tr>
<td>Total</td>
<td>10,737</td>
<td>20,684</td>
<td></td>
<td>31,421</td>
</tr>
</tbody>
</table>

and small dealers from which they buy on a current receipt or no-grade basis.

The Grades and Grade Specifications Being Used by Egg Buyers

The method by which egg quality is commonly measured is known as "candling."¹ By this method it is possible to identify the better eggs and the poorer eggs with reasonable accuracy, although only with decidedly less accuracy is it possible to grade the "in between" qualities.² In commercial usage it is the only method of measuring shell egg quality.³

¹For the benefit of the reader who may not be acquainted with the presently accepted method for measuring quality of shell eggs, a brief statement is given concerning the technique of candling. The equipment needed is a candle, a weight scale and a reasonably dark room with access to daylight for sorting for shell color. Neither an acceptable candle nor an acceptable weight scale costs more than two dollars. The technique is to hold the egg by the tips of the fingers and below the level of the eye, large end up so that the air cell may be seen; place it before the one-inch hole so that it intercepts the beam of light shining through the hole; and then twirl the egg so that the mobility and visibility of the yolk, clearness of the white and presence or absence of germ development, blood, foreign matter, etc. may be observed. The technique requires a fair amount of skill. It is not a perfect method and requires considerable study and improvement. Cf. Stewart, George Franklin. Poultry products research. Ia. Agr. Exp. Sta. Res. Bul. 299. 1942. Cf. "Grading eggs". p. 711-12.


³Although many eggs are judged on the basis of their history, candling is necessary if the blood and meat spots or other foreign objects are to be identified.
Candling is required under regulations of the Iowa State Department of Agriculture but it is questionable how well this requirement is being enforced. The law requires further that no person may pay for inedible eggs. This is the extent to which legislation in Iowa relates to egg grading. As a result, whatever grading is practiced is done on the basis of grades formulated and interpreted by the buying agency. Hence, there exists little uniformity of grade names and grade specifications. Uniform grades between local markets are found over the state only where plants of the same organization are found. And even grade interpretation as between the plants may vary considerably as the result of competitive conditions in the local market. A survey of grading methods conducted in 1932 indicated that 50 grade designations were being used by 281 firms. Grades "No. 1, No. 2" were most frequent.

The usual two-grade system is to put in the top grade (No. 1) the larger and better quality eggs, and in the second grade (No. 2) the smaller eggs, the larger eggs of lower quality, and those with dirty or checked shells. But the procedure is far from uniform. "For example, 75 firms using the No. 1 and No. 2 grade described the weight requirements for No. 1. They were found to be using 22 different groupings."¹

specifications were based upon the specifications for U.S. grades, and some of the plants even referred to their grades as U.S. Extras, U.S. Standards, etc. In recent years\(^1\) certain large organizations have made a decided effort with fair success to train their plant candlers and graders to grade on the basis of these specifications. However, although such a policy is introduced, the names given these grades are those of the organization and there is no reason to believe that the degree to which the plants are required to grade in accordance with the specifications is uniform as between plants. Each plant has a unique competitive situation and standards are liable to change as between different seasons of the year.

Uniform grading requires not only uniform grade names and uniform grade specifications but also uniform interpretation of these specifications on the part of the graders. For instance, the condition of the white for "U.S. Extra" grade must be "firm", while for "U.S. Standards", it may be "reasonably firm". If there is to be uniformity of grading, there must be conformity of opinion as to what constitutes a "firm" and "reasonably firm" white. In recent years a number of plant managers in Iowa have become aware of their inadequate grading methods. Some plants or firms which have sold eggs to the U.S. Government for Land-Lease or for Surplus Marketing Administration have experienced difficulty with their grading methods when they attempted to pack their eggs in

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\(^1\)Egg candler schools conducted by the Ia. Agr. Ext. Service at Ames, have been well attended. The primary purpose of these schools is to teach the grader the quality factors of a broken out egg, how to interpret these factors when seen before the candle, in terms of U.S. grades.
conformity with government grade specifications. When these eggs were sampled and graded by an agent licensed by the U.S. Department of Agriculture and the inspection showed that the eggs failed to meet grade specifications, the plant manager discovered that his graders did not know how to grade or that his ideas of the grade specifications had been incorrect.

Unless the grading is rigidly supervised, uniformity of grading will not and cannot exist. Hence, in any local market in Iowa the only accurate basis upon which farmers can compare the price they can get for their eggs is to compare the current receipt prices. Grade terms are not standardized, grade specifications are unknown and, if known, there exists no supervising agency which would guarantee an unbiased and uniform interpretation of the grade specifications. Hence, it is impossible to compare accurately prices of grade buyers. It is thus understandable why farmers are hesitant to sell their eggs on grade. And it seems highly probable the grade buying from farmers will never be well accepted by farmers until the grades are standardized both as to name and as to interpretation. Such standardization may come either through joint adoption by the larger packer organization or through state legislation and enforcement.

1It is significant that the market price quotation used by most local merchants is based on Chicago current receipt price. Terminal market grades do not reach as far back in the market process as stores. This is understandable, in that other terminal market grades are not widely understood, whereas a current receipt price is. Since 1923 gestures have been made by the New York Mercantile Exchange and the Chicago Mercantile Exchange to adopt a uniform grade system but without success. It is expected that within several months the Exchanges will be forced to conduct trading operations on the basis of grade to be promulgated by the Secretary of Agriculture. This may help to standardize and encourage grading at country points.
In summary, although there is at best a tendency to grade in accordance with U.S. Government grades, there is no reason to believe that those grades may be interpreted by the farmer as having the effect of a uniform and standardized grade system. Much of the grading which is carried on is of a nebulous character, tends to emphasize weight and shell cleanliness with less emphasis placed on interior quality. There is a sufficient number of larger dealers who are grading on a basis similar to the U.S. Grades, however, so that a rigidly enforced and well-supervised system of grading could be instituted at this level within a year's time. Since the surveys have been taken government buying at shipping point has helped considerably to inform plant managers of the advantages of a standardized grading system.

Egg Quality in the Des Moines Market

Although less than 15 per cent of the eggs produced in Iowa are sold to Iowa urban consumers, the quality of eggs supplied and method by which they are retailed to these consumers, should not be neglected. Within Iowa there are three counties which during most of the year, do not supply enough eggs to meet consumption needs. The city of Des Moines lies in the center of one of these counties, and was selected for special study by two groups: The Agricultural Trade Relations, Inc., and the Iowa Agricultural Experiment Station. \(^1\) The first study was made to

\(^1\)Agricultural Trade Relations, op. cit.

secure a picture of consumers' and retailers' attitudes toward the manner in which eggs were merchandised in Des Moines. The later study was concerned with the manner in which jobbers of eggs, retailers and consumers operated in the market as well as their attitude toward the market. A few observations derived from these studies will be given to present some of the problems of a deficit market in the heart of a surplus egg producing area.

Both studies depict some of consumers' dissatisfaction with the quality of eggs received in the Des Moines market in contrast to an almost apparent total unawareness on the part of the retailer of the consumers' dissatisfaction.

Most of the retailers handle "farmers'" eggs and assume the attitude that no egg could be fresher than "farmers'" eggs. In a similar spirit eggs are generally advertised and referred to as "fresh" or "country fresh". One retailer retorted quite indignantly when asked where she had purchased her eggs: "Right from the farm. The men just trucked them in." It so happened that the eggs she was selling showed smoke stain on the shell and were undoubtedly part of the lot of eggs dumped in the Des Moines market from an egg concentrating plant which had just previously been burned.

Roughly two-thirds of the retailers in Des Moines purchase their eggs from farmers (or farmers' representatives) during nine months of the year. The remaining three months they purchase some, if not all of
their eggs, from Des Moines egg dealers. Some stores even in the heart of the city have sufficient farmer trade so that it is only occasionally that they have to buy from city egg dealers. Almost all stores will purchase eggs from farmers. Few of the stores candled their eggs, claiming that they knew the farmers and could trust the source of supply. This practice occurred in spite of the fact that Iowa legislation requires that all eggs sold be candled. The larger stores, however, did candle their eggs before selling them to their customers. If the eggs were graded, they were graded on the basis of size, shell cleanliness and shell color. Quite generally retailers were unaware of the delicacy of the internal quality of eggs. When they were asked to describe the quality of eggs they purchased, the answer most commonly received was: eggs of a certain weight per case. And when several retailers were asked why they did not keep their eggs under refrigeration, they either said it was unnecessary or that consumers would think they were cold storage eggs.

Retailers expressed skepticism of egg dealers, suspecting that they were often times sold cold storage eggs without their being informed. In most cases their skepticism seems to have been warranted. They also were hesitant to trust the egg dealer, knowing that the egg dealer sorted out the farmers' eggs into different grades which the retailer did not fully understand. Furthermore, the retailer could generally purchase eggs from farmers at a lower price than they had to pay for graded eggs.
from the dealer, i.e. they could circumvent in part the costs of the extra handling by the egg dealer.

Eggs were purchased in Des Moines from some 50 retail stores, once each in September, October and November. At the time of purchase the dealer was asked when he purchased his eggs, the price paid and the grade bought. Price quotations by grade were also secured from Des Moines egg dealers with whom the retail data were checked. When there was a disparity between the information from the two sources egg dealers were asked to explain it. The dealers were unusually cooperative and were willing to give whatever information was requested. Some dealers maintained uniform grades and price quotations for all buyers; and all stores purchasing from these dealers quoted identical grade names and prices. Other dealers "made the grade and price to suit the retailer's demands." Although these dealers had their own definite grades or prices, these were not quoted to the retailer. It might be that "No. 1," "Extras," and "Selects" were actually all the same grade of egg, sold under these different names to different retailers. And retailers who were unwilling to pay the price for this grade were sold eggs at a lower price and commonly received cold storage eggs. Several dealers admitted that they mixed cold storage in with the fresh eggs, others said they told the retailer whether the eggs were cold storage or not only when asked.
The plight of the egg dealers was well expressed by one of the dealers: "Nine months of the year we are trying to find retailers who will buy eggs, the other three months we search the country for enough eggs to supply them. How can we develop a merchandising program? They don't want our eggs when the eggs are good and plentiful, but they want them when good eggs are scarce if they are to be had at all." The egg dealer is also frustrated by the ignorance of most retailers concerning egg quality. No dealer has been successful in selling to retailers a better quality egg. This is in part because retailers do not understand egg quality and also because they feel that consumers would be unwilling to pay the extra price over what they must pay for so-called "country fresh" eggs, or what the retailer would have to pay to get actually country fresh eggs.

There is also some reason to suspect that some of the egg dealers do not know egg quality. The largest supplier of eggs to Des Moines retailers, after having received a contract to supply two qualities of eggs to the largest chain store in Des Moines, requested that an inspection be made of these eggs. He said he was attempting to put in the top grade the equivalent of U.S. Extras and in the second grade U.S. Standards. Eggs were purchased at the stores and inspected. The results failed to bear out the policy of the dealer; there was no significant difference in quality of the two grades. Further inspection conducted at the dealer's establishment led to the belief that the grade of eggs packed for the retailer was determined more by the quality of eggs as received.
by the egg dealer than by the efforts of the grader; that is, the top grade, graded "extras" if the original eggs were of "extra" quality, and "standards" if the original fresh were of "standard" quality. The graders apparently had no standards of judgment.

The consumer reaction to the manner in which eggs are merchandised in Des Moines was similar to that of retailers; wherever possible they tended to purchase farmers' eggs and many reported that they refused to buy "store" eggs. Further statements concerning consumers' attitudes is given in the chapter on consumers' preferences.

The quality of eggs supplied by retailers to Des Moines consumers in the months of September, October and November in 1940 averaged U.S. Standards. The quality was lower in September than in November. Of the eggs sampled from the 55 stores during these three months only one dozen graded as high as U.S. Extra, while 5 dozen graded U.S. Trades or lower. It is of interest to note that California prohibits the sale at retail of eggs of U.S. Trades. The quality of eggs purchased from stores which reportedly purchased from farmers was slightly higher in one month and lower in the next than eggs purchased from stores which purchased eggs from egg dealers. The data do not support the notion that "farmers'" eggs sold in Des Moines to retailers are of higher quality than those reaching retailers through intervening middlemen.

In conclusion it may be said that the entire Des Moines egg market is confused. The quality of eggs offered at retail is lower than might
be expected considering its proximity to egg production areas. Until market standards are developed the market terminology and such grading as occurs may not be expected to improve.

Some Factors Which Retard or Promote Egg Grading

Several factors tend to promote development of egg grading in Iowa:

1. Purchases of eggs by the Agricultural Marketing Administration for lend-lease and relief distribution, and purchases by the Army and Navy have been effective in educating dealers in Iowa as well as in other markets about government grade specifications and standards. Much of the criticism of government grading, which appears to have been quite widespread in Iowa, has arisen out of misinformation and misunderstanding. Misunderstanding of U.S. grades, however, has not been confined to Iowa. One of the larger receivers in New York City confessed to the writer that he was quite chagrined after the first year of large-scale government buying of eggs at having failed to realize that had he known the government grades he could have made considerable money. And significant also are the reports of egg inspectors operating in the state of Iowa relative to the change in attitude of many of the larger dealers toward government grades. These dealers are beginning to appreciate the value of a strict grade program.

2. The egg grading short courses, conducted annually by Iowa State College in recent years, have undoubtedly helped to educate representatives
of the larger dealers in Iowa as to acceptable grading. Also there has been developed sufficient experience in handling these schools so that it is now felt that they could be conducted throughout the state in one-week intervals and in one year's time the entire state could be covered and all egg graders examined and certified.

3. There is considerable discussion to the effect that within a month or two the Secretary of agriculture will promulgate official egg grades. If this occurs it will mean that all exchanges under the provisions of the Commodity Exchange Act will be required to trade on the basis of these grades. It is expected that this action will greatly stimulate the adoption of these standards for grading in Iowa.

4. All states directly east of Iowa with the exception of Illinois have enacted egg legislation to protect their quality egg markets. There are indications that more states are beginning to realize that legislation is also needed to protect the consumers of lower quality eggs, and that "fresh egg laws" have been only a start.1 New York State


"After eleven years of egg law enforcement I firmly believe that all of the various groups affected by this law (poultrymen, wholesalers, jobbers, retailers and consumers) have profited greatly; the consumer by being assured of receiving the quality of eggs which he can reasonably expect when buying fresh eggs, and all of the others named by the elimination of unfair competition due to inferior eggs being sold as eggs of high quality, which was the case previous to the time the law went into effect.

"Wide publicity during the first few years of this law very definitely, I believe, made the producer more quality conscious and as a result
requires that all eggs sold at retail be graded and sold in accord with stipulated grade labels; while most of the other states require that if an egg is to be called "fresh", it must be "fresh" as defined by law. Because Iowa's eggs are sold outside the state, the full effect of these state laws will be felt in Iowa in time. Also it is quite possible that the Office of Price Administration may find it necessary to require that all eggs be sold at retail in accord with stipulated grades.

Several factors tend to retard development of egg grading in Iowa:

1. Lack of understanding of the problem. Probably the chief obstacle to reform is the lack of understanding of the conditions which exist and failure to appreciate what the possibilities are for reform. This fact was clearly brought out in the course of the survey made in the city of Des Moines. When the author was planning the above-mentioned surveys conducted in Des Moines he contacted Mr. Potter, the Secretary of the Des Moines Retail Grocers' and Meat Dealers' Association. Personnel and office facilities had been offered to the Agricultural Experiment Station by the Agricultural Trade Relations, Inc., a public relations

he is producing eggs of a much higher quality than was true in former years.

"One criticism that I have of this law is that it does not cover the complete range in quality, that is Specials, Extras, Standards and Trades, and I believe that a law similar to the one now in effect in New York State would prove even more beneficial than the type now in effect in Connecticut. I am of the opinion that it would be possible for us to change to this type of law any time without much opposition from any of the groups involved. This, of course, would increase the enforcement difficulties as they would be slightly more complicated. I would not, however, recommend that a state previously without any egg law adopt a compulsory law such as the New York State Law. They should work into it gradually using a voluntary law such as is now in effect in Connecticut."
organization of chain stores, and the local organization of
independent stores. Mr. Potter offered office facilities and
such other help as he might be able to render, on the stipulation
that the survey was not to be used to secure egg legislation. He
recognized the desirability of publishing the findings of the survey
which would be made available for the use of any groups which chose
to use them for support of legislation or any other purpose. When
the eggs were purchased at retail in Des Moines, Mr. Potter was
invited to watch the inspector as he graded the eggs and to
personally inspect the quality of eggs as retailed by the members
of his association. In his next newsletter to the association he
reprimanded the membership for the quality of eggs being sold.¹

October 29, 1940.

"Saturday morning I went over to one of the packing companies and
watched two boys from Iowa State College at Ames grade eggs. These
eggs were purchased in dozen lots from various grocery stores here
in Des Moines. Now if you will refer to the chart which I sent
you about two weeks ago, you will know what I mean when I say that
practically all of these eggs went under the classification of
'standards,' and not more than two out of any one dozen would grade
'special' or 'extra special'. A surprisingly large number were
checked or cracked and were classified as dirty. Out of this group
of eggs, I would say that most of them were storage or had been held
for some time. I used to think that I could tell a fresh egg by
handling it, but not these eggs as the shells appeared to have been
treated to either take off the shine, or to make them look clean.

"The story back of this is that you can get better eggs in the eastern
states than you can right here. Later on you will probably learn
that someone wants to pass stricter egg laws here in the state of Iowa.
It is my opinion that our best eggs may be going east or else we
have very poor enforcement of the egg laws we already have. Certainly
these eggs either were not candled at all when they came from the
Within a month he began talk of legislation, and within three months he had arranged for a meeting with a representative in the legislature.

2. Lack of group support for reform legislation

The carlot shippers' organization, it is felt, would favor the inauguration of a well-enforced and comprehensive grade system. This is in part understandable both because in most cases they sell into markets where eggs are bought and sold on a graded basis.

The retail store group as a unit sees gradings only as something which will hurt the small dealer and benefit the big packer. The leading farm organizations of the state have not pressed for egg grading legislation, although in 1940-41 the Iowa Farm Bureau Federation expressed an interest in formulating an egg grading bill to present to the legislature. But when the Farm Bureau promoted the "Iowa Poultry Producers' Marketing Association" and failed, interest ceased. The only reason given for the sudden loss of interest by their representative was that they had conducted research and concluded that it was questionable whether egg grading was beneficial to the farmer. Thus the only pressure group which has

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farmer or wore very poorly candled before they went into storage. I would like to suggest that you get after your produce men and urge them to be more careful, and to also get after the farmer or whoever they buy their eggs from. This is the only way I know of to change the situation. Also it wouldn't do a bit of harm to get after our state and city inspectors and see that they do a better job.

Another thing, too many stores are sending eggs out in paper sacks which, in my opinion, accounts for the large percentage of cracked and cracked eggs. Surely customers do not like to reach home and find broken eggs regardless of what they may have paid for them."
expressed interest in developing an egg grading program in Iowa has been the carlot shippers' organization. And this group is not powerful enough to secure passage of legislation without the support of the farm organization and the stores. In fact, this group fears openly to support legislation on the grounds that such action would only alienate the other group's support because of the suspicion that it would arouse that egg grading would bring benefits chiefly to "the big packer".

3. Lack of trust in ability of state to enforce egg grading

Historically there is a good basis for distrust of the state inspection service. (1) The inspection force of the Dairy and Food Division of the State Department of Agriculture is very much understaffed. It is charged with the enforcement of 26 laws and in 1939 had but 33 men "to administer efficiently and impartially the inspection service of the state". There were only 22 dairy and food inspectors. In contrast with this number there were in 1939 7,289 licensed egg dealers, 2,772 licensed poultry dealers, 3,653 licensed milk dealers, 3,207 licensed cream graders, 1,398 cream station licenses, 1,768 cream truck licenses, 476 creamery licenses, and many others. It should be apparent that such a variety of duties and such a multitude of licenses presents a job many times greater than such a small staff can administer efficiently and impartially. (2) The inspectors are subject to political influences. The only direct evidence at hand of political influence affecting the inspection staff was secured by
making a tabulation of the officers and employees of the Dairy and Food Division of the State Department of Agriculture for each year 1920-1940. Over this period of years the personnel of the Division varied in number between 46 in 1926 to 51 in 1940. There were no unusual changes in personnel until the year ending 1933 when the Democrats took office. At this time every state inspector but the chief, who was relieved of his duties in 16 months, was either replaced by a new appointee or the positions were dropped. Outside the inspection force in the division, 12 former employees were temporarily left in office. Most of these, however, were later dropped. During the years ending 1934, 1935 and 1936 the shifts in personnel were not unusually large in view of the fact that the majority of the personnel was new. In 1937 a new Secretary of Agriculture was elected and 13 employees were replaced by new appointments. There was no unusual disturbance in personnel again until after the next election in 1938 when the Republicans took office. Only 4 employees were permitted to keep office and two of these were persons that had been appointed during the former Republican administration. The entire personnel of the inspection force was changed. A number of persons formerly employed under Republican administrations were reinstated. Of the 13 persons reinstated, 9 had been employed last in 1932, 2 in 1934 and 1 in 1936;

all of them had been employed during Republican administrations although a few had held office for some time under the Democratic administration.

Although these data do not represent evidence of political activity on the part of personnel of the Division, it does present a picture of the insecurity of tenure and has some bearing on interest in efficiency in performing various jobs. The attitude of the public toward the functions of such a regulatory agency has an important bearing on the administration of the inspection service. An adequate and competent enforcement agency is possible only if the public and particularly the farmer and consumer pressure groups realize the importance of securing better enforcement of laws designed to protect the health and welfare of the people, to prevent fraudulent trade practices and laws designed to establish basis for fair trade. The public is to be blamed for tolerating a regulatory agency to which it cannot entrust the enforcement of laws the public deems necessary. The large number of laws to be enforced and the large number of dealers to be inspected by such a limited personnel together with the changes in personnel subject to the political party in power are both factors leading one to suspect inadequate inspections to ensure enforcement of all laws. Present egg legislation provides merely that all eggs bought be candled. Many buyers have reported to the author that no candling was done in their store of eggs purchased from farmers.
4. A general failure to develop better methods for grading. As early as 1916 Frank G. Urner, the erudite editor of the New York Produce Review, advocated that grade standards be established and be based on the individual egg. And in 1920, he stated more specifically the quality factors which should be considered when establishing grades. It was in 1921 that "preliminary research (on egg standards)

1In the larger markets, where standards have been attempted, there has been little effort to establish standards of quality based upon the unit of the egg, upon which eggs candled to practical uniformity could be graded, giving a useful standard according to the requirements of retail trade and the larger consumers, as well as for educational purposes in producing districts. It has occurred to the writer that by first establishing standards of quality based upon the unit of the single egg these might be used as a basis for the commercial grading of candled eggs. (N.Y. Prod. Rev. 42:1, April 26, 1916.)

2Paper read at discussion on Marketing, Farmers' Week, N.Y. State College of Agriculture, February 12, 1920. Frank G. Urner.

The foundation of all grading, meaning the establishment of grades, must be standard of the individual egg with relation to those characteristics and qualities which affect its worth and relative value. Chief among these are fullness, strength of body, color of yolk (all depending more or less upon freshness or environment) and size. It is my opinion that the egg grading rules formulated by trade organizations could easily be framed in such manner to retain their full usefulness as a means of classifying the irregular and mixed qualities of eggs which form the vast majority of the eggs of commerce, and at the same time serve as a means of classifying and grading eggs candled and assorted to a practical uniformity. This could be done by first standardizing the individual eggs, specifying quality requirements that would permit candling into the number of classes necessary to differentiate them just as they are, on the average, differentiated by the classes of trade who are now the final users, and by those who cater to such users. With such standard of the individual eggs as the basis, rules governing the grading of mixed qualities could be maintained, specifying the proportions of eggs of each class admissible or prohibited in the original case unit. (N.Y. Prod. Rev. v. 49 - p. 742-743 - February 25, 1920)
was begun in the U.S.D.A.¹ And in the Annual Report of the Bureau of Agricultural Economics (Division of Dairy and Poultry Products) for 1923-24, it is reported that "U.S. grades for eggs were issued in tentative form as a basis for discussion and criticism by all branches of the egg industry.²

The tentative grades were variously received. They served as the basis for state egg legislation and for negotiation of contracts. The industry was prone to consider them as a means of unifying the standards of the mercantile exchanges³ and as a logical device for

¹Lloyd S. Tenny, National Standards for Farm Products, U.S.D.A. Circular No. 0, August 1, 1927, p. 16. "It was in 1921 that 'preliminary research (on egg standards) was begun in the U.S.D.A."

²B.A.E. Division of Dairy and Poultry Products, 1923-24, p. 29 - says: "U.S. grades for eggs were issued in tentative form as a basis for discussion and criticism by all branches of the egg industry."


By a resolution passed by Chicago Merchant Exchange that body has made a step toward securing egg standards that will apply in all the markets of the country. — Attempts have been made in previous years to arrive at nationwide egg standards but these have been rather indifferently received. The next attempt may be made through cooperation with the B.A.E. It is felt that with the government taking the lead and by representatives of all markets working together with government representatives, the jealousies, or whatever it was, that prevented agreements in former efforts, will not arise. It will not be a question of adopting Chicago standards, N.Y. standards or the standards of any other market, but of adopting standards that will be accepted and put into force as government standards." (New York Prod. Rev. - 57:506 - December 26, 1923).
avoiding cold storage egg labeling laws.\footnote{Oct. 15, 1924. (V. 58 - p. 1046)} But by 1927 the cooperation of a large part of the egg industry was alienated.\footnote{(Chicago Dairy Prod. v. 34, pt. 1, Oct. 18, 1927. p. 18) At the Louisville, Ky. convention of the National P.B. & E. Association: "Mr. Potts could see government standard coming but those in the trade could not accept that idea. The trade view is to create their own standards and then invite the government in. Nearly everybody in the room had something to say and government fixed standards did not have a friend it seemed."} The editorials in egg trade journals of this period give the reader a feeling that (1) the industry did not want their grading subject to inspection by government men; (2) there existed a growing distrust of the Bureau of Agricultural Economics because of its efforts to encourage the development of farmers' cooperatives. (3) Mr. Potts of the Bureau of Agricultural Economics was apparently too bold and went faster in developing plans for a widespread grading program for

\footnote{The Review believes it to be impractical to attempt any government supervision over the quality of eggs in trade channels (apart from their wholesale edibility) unless they are sold under clearly specified government standards and branded accordingly. And we consider equally impractical any attempt to make the use of government quality standards compulsory. --- The Review is strongly convinced that the legal requirements for branding cold storage eggs should be abandoned in the interests of producers and consumers alike, and that all eggs should move through trade channels and into consumption on a basis of quality only. But it is equally convinced that public interests in respect to egg quality can be best left to the natural trade competition; that compulsory government supervision is unnecessary and impossible.}

\footnote{Government standards in the egg and poultry trade received a thorough discussion at the Louisville convention, but not a voice aside from Roy C. Potts of the government B.A.E. was raised in their favor. Instead the whole argument was opposed to the idea as being unnecessary, impractical and impossible at this time. The opinion generally held was that the trade is making good progress toward arriving at national standards without national legislation.}
the nation; (4) the industry began to realize that compulsory grading was in the picture for New York State had passed legislation requiring that all eggs be sold on the basis of the government grades. As had occurred in former years, the chief argument against grading from 1927 on was in terms of the inapplicability of candling as an accurate method for grading. Support for this argument was offered by the researches of Stewart, Gans and Sharp\(^1\) conducted in 1932 by the New York Agricultural Experiment Station and by other research studies conducted to determine the relationship between internal egg quality as determined by candling and as determined by actual broken out tests.

Since this time there has been no serious reappraisal of the U.S. Grades by the U.S. Department of Agriculture. And to date Dr. Stewart lists research on methods for determining the quality of the shell egg as one of the research problems most needed by the poultry industry.

The government ignored the problem in its failure to reassure the industry that adequate methods were at hand for measuring egg quality.

The Position of the Retail Store as a Buyer

So many factors bearing on egg grading center on the retail store as a buyer to call for separate discussion.

There has been some agitation to eliminate the grocery store as the primary receiver of eggs. It is held that most grocery stores do not have adequate facilities for holding the eggs; that eggs absorb store odors and they are not held at a temperature which retards adequately the loss in egg quality. These accusations are essentially correct, but they are not peculiar to stores alone. And agitation aimed to improve the facilities of market agencies for holding eggs should be aimed directly to effect this purpose.

It is also held that if stores were not permitted to buy eggs, the largest number of "current receipt" buyers would be eliminated and thereby permit the establishment and development of more grade buying. There are several matters involved in this argument:

1. Farmers tend to be suspicious of grading. Grading has been known to be used as a competitive device for drawing farmers' trade; high prices have been quoted for top grade eggs, but when the farmer sells, a small percentage of his eggs falls in the top grade. Also farmers feel that graders "tighten" up on their grading or "lower" their grading, depending on how the competitor is grading. Further reasons in justification of farmers' skepticism of grading have been given above.
2. Grading or no grading is not necessarily peculiar to stores, but more directly related to the volume of eggs handled by the market agency. It is uneconomical for an agency handling a small volume of eggs to employ a trained egg grader and to provide adequate grading facilities. It is recognized that stores on the average handle a lower volume of eggs than other market agencies, yet some stores handle a volume sufficient to grade efficiently while some agencies handle an insufficient volume to grade. Hence, if grade buying from farmers is to be encouraged, the agitation might better be aimed to eliminate all small volume egg dealers. However, such a move would not necessarily mean that eggs would be graded and if graded, there is no reason to believe that they would be graded in accord with desirable standards. If adequate and desirable standards of grading are to be secured, the standards should be stipulated and all buyers whether stores or carlot shippers, low volume or high volume buyers, should be compelled to conform to these stipulated standards. Such standards might include: (1) that the grader be subject to examination and be certified before he is issued a license to grade; (2) that all eggs be graded by a licensed egg grader; (3) that the type of equipment and facilities for grading be inspected and certified as adequate for performing the grading operations; (4) that no dealer be permitted to buy eggs ungraded.
It is to be recognized that small volume dealers would probably find it uneconomical to conform to these standards. Hence, these standards would, in effect, discriminate against the low volume dealer, but not because they are grocery stores or low volume dealers, per se.

3. Grocery stores have used their egg buying as a means of drawing farmer trade. In many communities in Iowa, stores pay a higher price to farmers if they take their egg money in the form of groceries, "in trade". The "trade" price is generally a cent or two higher per dozen than the cash price. The following data give a picture of the importance of cash and trade methods of buying by stores. In six counties in Iowa 710 consumers were asked whether they sold their eggs on a cash or trade basis. There were 288 who reported selling to stores of which number 253 answered the question; 70 per cent reported selling on a trade basis, 23 per cent reported selling on a cash basis, and 7 per cent reported selling on both bases. Slightly less than 50 per cent of the 1222 stores surveyed in 1940 reported quoting a "trade" price for eggs.¹

Stores not only want farmer trade, but they also want the eggs for resale to consumers. One store in Des Moines has used eggs as a

¹These data are difficult to interpret accurately because the basis of buying varies by communities; that is, competition between stores in a community generally results in all stores pursuing the same buying policy. No check has been made to determine whether a larger per cent of reports were received in communities where a "trade" price is quoted or whether these data represent a picture of all communities in Iowa.
two-way price leader. In the spring the store advertises over the
radio to producers to bring their eggs in to the city store and
quotes a higher price than the farmers could otherwise secure. The
store, flooded with eggs, then has the alternative of either selling
the surplus eggs to the carlot shipper at a lower price than it paid
the farmer, or of advertising to consumers "country fresh" eggs at
the lower price. Eggs as a "loss leader" to consumers and producers
yields the store enough extra store trade to carry the loss on eggs.
It is difficult to secure accurate data, but it is recognized by
some stores at least that they lose money on their egg business.
They remain in business because they feel compelled to buy eggs or
lose their farmer trade. One store manager in Grinnell, Iowa, told
the author of an incident which took place in that city, an incident
which undoubtedly occurs from time to time in many other communities
in Iowa. One store in Grinnell was buying eggs from farmers at
the same cash price as were all the other stores, but this store
was not receiving enough eggs to supply its "over-the-counter" trade.
It had the alternative of raising the price to farmers by a cent a
dozens and presumably secure more eggs and get farmer grocery trade,
or of purchasing eggs from a dealer at a cent or two a dozen more
than it would pay the farmer. The store raised its buying price
and issued a general party line telephone call to farmers notifying
them of the increase in price. Within several hours all the other
stores raised their prices. At the end of the week the manager reporting the affair said he met the manager of the competing store at lunch and quizzed him as to why he had raised the egg price. When he learned of the reason he said he commented: "The rest of us raised our price to meet yours, didn't we? You didn't get any more farmer trade and we all lost money on our eggs." The following week the price fell back to its original level. Then the Chamber of Commerce reported that the farmers were getting a better price for their eggs in a neighboring town, so the price was again raised.

This same store manager related that several years ago all stores agreed not to buy eggs and to turn the egg business over to the regular egg dealers in the town, two of which buy on grade. One store refused, and as a result, all stores continued to buy eggs. The author visited the other store managers and all but one volunteered that he wished he were out of the egg business. One manager put it this way: "I know I don't sell consumers a good egg and they have a right to complain. On the other hand, I can't be particular with farmers or they'll quit trading with me. I wish all stores were out of the egg business, so I could get out too." This is not intended to prove that stores want to be out of the egg buying business, but only to show there is some reason to believe that some stores would favor such a move.

4. Competition for farmer trade exists between communities. It is in the interest of all merchants that farmers come to town to trade.
For this reason communities keep track of what neighboring towns are paying for eggs and tend to set their price accordingly. Also there is a feeling that if farmers are paid cash for their eggs, they will do more of their buying at the county seat and the small town merchants will lose trade.

In summary, then, agitation to eliminate stores as egg buyers is misdirected. If holding facilities for eggs are to be improved, direct measures should be enacted to improve them. Likewise, if it is deemed advisable to encourage grade buying and prefer grading methods, a direct effort to effect these purposes would be preferable to measures directly discriminatory of stores.

Nevertheless it is recognized that the inauguration of a universal and mandatory grade buying program for all egg dealers would affect adversely low volume dealers, the most numerous of which are stores. Hence, the question of whether a grade program should be instituted rests probably less on the merits of grading as such and more on judgments concerning the status of the county merchant, the status of the town and village relative to county seat cities, the credit problems of the country merchant, etc.

It is questionable whether direct measures need be taken to improve holding facilities if dealers were required to buy and sell by grade. The loss in quality would be made explicit in terms of revenue decreased by egg deterioration; and the dealer would individually match the cost of loss in quality against the cost of improved holding facilities and act so as to maximize his profits. In lieu of a grade program, the buyer is not made mindful of the loss of quality. Bills have been introduced to restrict egg trading to only those with defined holding facilities. Such legislation is intended to restrict the business into the hands of a relatively few firms and has no economic justification.
Summary of Factors to be Reckoned With in Developing
An Egg Grading Program for Iowa

1. At least ninety per cent of the eggs in Iowa, at the time when they are laid, are of U.S. Extra quality or better. All eggs are potential rots and will be rots if they are not cared for properly. An essential problem is, therefore, not how to produce better eggs, but how to maintain the quality product that the hen produces.

2. If the farmer is to be expected to maintain the quality of his eggs, he must find it profitable and know how to do it. The extension service and others provide farmers with information on how to maintain quality. But the techniques for quality maintenance recommended require extra time and care which the farmer may think will net him higher income if spent on hogs. Raising the quality of eggs offered on the market by farmers requires both an economic incentive and knowledge.

3. The bulk of Iowa's eggs are sold by farmers on a current receipts basis. This means that farmers with inferior eggs get as high a price for their eggs as farmers with superior eggs. This condition inhibits developments that would improve egg quality. No economic incentive is offered.

4. Egg grade buying practices that do exist are often not satisfactory.
   a. Occasionally an egg buyer uses grades as a means of quoting a more attractive price than his competitor, yet pays the farmer
no more or perhaps less for his case of eggs. This is done by putting a large percentage of the eggs in the low grade. Quite frequently in such cases two prices are quoted and the difference between them is great.

b. But even where egg-buyers buy on fairly reliable grades, uniform from day to day and from one case of eggs to another, dissatisfaction may arise. In such circumstances each dealer may have his own system. Farmers usually are not familiar with grades used by those to whom they might sell, and consequently cannot compare one grading system with another. In other words, given the grade-prices of all the dealers, but not knowing how a lot of eggs will grade out, it is impossible to determine which dealer will pay the most for the eggs.

There are several results: (a) Farmers tend to sell their eggs current receipts since in this case they at least know how much they will get for their eggs. (b) They may sell their best eggs graded and get the premium prices, and then sell the undergrades elsewhere as current receipts. (c) A general distrust and dislike for grading develops among farmers.

5. The bulk of Iowa's eggs is shipped to the large consuming centers. Before these eggs reach the ultimate consumers, they are graded and perhaps regraded many times. Thus, Iowa's eggs are being graded, but these grades and grade prices are being felt by but few farmers
245.

in such a manner as to make them conscious of the demand in the
major consuming centers for quality eggs.

6. Although there is little standardization of egg grade terminology
and specifications, there does seem to be a tendency toward the use
of federal grade specifications.

7. In Iowa's local consuming markets, wholesalers, jobbers, produce
houses from which retailers buy eggs at certain seasons do not have
comparable grades. Thus the retailer is unable to match price
quotations of various dealers for the grade he had found by exper-
ience his clientele wants. He may either decide that eggs are eggs
and take those offered at the lower price. Or he may depend on one
dealer whose eggs he has some time found satisfactory and hope that
the price he pays is "just". At the same time he may gamble a bit
by taking a case or two of some lower-priced eggs from a farmer or
huckster, thus proving his lack of complete dependence on any one
dealer. There is considerable evidence that egg dealers are often
careless in the grading of even their so-called quality eggs.

8. Many retailers unable to buy from wholesalers with assurance of
quality and desiring farmer trade tend to buy from farmers. Because
of seasonal production, this buying procedure becomes very complicated
since during the low point in production retailers must find other
sources than farmers for their egg supply, and at the high point in
production retailers receive a surplus of eggs which must be moved
into other markets. As one wholesaler put it: "In the late fall I search the country for enough eggs to supply the retailers, while in the spring I search the market to find an outlet for my surplus of eggs."

9. Consumers likewise find it impossible to compare the prices of various retailers by grade and to be sure of both quality and price per quality. Both the statement of the clerk and the price seem to be very unreliable indices of quality. Even the reputation of the store may not help the consumer because as indicated above, the retailer unless he knows egg quality may not be able to keep on hand the quality of eggs the consumers want. As a result consumers may cut their consumption of eggs. On being unable to buy from retailers with assurance, they tend to buy direct from farmers whenever possible. Although buying from farmers may provide a satisfactory solution for some consumers, it is often a less convenient method than getting eggs at the store. Many consumers will probably feel that it is easier to use other foods.

10. There is evidence that consumers do consider the condition of the yolk and the white when describing the freshness of an egg. Taste, smell, shell color, cleanliness and firmness are also "quality" factors in the minds of the consumers. The shell condition may be observed by the consumer, whereas the condition of the yolk and white and the taste and smell cannot. Some rough idea of the condition of
the yolk and white may be had by cajidling. Without tasting and smelling the opened egg, flavor and odor can be judged only through knowledge of the history of the eggs, except in the extreme case of rots and molds being present. These can be determined by cajidling. Egg marketing organizations which maintain uniform flock management practices of its members and large single flock owners do merchandise their eggs on a "history" or reputation basis. But where there are large numbers of small flock owners feeding differently and caring for their flocks differently, as is the case in Iowa, then cajidling is probably the best tool for discovering egg quality even though it does not tell the full story of odor and flavor.

11. With recognition that cajidling does not tell all the facts a consumer or retailer would like to know, it should again be pointed out that it gives much important information, and it is the best means available apart from a detailed history of the egg of getting some idea of quality. Furthermore, it should be remembered that Iowa eggs that go to eastern markets are being graded by cajidling.

12. Many farmers, egg dealers, retailers, etc., are well aware of the benefits to be derived from egg grading. Individually and in small groups they have tried to introduce better practices. Their efforts are often ineffective because full benefits become apparent only when egg grading becomes generally and uniformly adopted.
Summary and Introduction

In Chapter I was presented the role of grading in the market and the general advantages to be derived from a grade program were cited. The following chapter was devoted to the establishment of grade criteria; the basis for grade specifications and number of grades which should be promulgated for use at any market level. Both because consumers' preferences have been accepted as the fundamental basis for grade specifications and because there exists in the literature but limited reference to studies of consumers' preference, Chapter III was devoted to an appraisal of methods used for measuring consumers' preferences. In Chapter IV were discussed studies bearing on consumers' preferences for foods other than eggs. From this point on, attention has been centered upon problems peculiar to eggs. Consumers' egg preference studies and their findings were presented in Chapter V. Chapter VI was concerned with the egg marketing problems of Iowa, which lies in the heart of the egg producing area of the country. Description of the market made it evident that little progress so far has been made in egg grading. There was also presented a discussion of the factors in the Iowa situation which are, on the one hand, influencing the development of grading and, on the other, retarding it. It shall be the purpose of this chapter to consider a
positive program for Iowa which has as its goal the attainment for Iowa producers and consumers of eggs the benefits to be derived from grading and which recognizes the present forces, political and non-economic, as well as economic, which are likely to influence such a program.

**Economic Adequacy versus Political Feasibility**

It is questionable how advisable it is in such a dissertation as this to formulate a specific bill formulating grading legislation which, in view of existing or non-existing political pressures, could possibly become law, and yet which would be considered adequate legislation in terms of the criteria for market efficiency formulated in the earlier chapters. This is to say, how far should one go in laying out a positive program which fails to satisfy fully the criteria established for market efficiency, yet which is politically feasible; or in laying out a positive program which would be entirely consistent with and would satisfy the established criteria, but the enactment of which in view of the attitudes and influences of pressure groups as described in Chapter VI would be utterly inconceivable. Political feasibility and adequacy in terms of criteria established must both be considered.

If major emphasis were placed upon political feasibility of proposals, it would then be necessary to formulate as adequate a program as might likely be acceptable now, together with successive programs more
and more adequate which could be enacted from time to time as political pressures permitted. Any such listing would be of dubious value in view of the limited knowledge relative to the intricacies of present and future political action. Consequently the author chooses not to discuss rigid rules and regulations which might be found acceptable from time to time in different political frames of reference, but to discuss actions which might be taken in such a state as Iowa to accomplish the benefits of grading and because of this to improve the efficiency of the market. The proposals are couched in the form of proposals for action to be taken by an "Iowa Egg Marketing Commission". This commission would be charged with responsibility for improving the efficiency of egg marketing in Iowa and thus would presumably be receptive to proposals concerning grading. It would be composed of representatives of the important pressure groups together with state representatives of the research, education, and enforcement agencies. The commission would entertain proposals, formulate programs, and put them into effect as fast as the pressures permitted. Thus the commission charged with improving the market will take such action as is proposed only by degrees and to the extent to which the representative pressure groups permit. By this procedure it will be possible to set forth in general and broad outline how such a Commission might function, subject to the checks and restraints of existing attitudes and pressures as reflected by the members of the Commission.
State Egg Legislation

Before engaging in further discussion of the Commission it may be well to review the types of state egg legislation found in other states and pressures which have brought about their enactment. Such a review will provide a perspective with which to view proposals for Iowa.

Although State egg grading legislation was first adopted in the Midwest, the Midwest remains without adequate egg legislation. Most Midwestern legislation may be traced back to a conference held in St. Louis in 1919, at which time there was developed a model "Good Egg Law". The characteristic of this law is that it prohibited dealers from trading in inedible eggs and thus required that all eggs purchased should be candled before payment was made. This law is called a "candling law", and the type of buying which it requires is called "loss-off" buying; that is, when making settlement, the buyer takes "off" for the eggs which are "loss".

This law remains in effect in many states, but it is not generally enforced because most states do not have an adequate staff of enforcement agents and because the law is difficult to enforce. Possession of inedible eggs does not provide sufficient evidence to prove that the dealer bought the eggs as inedible, and it is also difficult to prove conclusively that the buyer did pay for the inedible eggs. There are two recent developments in the Midwest which reflect the extent to which candling has been enforced. Kansas, this past summer, is reportedly making a concerted drive to establish loss-off buying. Goss expected
that in the next legislature in Minnesota a bill with the support of the Department of Agriculture, Dairy and Food Division, will be introduced which aims to establish certain requirements for the trading in eggs so that the candling provision of the bill will be enforceable. Mr. Goss feels that enforcement of even an egg candling law would greatly improve the Minnesota egg marketing situation, and that consideration of a more advanced egg grade buying system applicable to buyers in Minnesota is out of the picture of reality for the present. Country stores would kill an attempted passage of a bill which required grading.

The more advanced state egg legislation, that is, legislation applying to more refined grading than mere selection of edible from inedible eggs, is to be found in states other than in the Midwest where any of the following pressures are to be found: (1) pressure to protect consumers; (2) pressure from commercial egg producing interests, close to the consuming market, to protect their market for quality eggs; (3) pressure from producers who are organized into cooperatives which have developed fairly complete grading systems as a part of their merchandising program and have aimed to standardize the local market so that eggs may be marketed efficiently.

None of these pressures is significant in Iowa. Although it is speculated that had the Iowa Poultry Producers' Marketing Association, 

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a cooperative with extensive membership in southeastern Iowa, not failed, it is quite likely that it, through the support of the Iowa Farm Bureau Federation, would have secured more adequate legislation and enforcement in Iowa. There were decided developments in this direction when the cooperative failed.\(^1\)

Can Egg Legislation of Other States Be Used as a Model for Legislation in Iowa?

There is state legislation now enacted in other states which could be enacted in Iowa and would prove to be more satisfactory in terms of the problems of Iowa egg marketing than existing legislation. All state egg grading legislation, other than the candling laws, concern the labeling and grading of eggs sold at retail. State legislation doesn't require that eggs be purchased from farmers on a graded basis.

Although there is need for uniform standards for grading of eggs sold at retail in Iowa, this market does not constitute the important area for Iowa egg marketing. It is important in Iowa to devise a system by which eggs are bought from farmers on a graded basis so that consumers'

\(^1\)The author and Mr. Ralph Baker of the Iowa Agr. Ext. Serv. had been requested to attend a conference with the legal advisor of the Iowa Farm Bureau Federation at the time the fatal decision was rendered the cooperative. The proposed meeting after some delay, was postponed, never again to convene.
preferences may be reflected back through the marketing process to the producers in terms of prices for well defined qualities in terms of grades. Once this technique is developed and eggs in Iowa are bought and sold on recognized grades, it will be a simple matter to get sales by grades in retail stores.

Special problems will also arise in connection with the dried and frozen egg industry in Iowa with the possible development of shell treating or egg processing, with shell egg storage, with washing of eggs, with use of sterile incubated eggs, etc., as industry and research develop new techniques and increased present knowledge of eggs and egg products. These are not now the major problem for Iowa. Again the major problem for Iowa egg marketing is to devise a market system whereby the demands for the different qualities of eggs are brought into the consciousness of the farmer in terms of price alternatives. Then the farmers and successive market agents can allocate their resources more efficiently in terms of supplying the qualities of eggs demanded.

Program Planning for Iowa Egg Marketing

Attention will now be given to the objectives, the organization and the functions of an Iowa Egg Marketing Commission. The formulation of this organization will set forth in broad outline what is needed to correct the inefficiencies of the Iowa egg market. The general direction toward reform will thus be established.
The objectives of the Commission shall be to improve the marketing of Iowa's eggs and in so doing improve the consumption and production of eggs. It shall use as its criteria of an efficient market one that permits the consumer to register relative preferences for various egg qualities in the retail store, and permits other users of eggs and market agents to register their demands in their respective buying markets, and translates these preferences and demands back through the market channels in terms of price differentials to producers; all of which should be effected with little confusion and misunderstanding with regard to the interpretation of grades and at an expected cost of regulation and operation lower than the expected economies effected through reduction of marketing costs and expected increase in total revenue.

General procedure

1. It is recognized that improvement in market efficiency from grading arises chiefly because people are provided a common language in which to express specifically their supplies and demands. Hence, it shall be a duty of the Commission to promulgate and enforce uniform grades, stated in simple terms which represent the ordinal relation of the qualities; and to inform all parties concerned as to the full meaning
of the grades so that they can interpret these grades in terms of
the uses each person might wish to make of the product.

2. It is recognized that the number of grades may be increased almost
without limit. The Commission shall pursue a policy of increasing
the numbers of grades employed at any market level until the point
where the total cost to all parties involved of maintaining the
additional grade is not greater than the increment in total revenue
secured from the sale of eggs with the added grade; provided, how­
ever, that allowances are made for long-run consideration.

3. Furthermore, it is recognized that market efficiency from grading
arises also because price data take on more definite meaning; the
item for which the buying or selling price is quoted is more clearly
defined. Hence, it shall be an objective of the Commission to
require price records and records of market transactions so that
highly reliable market price data as between different markets and
sections of the market in Iowa shall be available to all buyers and
sellers as well as to the researchers.

4. Inasmuch as price and grade are so interrelated (that is, price is
quoted per unit of grade) it would seem advisable to maintain the
grading process separate from either the buying or the selling oper­
ations so that each party to a transaction could quote their buying
and selling price on the basis of grades determined by a party
independent of either. Under present practices, the price a buyer
is willing to pay is determined in part by whether he is given the
power to determine the quality of eggs upon which he is to make payment, or whether the seller determines the quality. Hence, the Commission shall be charged with power to regulate all grading operations. This may mean the training, certification and regulation of all graders; it may also mean the establishment of egg grading stations independent of control of either the buyer or the seller.

5. Insofar as there are general advantages to be gained through uniformity of standards, not only within the state, but within the country as a whole, the Commission shall generally adopt grades in conformity with those promulgated by the Secretary of the United States Department of Agriculture. Also it shall not proceed in such a way as to establish regulations which constitute trade barriers to eggs of other states.

Organization

Although it is recognized that there exist in Iowa the State Department of Agriculture charged with the enforcement of egg legislation, the Iowa Agricultural Experiment Station which conducts research in eggs and egg products and the marketing of them, and the Iowa Agricultural Extension Service which carries forward the educational program among the egg producers, together with farm organizations which are composed in part of egg producers and special commercial interest groups engaged in egg marketing such as carlot shippers' associations, or such as hatcherymen and feed dealers, which service egg producers, there exists no agency in the
state which considers as its function or within its power to engage in
effective planning of an efficient program for the marketing of Iowa's
eggs. Uppermost in the proposed plan of organization is an attempt to
establish a planning commission, staffed by research, education and
enforcement arms in order that the plans formulated may be developed on
the basis of adequate information and be effected through the coordin­
ation of these essential functions.

The Commission shall be established by the state legislature and be
vested with powers to promulgate rules and regulations consistent with
the above stated objective and general procedures. All existing laws
and regulations shall be rescinded.

The Commission shall be composed of representatives of and shall

1 For example, note the composition of the Indiana State Egg Board.

Section 2. Creation of State Egg Board. There is hereby created
in the State of Indiana a state egg board and hereinafter referred
as the "board", to consist of five members. Said board to be
composed of representatives chosen within thirty days after this
act is in full force and effect, one of which shall be chosen by
the State Poultry Association of Indiana, Inc., who shall hold office
for two years from said date, one by the Indiana Farm Bureau, Inc.,
who shall hold office for two years from said date, one by the Indiana
Retail Grocers and Meat Dealers Association, Inc., who shall hold
office for three years from said date, one by the Indiana Chain
Store Council who shall hold office for three years from said
date. All subsequent appointments to said board shall be nominated
as above specified and the terms of office shall be for three years
and until their successors are duly appointed. The board shall meet
and organize for work within thirty days after its appointment. The
board shall elect a president, vice-president, and secretary-
treasurer, at the organization meeting, and annually thereafter.
All members of said board shall receive as compensation the sum of
be appointed by the several organizations mentioned in the preface to
this section together with representatives of the consuming public.
The Commission shall function as a planning committee and shall formulate
all policy decisions.

A Commissioner, responsible to and selected by the Commission, shall
be charged with administering the enforcement of the rules and regulations
promulgated by the Commission and for administering the educational and
research programs of the Commission. The Commissioner should be a
licensed federal egg inspector or be eligible as one, and approval of
his appointment should be secured from the primary functional agencies
with which the Commission should cooperate. These functions and functional
agencies would include: (1) Enforcement, Secretary of the State Department
of Agriculture; (2) Education, the Director of Agricultural Extension
Service; (3) Research, the Director of Iowa Agricultural Experiment
Station.

The Commission shall be staffed by three functional units: a
research unit, an educational unit and an enforcement unit. The function
of the research unit would include:

1. Conduct surveys of consumers' preferences and commercial and consumer
uses, and to scrutinize constantly the appropriateness of the grade
specifications;

not to exceed eight dollars for each day actually employed in the
work of the board and all members of the board shall receive their
necessary traveling and hotel expenses while engaged in the work of
the board. Said board shall provide itself with suitable office,
equipment, supplies and facilities for the conduct of its business.
All vacancies of said board shall be filled in the same manner as
provided for in the original appointment and shall be for the
unexpired term. (Acts of 1939 - Indiana General Assembly, Chapter 117,
p. 567-571.) Quoted from Indiana State Egg Board. Fresh eggs in
2. Estimate demand and supply, and from empirical data secured through sample studies (grades may be altered for experimental purposes in certain localities and under semi-controlled conditions) investigate the need for changes in number of grades, grade terms, specifications, etc.

3. Scrutinize the price reports and quotations published currently, and in so doing, to aid in grade enforcement (look for unusual price changes which may be justified only through under-grading) and to aid in accomplishing the intent of the "unfair discrimination in purchases" law,¹ which to date has been almost unenforceable because of lack of grading;

¹Sec. 9886. Unfair discrimination in purchases. Any person, firm, association, company, or corporation, foreign or domestic, doing business in the State, and engaged in the business of purchasing for manufacture, storage, sale or distribution, any commodity of commerce that shall, for the purpose of destroying the business of a competitor or creating a monopoly, discriminate between different sections, localities, communities, cities, or towns, in this State, by purchasing such commodity at a higher rate or price in one section, locality, community, city, or town, than is paid for such commodity by such party in another section, locality, community, city, or town, after making due allowance for the difference, if any, in the grade or quality, and in the actual cost of transportation from the point of purchase to the point of manufacture, sale, distribution, or storage, shall be deemed guilty of unfair discrimination, which is hereby prohibited and declared to be unlawful; provided, however, that prices made to meet competition in such section, locality, community, city, or town shall not be in violation of this section.

Iowa Code, Title XXIII, Chapt. 432, Sec. 9886.
4. Secure estimates of net revenue to be derived from price and sales information and secure estimates of costs in order that the criteria of number of grades can be applied.

5. Develop techniques for grading and measurements.

6. Develop a sampling procedure to be used in grading, and trace the effectiveness and reliability of grading over time.

The functions of the educational unit would include:

1. Educate all (producers, consumers and market agents) as to the full meaning of the grade specifications.

2. Interpret for the producer, consumer and market agent the full meaning of grading so as to augment and speed up the dynamic process, help them adapt their practices to an optimum position, stimulate the adoption of not "the better" practices, but economical practices.

3. All these may be done through normal channels for publicity such as radio, newspaper, etc. It also can be done through ingenious use of leaflets, inserts, stickers attached to the containers, sales slip, grade sheet. The latter techniques have one merit in that the material goes to a known public, e.g., on the grade slip the producer can be told not only that he was selling underage products, but a form statement giving the correction could be attached. Likewise, consumers could be told the meaning of not only the grade purchased in terms of its uses, but also the quality of the grade above and the grade below.
The function of the enforcement unit would include:

1. Enforce the regulations promulgated.
2. Educate the graders as to the techniques of grading.
3. Aid the research unit in appraising and improving the techniques for grading.

Cooperative agreements shall be drawn up between the Iowa Egg Marketing Commission and the existing organizations functioning in the state and presently engaged in research, education, and enforcement in order that they may carry forward jointly the activities with which the Commission is charged. These organizations are, respectively, the Iowa Agricultural Experiment Station, Iowa Agricultural Extension Service, the State Department of Agriculture, and the Agricultural Marketing Administration of the U.S. Department of Agriculture. It is intended that by these agreements it will be possible to reduce duplication of activities, and that by these agreements it will be possible for each of the existing functional organizations in the state on the one hand to direct its activities in egg work in conformity with an integrated plan for state-wide action, a plan recognized as formulated by the Commission, and on the other hand, to integrate their activities in egg work with their activities relative to the many other commodities with which each is normally engaged. These cooperative agreements shall be made formal by the use of a memorandum of understanding drawn between the Iowa Egg Marketing Commission and the above mentioned agencies, made jointly or separately, relative to: education, research and enforcement necessary
for increasing the efficiency of egg marketing in Iowa. The specific
duties of each agency and the contribution of funds to be made by the
Commission for the support of the cooperative activities of the collabor-
ating agencies should be clearly defined.

The Commission should be directly subsidized by the State for a
few years until it becomes established. Although there is no good
reason why the egg industry should be taxed to support activities other
than egg market regulation, there may be justification for subsidizing
at the outset a commission which, in time, will effect economies many
times greater than the original subsidy. The Commission shall keep
accurate financial records of all funds budgeted to it and of funds
which accrue to the state from licenses, fees, fines and special taxes
it imposes on the egg industry. It will also be necessary for the
Commission to keep other records such as estimates of cost of grading,
the cost of enforcement, etc., so that it may justify its operations
in accord with the general procedures established.

Possible action to be taken

In conclusion it is difficult to predict how rapidly the Commission
might act toward accomplishing its objective. Probably its first task
would be to apprise itself of the status of the egg marketing situation
in Iowa. It might immediately declare null and void all rules or
regulations which have been established and are not enforceable, including
the existing egg candling and cold storage laws. A second move it might make would be to stabilize grade buying from farmers and grade selling to retailers and consumers by establishing uniform and standard grades, and prohibiting the use of any other grade labels or designations than, say, the name of the agency and perhaps name of the grader, and date of grading. This is to say, grading might well be inaugurated on a permissive basis. Such action would greatly enhance the prestige of grading by eliminating the confusing grade terminology. As a part of this action it may also be necessary to certify egg graders and require that all eggs to be sold as graded must have been graded by a certified and licensed grader; all other eggs would be sold as "ungraded". Later, procedures may be enacted which would concentrate the eggs in local markets so that the cost of grading would be reduced and further grading made economically possible. Such a procedure might be devised so that eggs marketed locally would be paid for in the form of an egg grade receipt redeemable at local stores at a premium. Thus local stores would not oppose further steps which might be taken to bring grading closer to the farmers.

In another direction, regulations concerning the posting of prices by grade should be inaugurated immediately so that accurate price data could be quoted publicly and be made available to the Commission and price reporting services.
An immediate function of the Commission would be to administer under a Federal-State cooperative agreement with the Agricultural Marketing Administration of the U.S. Department of Agriculture inspection of eggs sold to the government. This work in Iowa is now being undertaken by the Iowa Agricultural Extension Service, but only because the State Department of Agriculture refused to undertake it. The Commission would be the logical agency in Iowa to perform this regulatory work.

The Commission would develop adequate programs as fast as the pressures expressed through the personnel of the Commission would permit.
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-------- The relation of the condition of thick white to interior quality as determined by candling and from the opened egg. U.S. Egg & Poultry Mag. 38, no. 9:38-41. September, 1932.

-------- The relation of the color of yolk to the interior quality as determined by candling and from the opened egg. U.S. Egg & Poultry Mag. 38, no. 10:44-48. October, 1932.

-------- The relation of yolk index to the interior quality by candling and from the opened egg. 38, no. 11:35-39. November, 1932.

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AGENCIES COOPERATING
The agencies cooperating were:

Agricultural Trade Relations, Inc.

Des Moines Retail Grocers and Meat Dealers' Association

Iowa Agricultural Extension Service

Iowa Carlot Shippers' Association

Iowa State Department of Agriculture

Work Projects Administration

Official Project #265-1-72-116
Dear Cooperator:

We are making a study of rural and urban people's preferences for eggs and uses of eggs during the winter months. We would appreciate receiving your answers to the following questions. (Please mail this form to Miss Cessna, Morrill Hall, Ames, Ia., or use the addressed envelope which requires no postage.)

NAME ______________________________ ADDRESS ______________________________

What is the number of hens in your laying flock?____ Breed?____

How many eggs did you market last week?____ No. of times?____.

Were your eggs bought on a graded basis? Yes__ No__. Price rec'd: $ per dcz.

To whom sold? Store____, buying station____, hatchery____, truck buyer____, processing plant____, other____.

Do you sell only clean eggs? Yes__ No__ No. of persons eating at home last week____.

Do you produce infertile eggs by keeping roosters out of flock? Yes__ No__

Do you make any attempt to feed for a particular yolk color? Yes__ No__

Where do you store your eggs while held for market?____________________________

How many eggs delivered to market were rejected and returned to you because of blood clot or meat spot? Last week____. Do you ever use such eggs for poaching or frying? Yes__ No__. For baking? Yes__ No__

Have you noticed any difference in flavor of eggs which may have been caused by green or other feed? Yes__ No__. What flavors____________________________?

What other things have you noticed that cause differences in flavor of eggs?

Have you noticed any difference in taste between white, cream, or brown shelled eggs? Yes__ No__; or in yolk color of these eggs? Yes__ No__.

Do you prefer one shell color over another? Yes__ No__ Which?________________________

Do you use the same eggs for poaching, frying, or for baking? Yes__ No__

(If not, what kind of egg do you prefer for poaching?__________; for frying?__________; for custards?__________?)

How do you tell a fresh egg?____________________________

What kind of eggs do you consider unfit for home use?______________________________

How many times did you serve eggs for breakfast last week?____ How prepared?____

At how many other meals last week did you serve eggs?____ How prepared?____

How many of eggs used did you purchase last week?____ Price paid:___ $ per dcz.

From whom did you purchase eggs? Store____ Farmer____

How many of eggs from your own flock did you use last week?_____________________

What color of yolk do you prefer? Light____, med. light____, medium____, med. dark____, dark____

What color yolk don't you prefer? Light____, med. light____, medium____, med. dark____, dark____

Are you particular about shade of yolk color for baking eggs? Yes__ No__ for frying and poaching? Yes__ No__

What differences exist among members of your family in their preferences for eggs?

USE OTHER SIDE FOR MORE SPACE
Dear Cooperator:

We would appreciate receiving your answers to the following questions. Please mail this form to Miss Cesena, Morrill Hall, Ames, Iowa. The addressed envelope requires no postage. Please note that most questions call for information concerning last week only.

NAME__________________________________________ P.O. Address __________________________ Co. ______

I. Production and Marketing of Eggs:

What is the number of hens in your laying flock? Breed _____________________________.
The last day you sold eggs was __________. The lot before was sold on __________.
Total eggs sold last week was _______ dozen. Value received for these $ _______.
Were your eggs sold on grade basis? Yes ________ No _______.
a) If not graded, what price did you receive? $ ______ per doz. in Cash _____ Trade _______.
b) If graded, how many dozen did you sell as of:
   Top grade _______ doz. Price $ ______ Thir'd grade _______ doz. Price $ _______.
   Second grade _______ doz. Price $ ______ Fourth grade _______ doz. Price $ _______.
To what agency? store ______ buying station ______ truck buyer ______ meat packer ______ hatchery ______ consumer ______ cooperative ______ processing plant ______ other ______.
Do you sell only clean eggs? Yes ______ No _______. Do you try to use all cracked and dirty eggs at home? Yes ______ No _______. Comments _______.

How many times a day do you now collect eggs? ______ times. Do you produce infertile eggs for market? Yes ______ No _______. Do you make any attempt to feed for particular yolk color? Yes ______ No _______. How _______.

II. Consumption and Use of Eggs:

Number of persons eating at home last week? _______.
How many eggs did you use last week for home use? _______ dozen.
   a) How many from your own flock did you use for home use last week _______ dozen.
   b) How many did you purchase for last week's home use? _______ doz. Price paid $ _______.
Where did you purchase these eggs? store ______ Tanner ______.
At what season of the year do you use the most eggs per person? Summer ______ Fall ______ Winter ______ Spring ______. Why _______.
Have you noticed any difference in taste between eggs with light or dark yolks? Yes ______ No _______. What color do you prefer? _______. Are you particular about shade of yolk color for baking eggs? Yes ______ No _______. For poaching and frying? Yes ______ No _______. How many eggs did you put up last season for use this winter? _______ dozen. How _______.

III. Are you satisfied with the present marketing and grading system for eggs? Yes _______ No _______. Suggestions for improving the system: _________________________________.


(A single spaced copy of original)
Dates of Last Week. ________ to ________ Q-3

COOPERATIVE EXTENSION WORK IN AGRICULTURE AND HOME ECONOMICS
U. S. DEPARTMENT OF AGRICULTURE AND STATE LAND-GRAANT COLLEGES COOPERATING

Please check your type of business: Store___; buying station___; produce plant ___; truck buyer___; other (indicate)__________

1. How many cases of eggs did you handle last week? _______ cases.
2. What percent of the eggs you handled last week did you buy as current receipts?______% What percent on grade basis? ______%?
3. How many buying grades do you have? ________
4. Do you quote both a cash and trade price? Yes___ No____ Which___
5. What percent of the eggs you sold last week did you sell as current receipts? _____%. What percent on a grade basis? ______%?
6. How many selling grades do you have? ________
7. Estimate percent of eggs sold last week to: Consumers ________, stores ___%; produce plant ___%; truckers out of Chicago ___%; truckers who sell in Iowa ___%; meat packers ___%; carlot shippers ___%; other ___%.
8. Do you have cooling facilities for eggs? Yes___ No____
9. Length of time you hold eggs before shipping? ________ days.
1. How many cases did you buy last week from:

<table>
<thead>
<tr>
<th>CASES</th>
<th>Percent of eggs bought from each as current receipts on grade basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Farmers</td>
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<tr>
<td>Stores</td>
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<td>Truck Buyers</td>
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<tr>
<td>Produce Stations</td>
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<tr>
<td>(state others)</td>
<td></td>
</tr>
</tbody>
</table>

2. Please give the name and description of your BUYING GRADES (Quality & Weight) (If more convenient, give comparable government grade.)

<table>
<thead>
<tr>
<th>NAME OF GRADE USED</th>
<th>weight</th>
<th>air cell</th>
<th>yolk</th>
<th>white</th>
<th>shell condition</th>
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</thead>
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</table>

3. Are you buying a larger percentage of your eggs by grade this year than last year? Yes _ No __. What percentage increase? ___% (estimate)

Than five years ago? Yes _ No __. What percentage increase? ___%

4. Please give the name and description of your SELLING GRADES (Quality & Weight) (If more convenient, indicate comparable government or trade grade by name)

<table>
<thead>
<tr>
<th>NAME OF GRADE USED</th>
<th>weight</th>
<th>air cell</th>
<th>yolk</th>
<th>white</th>
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</tr>
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<tbody>
<tr>
<td>Grade (1)</td>
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<td>Grade (2)</td>
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<td>Grade (3)</td>
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<td>Grade (4)</td>
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</tbody>
</table>

5. How many 30 doz. cases of eggs did you sell or ship last week to the outlets listed below. Please give the place of business of each. Give sales in terms of the grades as you have described them above in #4.

<table>
<thead>
<tr>
<th>Location of outlets</th>
<th>Outlets</th>
<th>'Current' receipts</th>
<th>Grade 1</th>
<th>Grade 2</th>
<th>Grade 3</th>
<th>Grade 4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eastern receivers</td>
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<td>Meat</td>
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<td>Packer</td>
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<td>Other co-op</td>
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<td>Shippers</td>
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<td>Terminal Mkt.</td>
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<td>Truckers</td>
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<td>Chain stores</td>
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<td>Retail stores</td>
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4. Please give the name and description of your SELLING GRADES (Quality & Weight) (If more convenient, indicate comparable government or trade grade by name)

<table>
<thead>
<tr>
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<th>Grade (3)</th>
<th>Grade (4)</th>
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<td>packers</td>
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<td>other carlot shippers</td>
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<td>Terminal market truckers</td>
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<td>Hotels and institutions</td>
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<td>Bakeries</td>
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<td>Egg breaking plants</td>
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<td>(others)</td>
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</table>

6. What percentage of your eggs do you estimate reach the following markets? ___% to N.Y.; ___% to Chicago; ___% to Phil.; ___% to Boston; ___% to Des Moines; ___% to other Iowa points; ___% to other western points, specify cities ___; ___% to other eastern points, specify cities ___.

1. How many persons a day are you preparing meals for? __________ persons

2. How many eggs did you use last week? _______ dozen

3. Number and uses of eggs used last week.
   Times for:
   - breakfast eggs: Uses: a__ b__ c__
   - noon eggs: Uses: a__ b__ c__
   - night eggs: Uses: a__ b__ c__
   Total eggs: Uses: a__ poaching, frying, boiling
                 b--custards, souffles, eggnog, omelets
                 c--baking with flour mixtures

4. Do you include eggs in diet of children 2-7 years of age? Yes__ No_ b) How many eggs a day per child did you use last week? ______ eggs.

5. Are there any members of your family on special egg diet? Yes__ No__ b) Circumstances:

6. Are there any members of your family who don't eat eggs? Yes__ No__ b) Reason why: Allergy______; dislike______; other______

7. Do you serve eggs more frequently on Fridays than on other days? Yes__ No__

8. At what season of last year did you use most eggs? ______ Why?________

9. At what season of last year did you use least eggs? ______ Why?________

10. Seasons when you use least eggs, what uses do you eliminate?________

11. Seasons when you use most eggs, what are the additional uses?________

12. How many recipes for egg dishes, including angel food cakes, have you collected this past year?_______ b) Do you keep a file of recipes?________

13. Do you bake most of your own cakes? Yes__ No__ b) How many cakes have you bought in last two weeks? ______ Made?

14. Do you buy eggs yourself?______, Order by phone?______, Or send children?________

15. Where did you last purchase eggs?
   b) How many did you purchase? ______ dozen. What price did you pay? _____¢ per doz.

16. How many different quality eggs did retailer have? (Price and description)
   a)____________ b)____________ c)____________

17. Which grade did you buy? best__ brown__ white__ No. 1__ No. 2__ pullet__
    cheapest__ freshest__ a__ b__ c__
   b) Did retailer have eggs under refrigeration__ on counter__ in cases__ in cartons__

18. Where do you buy your eggs most frequently?
   b) Store__ Milk route__ farmer__ egg dealer__ huckster__ supermarket__
   c) Are most of your groceries from this source? Yes__ No__
   d) Distance to store? ______ blocks

19. From what other stores or dealers have you purchased eggs in last month?______
    b) In last year?
    c) Where were best quality eggs of last month purchased?________
20. Do you make a practice of watching for store advertisements in the paper or store circulars? Yes  No  
b) Buy their bargains? Yes  No  c) Where did you last see eggs advertised? ________________________________

21. How many times a week do you purchase eggs? Summer  ____________ Winter  ____________ 
   b) How many eggs do you buy at a time? Summer  ____________ dozen  Winter  ____________
   
22. Do you generally buy eggs: In sack  , in 3x4 carton  , in 2x6 carton  .
   b) Do you ever buy eggs with quality seal? Yes  No  Where? ________________________________


24. Do you buy the same quality of eggs for poaching and frying that you buy for baking? Yes  No  
   b) If not, what distinction do you make when buying? When using? ________________________________

25. How many eggs would you use next week if the price were  ?
   b) You did buy  dozen last week.  c) To what use would you put the additional eggs? ________________

26. How many eggs would you use if the price were  ?
   b) Where would you cut down?
   c) What would you substitute? ________________________________

27. How much are eggs selling for now? ____________________

28. Have you ever weighed out eggs or had them weighed for you when you noticed the difference in size? Yes  No  
   b) Which did you buy? Large  Small  
   c) Would you rather buy eggs by the pound or by the dozen? (Encircle)

29. Have you ever noticed much difference in the color of the yolks? Yes  No  
   b) Are all yolk colors equally suitable for poaching and frying? Yes  No  
   c) For custards? Yes  No  d) For baking? Yes  No  

30. What colors do you prefer  A  B  C  D  E  F  
   b) What colors do you not prefer?  A  B  C  D  E  F  

31. How can you tell whether these eggs are fresh or not? ________________________________

32. Did you buy any eggs last month you preferred not to use for poaching or frying? Yes  No  
   b) What was wrong with them? Taste  Smell  Yolk  Color  Blood clot  Germ development  Mottled yolk  Cloudy white  Dirty shell  
   c) Did you use them for cooking? Yes  No  d) Where purchased ________________________________

33. Have you had difficulty in getting the quality of eggs you want? Yes  No  
   b) Have you had difficulty in comparing price of eggs? Yes  No  
   c) What do you suggest would help you in buying? ________________________________

34. Would you buy more eggs if eggs were of standard grades? Yes  No  ____________________

35. Would you pay a little more for graded eggs? Yes  No  

Race  , Size of family:  No. of adults  ,  No. under 5  ,  5 to 10  ,  10 to 15  ,  15 to 20  .  Weekly income  .  Week's grocery bill  .  Occupation of wage earners  .  Date and time  .

Refrigeration facilities for eggs  ________________________________

Name  ________________________________  Address  ________________________________
YOLK COLOR PREFERENCE

1. For each yolk color displayed, indicate your order of preference by placing:
a (1) by those you like best; a (2) by those you like next to best; a (3) for those of third choice; etc.

A___, B___, C___, D___, E___, F___

2. Encircle those colors you would prefer not to use:

A B C D E F

SHELL COLOR PREFERENCE

1. For each shell color displayed, indicate your order of preference by placing:
a (1) by those colors you like best; a (2) by those you like next to best;
a (3) for those of third choice; etc.

A___, B___, C___, D___, E___, F___

2. Encircle those colors you would prefer not to use:

A B C D E F

Do you buy eggs? Yes___ No___ Do you sell eggs? Yes___ No___

Do you tend to judge yolk color by the color of the shell? Yes___ No___

Not certain___.