A STUDY OF CONSUMER PREFERENCE FOR TURKEYS WITH VARIOUS GRADE DESIGNATIONS AND PRICES

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ABSTRACT

A STUDY OF CONSUMER PREFERENCES FOR TURKEYS WITH VARIOUS GRADE DESIGNATIONS AND PRICES

by William Clearon Mills, Jr.

This study was undertaken in order to arrive at a better understanding of price influence and the effect of "Prime" and "Choice" as grade designations on purchases of turkey hens.

Two main questions were investigated: (1) How much more would consumers pay for turkeys labeled as "Prime", "Choice", and "Good" compared with Grade A and B; (2) At what price differential would a change in preference occur due to price.

Judgment sampling techniques were used to select stores in Charlotte, North Carolina; Grand Rapids, Lansing and Detroit, Michigan.

Turkey hens (10-14 pounds) labeled "Prime", "Choice" were sold during August-October and before Thanksgiving (1962) and before Easter (1963) in competition with turkeys labeled Grade A. Various other combinations were also sold using two different labeling methods. Price differentials of 2, 4, and 6 cents per pound above the prevailing Grade A retail price (control group) were used.

Consumer preference studies were made to evaluate the effect of "Prime", "Choice" and "Good" as grade designations on raw turkey parts, and cooked rolls with and without prices. The base price was the prevailing retail price and 2 and 4 cents price differentials were added to the test labels.

The results of the sales tests were analyzed by Chi Square and the "t" test. Confidence intervals for all proportions were obtained. The

theoretical sales ratio of Grade A to "Prime" or "Choice" was 2:1.

The sales ratios (price differentials, "Prime" and "Choice" combined) were: Grand Rapids 55:45; Lansing 75:25; Detroit 62:38. The combined sales ratio was 63:37 which is shown by Chi Square not to be significantly different from the theoretical sales ratio. Confidence intervals for the combined sales of "Prime" and "Choice" are 36 to 40 per cent.

The variability between the several store sales within cities was much less than the variability of sales between cities.

The panel results indicated that "Prime", "Choice", and "Good" are preferred as grade designations on raw turkey parts and cooked products.

Based upon the results obtained in this study, it is concluded that:

1. One-third of the turkey hens can be sold for 4 cents per pound more than the current price of Grade A turkeys when adequately differentiated and labeled "Prime".

2. Consumer satisfaction was apparently increased as measured by the willingness of some consumers to pay premium prices for turkeys in this study.

3. Some of the criteria by which consumers judged turkey quality in this experiment are: appearance, meatiness, wholesomeness, minor defects.

4. Consumers reacted favorably to grade labels "Prime", "Choice", and "Good" as labels for whole turkeys as well as for raw turkey parts and cooked turkey products.

5. One might expect aggregate sales of turkey hens in the United States to be similar to the sales ratios obtained in this experiment.

6. Consumer grades for turkey hens should be "Prime" and "Choice".

7. All other turkeys not meeting the specifications for the grades

of "Prime" and "Choice" should be classified as "Good" and used for canning and other processed foods.

8. The proposed grading system apparently more nearly reflects consumers' opinions of quality than the present grading system.

9. Total industry revenue from a given size of crop would likely be increased under the proposed grading system.

This study has pointed the way to possible increased profits for producers, processors, retailers, and greater satisfaction for the consumer. The turkey industry can profit by grade revision, produce differentiation, and proper pricing.

A STUDY OF CONSUMER PREFERENCE FOR TURKEYS WITH VARIOUS GRADE DESIGNATIONS AND PRICES

By

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INTRODUCTION

The question of mandatory consumer grades for turkeys is one that has spawned widespread interest and verbosity. Not only are there strong economic arguments for such grades, but also strong arguments against such grades. If mandatory grade labeling comes to pass, what system of grade labeling will be used? Is the present letter grade system best, or is there another system that is more adequately suited to labeling for consumer acceptance?

Before an intelligent decision can be made regarding mandatory grade labeling, it is necessary to decide what grade labels to use and to determine the most satisfactory grading system to use. What grade label has the highest psychological significance of quality to the person buying turkeys? It appears to some that the present system is prolix and no longer adequately expresses current consumer preferences and advances in technology in either production or marketing.

The improvement of turkeys is related to the problems of grading and product design. The diversity in quality of many agricultural products has often been considered a positive benefit to consumers and/or producers. Diverse qualities are thought to match the supposedly diverse preference maps of consumers, so that community satisfaction exceeds that which would prevail with a uniform quality. When the proper grading system is instituted, it will accurately reflect what consumers want and are willing to pay for, and it will return to producers the highest marginal value for their turkeys.

The effectiveness of price appeals for turkeys classified under our present system as "inferior" and "superior" has diminished due to today's technological knowledge, production and distribution methods in turkey production which have reduced the cost between grades to an insignificant level.

Poultry meat grades were designed primarily to facilitate wholesale trade, and recently increasing interest has been directed toward having grades more accurately reflect consumer preferences. This has led to a debate within the turkey industry as to the desirability of mandatory grade labeling as well as the advisability of changing the present grade labeling system. Any grade labeling system faces the problem of defining and measuring quality. In order for grades to be effective in differentiating quality for consumers they must be based upon those qualities that consumers look for in purchasing turkeys.

This brings up the question of quality and how it can be defined. For the purpose of this experiment, quality is defined as that combination of attributes that have significance in determining the degree of acceptability of a product by a consumer. Using this definition the question then arises, who should determine quality and how it should be labeled? Based on the above definition of quality, the author suggests that the consumer is the one who should determine quality, the degree of acceptability and how such quality should be labeled.

Many human variables enter into the behavioral and preferences picture. Examples of these variables are age, education, sex, occupation, nationality, environment and income. Exogenous factors such as seasonality of product, packaging and advertising also must be considered in the study of consumer behavior.

"In so far as economic and marketing research is concerned, the important question is not to uncover the inner motivations for particular actions but rather to identify motivations on a level where remedial steps can be carried out", Ferber and Verdoorn, 1962 (9). Mass production and marketing dictate that collective preference patterns be evaluated; therefore, the author is not particularly interested in individual grade preferences per se, but in the total market demand which is made up of a mass of individual preferences.

Purposes of this study were: to evaluate turkey grade labels and their quality meaning to the consumer; to determine the effect of price differentials on preference; how much of a price differential consumers would pay; and, at what price differential a decline in preference would occur due to price. Earlier work of Mills, et al. 1960 (17, 18); Makens, et al. (14) had shown that "Prime", "Choice" and "Good" are preferred by consumers to letter grades A, B and C as grade labels for turkeys. This study has enlarged upon their work via the route of retail turkey sales in various market areas.

With this in mind, this experiment was designed to test the following hypotheses: (1) The consumer will purchase turkeys based primarily upon appearance and labeled with the grade label which has the highest perceived quality meaning to her; (2) A portion of the consumers will pay a higher price for turkeys labeled "Prime", "Choice" and "Good" than they will for turkeys labeled Grade A or Grade B.

REVIEW OF LITERATURE

Development of Grading

Brunk and Darrah, 1955 (6)[1/] say the following about the development of grades for agricultural products:

> "Many of the state and federal grades (there are now over several hundred in effect) were developed from grades originally established by the trade. The Chicago Board of Trade established the grading of grain in this country about one hundred years ago. Until grading was set up, buyers or buyers' agents inspected the grain in person. When this became cumbersome and impractical, some sellers began to submit written statements guaranteeing their product. When the Chicago Board of Trade employed grain inspectors, other markets soon followed suit. In 1871, the State of Illinois established the first governmental grading and inspection service, but as other states followed suit, the wide differences in their standards did little to alleviate the difficulties inherent in trade-created grades. Even so, it was not until 1916 that the federal government assumed the responsibility of grading and inspecting grain.
>
> "Even before Congress passed the Grain Standards Act, there had been debate in the House of Representatives concerning the establishment of an inspection service for fruits and vegetables but not until August, 1917, did Congress appropriate funds for this purpose. Before that, some fruits and vegetables were sold under brand names but the great bulk was offered on the market unclassified to local buyers who, in turn, shipped to terminal markets. Under this system it was common practice for receivers to do much repacking and sorting at the terminal market in order to be able to meet trade requirements.
>
> "It was not until 1923 that the government undertook the grading of meat, but there was not as great a demand for meat grades as for grades of other products because a large proportion of the meat products were processed in relatively few packing plants with well-established brand names. It might also be argued that the qualities of meat, although highly variable, are not as subject to day-to-day ravages of weather as the qualities of fruits and vegetables. Feeding practices and processing methods make a certain degree of quality control of meat possible. Even to this day a large proportion of meat is sold under packer brand rather than U. S. grade unless it is sold under price control laws, which often require federal grading. In 1941, slightly over

1/ pages 277-279.

1½ billion pounds of meat and meat products were federally graded. From 1943 through 1945, when price control legislation made such grading mandatory, about 12 billion pounds were graded annually. By 1950 the volume of graded meat and meat products had decreased to about 2.7 billion pounds.

"For many years, the principal grades for eggs were established by the trade, which resulted in a wide variety of grade terms and grade interpretations. A definite effort was made in 1922 to develop and to encourage the use of a federal grading system for eggs. Although federal grades have never been in wide use, except for government purchasing during and immediately after World War II, they have been used quite generally by state governments and the trade as the basis for state and private grading systems. In more recent years, consumer grades for eggs have been adopted as a result of the enactment of laws in many states requiring the grading of eggs sold at retail. Federal standards and grades for live and dressed poultry were first proposed in 1928. Few packers have adopted U. S. grades; they use, instead, special grade names which have been advertised over a long period of time.

"It is difficult to determine the origin of grading and standardization, but the practice undoubtedly extends back many centuries. There was little need for grading or standardization as long as the products which people consumed were produced nearby or at home. Products purchased in the local market could be selected or rejected on sight, so that, in effect, the grading was done by consumers. But specialization in agriculture made it increasingly difficult for producers to sell directly to consumers, with the result that there was an ever-increasing demand for effective grading systems. The step from private market brands to federal grading was, for many products, a real milestone in the history of marketing."

Early History of Standards

Kohls, 1955 (11)[2/] has this to say about the early history of standards.

"Our grading standards have evolved hand in hand with the commercialization of agriculture. Some have been developed by trade groups and then have been formalized by federal and state agencies. Others have come about through the results of research directed toward the establishment of standards. Practically all have been changed with the passing years as weak points became evident.

2/ pages 140-141.

"In most instances, pressure developed for reform of the grading system from within the trade itself. Trade groups and organizations attempted to systematize nomenclature and grades. Generally, however, real permanent progress was not made until the federal government stepped in to coordinate the efforts to improve the grading system. In 1907, Congress appropriated funds to study federal standardization. The passage of the Cotton Futures Act in 1914 and the Grain Standards Act of 1916 initiated a series of laws which have gradually broadened the area of federal responsibility in promulgating uniform standards."

Baker, 1954 (4)[3/] wrote that,

"The official United States standards for market classes and grades of carcass beef were set in 1926. Grade standards have been extended since then to include the feeder and slaughter classes of most species of market livestock and meat derived therefrom. All the grade standards have remained practically unchanged since their origin, except for two changes.

"The beef standards, which previously had provided for grading each class of beef (steer, heifer, cow, stag and bull) on a separate standard, were modified in 1939 to provide for the grading of all steer, heifer and cow beef on a single standard.

"The beef standards were again modified in 1950, when the Prime and Choice grades were combined as a single grade Prime, the Good grade became Choice and the beef from the younger animals in the upper part of the Commercial grade was designated Good. Corresponding changes were made at the same time in the standards for slaughter cattle. In 1951 similar changes were made in both carcass and slaughter standards for veal and calf and for lamb and mutton. Standards were set in 1952 for slaughter barrows and gilts and their carcasses."

3/ pages 160-161.

The USDA classification and grading schedule for slaughter livestock and their carcasses are as follows:

Class or Kind	Subclass	Grades
Beef	(Steer, heifer, cow[1]	Prime, Choice, Good, Commercial, Utility, Cutter, Canner.
	(Bull and stag	Choice, Good, Commercial, Utility, Cutter, Canner.
Calf		Prime, Choice, Good, Commercial, Utility, Cull.
Veal		Same as calf.
Lamb		Prime, Choice, Good, Utility, Cull.
Yearling mutton		Same as lamb.
Mutton		Choice, Good, Utility, Cull.
Pork	Barrows and gilts	Choice No. 1, Choice No. 2, Choice No. 3, Medium, and Cull.

[1]Cows are not eligible for the Prime grade.

Poultry Legislation and Grade Development

According to the United States Department of Agriculture, 1956 (2)[4/],

> "There are many Federal, State and municipal laws and regulations affecting grading and marketing. Only those that apply most directly or indirectly to grading poultry will be described or listed here.
>
> "The Federal Food, Drug and Cosmetic Act as amended, and regulations for its enforcement by the Food and Drug Administration of the U. S. Department of Health, Education and Welfare are extremely important. This act was designed to prohibit the movement in interstate commerce of adulterated and misbranded food, drugs, devices and cosmetics, and for other purposes.

4/ pages 30-31.

"The Packers and Stockyards Act of 1921 was enacted to regulate interstate and foreign commerce in livestock, livestock products, dairy products, poultry, poultry products, and eggs, and for other purposes. It was amended in 1926, 1938, 1939, and 1942. Whereas the Food and Drug Act applies mostly to processed poultry in its effect on the public health, the Packers and Stockyards Act of 1921 is designed primarily to protect producers and consumers against various unfair, deceptive, and fraudulent practices and devices in interstate and foreign commerce. The regulations under the Packers and Stockyards Act are enforced by the U. S. Department of Agriculture.

"There is an increasing trend toward the development of state, county, and municipal laws governing the processing and marketing of poultry. The primary purpose of these laws is to protect the consuming public. They may serve also to encourage consumption of poultry providing the provisions of the laws are sound and they are adequately enforced. There are many differences in state, county, and municipal laws at present. Since poultry like other farm products move in interstate commerce, it would be desirable if the provisions of the laws and regulations were uniform.

"From an analysis of the laws which affect poultry grading and marketing the various state, county, and municipal laws may be grouped into the following categories:

1. Food and Drug laws are patterned after the Federal Food, Drug and Cosmetic Act. In addition to the general provisions of the food and drug laws, some states and local governments have certain sections which apply specifically to market poultry.

2. Licensing laws require poultry dealers to obtain a license before engaging in buying and selling poultry. Some require a different type of license for poultry-processing plants or slaughterhouses.

3. Standardization laws generally authorize the establishment and maintenance of standards and grades for farm poultry. A few of the states have established standards and grades for some or all classes of poultry. In most instances, standards and grades are voluntary and are usually patterned after Federal standards and grades. In several states, grading and grade labeling of poultry offered in retail channels are compulsory.

4. Laws pertaining to proof of ownership of poultry in transit. In some states, it is illegal to transport poultry unless it is accompanied by a bill of sale, or a memorandum signed by the vendor. Producers transporting their own poultry are usually exempt. Legally authorized common carriers are exempt in most cases. This is primarily to guard against thieving.

5. Laws pertaining to limitations on hours of business that make it unlawful to sell or offer for sale during certain periods of the day or on certain days.

6. Inspection laws. A few of the laws require inspection before poultry may be displayed, delivered, or offered for sale in certain forms. Other laws provide for the establishment of voluntary inspection service. A number of counties and cities require post-mortem examination during processing.

7. Laws affecting the sale of imported poultry pertain to the licensing of buyers, sellers, and processors of poultry outside of the state, county or city jurisdiction, regarding sanitation."

Benjamin and Pierce, 1937 (5)[5/] describe early turkey grading in the following manner.

"Ordinarily turkeys are grouped in three grades, according to quality. As quoted in The Producers' Price-Current, the New York market recognizes fancy, choice and medium grades and most trading is done under these nomenclatures (young hens, young toms, old hens and old toms). There are no authoritative specifications describing these grades as such, but they are approximately similar to and somewhat higher than the grades tentatively proposed by the United States Government under the terms "prime", "choice" and "commercial" as described in Table XXVII.

5/ pages 283-284.

Table XXVII

Tentative Specifications for U. S. Standards and Grades of Dressed Turkeys

Quality Specifications for Individual Birds -- Young Hens

U. S. Special "AA"	Young, fine-grained, soft-meated female bird with broad full-fleshed breast, and with entire carcass fully covered with fat. Must be well bled, well dressed, and practically free from pin feathers, and have empty crop. No flesh bruises allowed; and only very slight skin abrasions, bruises or discolorations permitted, none of which shall be on the breast. Slightly dented breast bones (not to exceed ¼ in. in depth) permitted but no crooked breast or other deformities allowed. A broken or disjointed wing above the wing tip, or a broken or disjointed leg, not permitted. Must be dry-picked or semi-scalded and must be dry packed.
U. S. Prime "A"	Young soft-meated female bird, with well-fleshed breast, and with entire carcass well covered with fat. Must be well bled, well dressed, with breast practically free of pin feathers and only a few scattered pin feathers over remainder of carcass. Crop must be empty. Only very slight flesh or skin bruises, abraisions, or discolorations permitted, with breast practically free of such defects. Slightly dented breast bones (not to exceed ½ in.) permitted, but no crooked breasts that would interfere with the slicing of the meat, or other deformities allowed. Broken wings above the wing tips or broken legs not permitted. A disjointed leg or wing permitted if only slightly bruised. Birds with crops properly removed and sewn up may be included in this grade. Must be dry-picked or semi-scalded and must be dry packed.
U. S. Choice "B"	Young female bird, with fairly well-fleshed breast, and with carcass fairly well covered with fat. Must be fairly well bled and dressed, and may show scattered pin feathers over the entire carcass. Crops may contain not more than 4 ounces of feed. Slight flesh or skin bruises permitted, but not more than three such defects on any bird. Slight skin abrasions or discolorations permitted. Abrasions or tears more than 3 inches in diameter not allowed, unless properly sewn up. Dented or slightly crooked breast bones or other slight deformities permitted. One broken wing or one broken leg permitted if bone does not protrude through the flesh and if not showing excessive bruise or blood clot.

U. S. Commercial "C"	Young female bird which may be poorly fleshed and with carcass poorly covered with fat. May show evidence of poor bleeding and have numerous pin feathers over the entire carcass. Skin abrasions and discolorations permitted. Hunch back or other deformities allowed if birds are fairly well fleshed. Birds badly bruised so as to make any appreciable part of the carcass inedible not permitted. Birds showing emaciation or external evidence of disease or other condition which would render them unwholesome or unfit for human food not permitted."

Chicken grades likewise were classified in the 1930's as Benjamin and Pierce, 1937 (5)[6/] list the following as U. S. Grades for dressed broilers, fryers, roasters and fowl: "U. S. Special or U. S. Grade AA; U. S. Prime or U. S. Grade A; U. S. Choice or U. S. Grade B; U. S. Commercial or U. S. Grade C."

In 1953 the Poultry Division, Agricultural Marketing Service, USDA, changed the turkey grades and grade standards. Marsden and Martin, 1955 (15)[7/] describe in detail the 1953 grade standards and state that, "Briefly, U. S. Grades are now three, formerly four, given in descending order of quality:

U. S. "AA" formerly Special (now discontinued)

U. S. Grade A formerly Prime

U. S. Grade B formerly Choice

U. S. Grade C formerly Commercial"

6/ pages 166-167.

7/ page 378.

The present specifications for standards of quality for individual carcasses of ready to cook turkeys are provided by the United States Department of Agriculture, Agricultural Marketing Service, 1960 (3).

Summary of Specifications for Standards of Quality for Individual Carcasses of Ready-To-Cook Turkeys and Geese
(Minimum Requirements and Maximum Defects Permitted)

Factor	A Quality		B Quality		C Quality
CONFORMATION:	Normal		Practically normal		Abnormal
Breastbone	Slight curve or dent		Dented, curved, slightly crooked		Seriously crooked
Back	Normal (except a slight curve)		Moderately crooked		Seriously crooked
Legs and Wings	Normal		Moderately misshapen		Misshapen
FLESHING:	Well fleshed, moderately long and rounded breast		Fairly well fleshed on breast and legs		Poorly fleshed
FAT COVERING:	Well covered considering class		Sufficient fat on breast and legs to prevent a distinct appearance of flesh through skin		Lacking in fat covering over all parts of carcass
PINFEATHERS:	Breast	Legs Elsewhere	Breast	Legs Elsewhere	
Nonprotruding pins and hair	Pract. free	Pract. free	Few scattered	Few scattered	Scattering
Protruding pins	Free	Free	Free	Free	Free
CUTS, TEARS and MISSING SKIN:[1]	Free	3"	3"	6"	No limit
DISCOLORATIONS:[2]	2"	3"	3"	6"	No limit[3]

Factor	A Quality	B Quality	C Quality
Disjointed bones	1	1 or 2, if no broken bones	No limit
Broken bones	None	1 Nonprotruding	No limit
Missing parts	Wing tips and tail	Wing tips, 2nd wing joint, and tail	Wing tips wings and tail
FREEZER BURN:	Few small (¼" diameter) pockmarks	Moderate-dried areas not in excess of ½" in diameter	Numerous pockmarks and large dried areas

[1]Total aggregate area of flesh exposed by all cuts, tears, and missing skin.

[2]Flesh bruises and discolorations such as "blue back" not permitted on breast and legs of A Quality birds. Not more than one-half of total aggregate area of discoloration may be due to flesh bruises or "blue back" (when permitted), and skin bruises in any combination.

[3]No limit on size and number of areas of discoloration and flesh bruises if such areas do not render any part of the carcass unfit for food.

Grade Labeling

The trend in Federal grading has been toward more grading. Each year a higher percentage of the turkey crop is Federally graded than was graded the year before.

Effective January 1, 1959 all poultry processing plants concerned with interstate commerce were required to operate under compulsory Federal inspection regulations, and all poultry (turkeys) processed therein and packaged for consumers was required to be labeled by age (young, yearling, mature or old). This law has inspired much debate about the future of compulsory grading of turkeys.

Much of this debate evolves around consumer grades and what grading system should be used. Since the topic is still controversial, it is fitting that the subject of grade labeling be reviewed. What is

grade labeling? Indeed, what is grading? What standards will be used? For whom will the standards be applied? For whose benefit? Shall the present system of A-B-C grading be used or is there another system more suitable for product differentiation for the consumer? These are but a few of the myriad questions which could be asked in analyzing the question of grade labeling for turkeys.

Waugh, 1955 (21)[8/] stated that,

> "Grading has been promoted by producers and traders, and largely because they stood to gain by it; but grades must rest solidly on consumer's preferences or on basic utility to consumers if they are to be effective. (underlining added). Consumers will not pay more for one grade than another if it makes no difference to them which grade they buy. Furthermore, the fundamental economic justification of grades likewise is that they afford a means for consumers to register their preferences more accurately and more effectively, so that, if the grading system is carried all the way back to the producers, consumers are better able to encourage the production of the grades they prefer and to discourage production of the less desirable grades.
>
> "...It's the consumers who determine the effectiveness of the grades set up. The grades established have been effective in proportion as they have reflected real differences in consumer's preferences."

In pointing out problems relating to consumer grades, Brunk and Darrah, 1955 (6)[9/] stated,

> "All too frequently, consumer grades are based on the opinions of technical workers concerning what consumers should want rather than on actual measurement of quality factors that are meaningful to consumers. A pen that will write under water is a great technical achievement, but there are probably few people in the market seeking a pen with that particular quality.

8/ page 304.

9/ page 288.

"Many of the opponents of consumer grades maintain that such grading is often misleading. To be helpful, it must be based on the ultimate use to be made of the product, a use that cannot be known ahead of time. Grade C tomatoes, for example, may be as satisfactory for use in some cooking as Grade A tomatoes, but the housewife buying them does not know this because she is not acquainted with the standards used to determine grade. All she knows is that Grade C tomatoes are not as good as Grade A. Precisely what "good" means in this context she does not know. Consequently, in some cases the lower grade designation results in unjustified discrimination." (underlining added).

In discussing the effectiveness of letter grades in communicating the image of quality to the consumer, Kohls, 1955 (11)[10/] wrote that,

"The "A-B-C" labels have the benefit of simplicity. But they will be useful only if the attributes of each grade are known by the purchaser. The opponents of this proposal point out that "C" quality products may be the best product for some uses. But the average consumer will not know this and will discriminate against the lower grades as products not useful for consumption. For example, both "A" and "B" eggs are adequate for table use. The "C" grade eggs may actually be better for some cooking uses, such as when whipped egg whites are wanted. All are nutritious and clean products. But it is maintained that the terms "B" and "C" discriminate against their use because of the consumer's association of these terms with unusable products."

Determination of Standards

Kohls, 1955 (11)[11/] writing about the objective of "ideal standards" states that,

"The principal objective of an ideal standard should be to aid the consumer in telling the producer what he considers desirable in a product for the particular use to be made of it. Ideal standards set up a chain of information between the consumer and the producer.

"Grading of agricultural products is a method of differentiation of the products to meet the various desires of the consumers. We have learned that consumers are characterized by a large range of incomes and preferences. Some desire and can pay for the highest quality. Others must be satisfied with a somewhat lower quality at a lower price. A grading system attempts to differentiate the product in such a way that the various consumers are tapped for all that they

10/ page 154.

11/ page 142-143.

will pay. Or from the consumer's point of view, a grading system attempts to aid the consumer in obtaining the particular product he desires. The best grading system will be such that it will move the greatest total amount into consumption and secure the greatest total price for that amount. The purpose of grading is not to assure the marketing of only top quality products. Those who conceive a grading system as a vehicle for the elimination of lower quality products are ignoring the wide range of consumer preferences and uses which exist.

"The major problem is developing grading standards then becomes one of determining differences in products which are economically significant and then developing methods for measuring these differences in the products. Only differences which users are willing to pay for are pertinent to the establishment of grades. Whims and desires not backed by the willingness to pay are not justifications for grade differentiation. Neither are the opinions of a few "experts" of what should be desired workable foundations for grades."

"The claims made for A-B-C grading and labeling are certainly specific in their language and positive. They may be summed up as follows, as far as possible in the proponents' own words (1)[12]:

1. A-B-C grading is a scientifically reliable and objective method measuring quality. Grade A represents the finest obtainable.

2. It is based on consumer preferences.

3. A grade letter on a label is a simple, truthful and concise statement of quality and provides a common language for buyer and seller since grades can be carried through from producer to consumer.

4. A-B-C labeling is a practical and honest way of selling; its application can be made uniform by proper training of graders.

5. A-B-C labeling reduces uncertainty in buying; grade letters are impossible to misunderstand; buying by grade is simple and accurate and requires no technical knowledge. It throws an x-ray of knowledge into the darkness surrounding consumer buying.

12/ pages 30-31.

6. It enables the consumer to compare prices and values.

7. It gives the consumer protection and a guarantee of minimum quality."

Quality grading, a form of standardization, is done to reduce uncertainty and waste in buying and selling. Fairoletti, 1939 (8)[13/] states that,

> "Devising a set of grades for a given foodstuff is an orderly and generally accepted method of accounting for significant differences in the characteristics that make up quality. Like the dollar and the ounce, a set of grades is a unit of account in exchange transactions, but it is applicable only to the commodity defined.
>
> "These defined standards of quality are not made up of exact, unchanging, or even easily measurable factors. For example, changes in methods of production or distribution, or the introduction of new varieties of the product, or even changes in the techniques of measuring the quality factors themselves, may require changes in the standards. Consequently, in different food trades or industries, there are found different degrees of development and acceptability of quality standards."

Waugh, 1953 (21)[14/] in discussing the establishment of grade standards stated,

> "One of the first problems encountered in the establishment of standard grades is that of locating boundaries between grades. These take the form or provisions in the 'specifications' for the several grades. When such specifications are changed, there usually follows a change in the proportions which graders will place in the different grades affected. ....Presumably grading is done to maximize returns to sellers. It does this by dividing given products into 'grades' on the basis of attributes which buyers of different classes consider significant. ....Just where the boundaries between grades should be placed will then depend upon the degree to which the various users will pay premiums for certain qualities rather than substitute adjacent qualities within the ranges available." (underlining added).

13/ page 307.

14/ page 307.

Many who criticize the various grading systems may not be too familiar with the grade standards of the system. Brunk and Darrah, 1955 (6)[15/] state that,

> "One of the greatest criticisms of grading systems is that frequently the standards developed have little or no relation to either price or use. Although the preferences of buyers should be reflected in grades, there is evidence that these are sometimes ignored. Perhaps the most serious shortcoming of present-day grading is that the selection of qualities for consideration and the determination of their respective importance are not based on scientifically measured tests of buyer preference." (underlining added).

Some guides toward a better understanding of grade labeling (1)[16/] are,

> "The scoring systems used for many products should be reexamined to determine to what extent each score takes account of qualities important to consumers and whether weights have a reasonable relationship to consumer preferences. If important qualities have been omitted from the scoring, reasons for such omission should be examined. If objective tests for an important quality are lacking, renewed effort should be made to develop a satisfactory test. It may be that attention should be given to scoring products for certain nutritional values."

In discussing the potential effect of research on grade standards, Fairoletti, 1939 (8)[17/] stated that,

> "Research in consumer preferences may discover that for some foodstuffs, at least, the grade standards used in a trade or industry are not so closely related to these preferences as they might be for optimum consumer satisfaction. If such discoveries are made, a reappraisal of the grade standards will be in order. Until then, however, it may be assumed that there is a real and significant relationship between a set of grade standards used in the trade and consumer preferences. Consequently, if it is technically possible to measure quality differences with a degree of objectivity acceptable to the trade, in all probability this objectivity can be transmitted to consumer grade labels."

15/ page 282.

16/ pages 45-46.

17/ pages 367-368.

Permeating much of the literature on consumer grades is the explicit statement that consumer grades should be based upon what the consumer looks for in a product. To what extent she will pay a higher price for a grade if such a grade is preferred, has not been fully explored. Neither has consumer preference for grade labels been fully explored.

Mills, et al., 1960 (16) conducted work in an attempt to discover if the consumer preferred the A-B-C system of grade labeling or if another system embracing the words "Prime", "Choice", and "Good" would be more preferable. They used the Detroit Preference Panel (12) to secure consumer opinions, attitudes and preferences for turkeys labeled with various grade labels and prices. A variety of qualities was used. Preferences during a series of repeated tests were in favor of turkeys labeled with the word grades. With no price differentials, preference for the word grade labels was overwhelming. When prices were increased 2 cents per pound, preferences actually increased in most cases. Their study showed that price was a nexus of turkey quality and cannot be overlooked or ignored in evaluating preferences for turkeys. Preference for turkeys appears to be directly influenced by the psychological significance of the grade label and price. Throughout the study, the panel members were apparently little concerned with minor defects. Discolorations due to moderate size flesh bruises and lack of flesh were the two main defects which consumers considered when selecting a turkey. The rejection of turkeys with these defects was consistent even when the preferred grade labels were used. Many consumers demonstrated that they did not like and would not buy turkeys labeled Grade B, but, they did like and would buy these same turkeys when they

were labeled "Good" or "Choice".

Expressed preference in a panel is one thing, but expressed preference at the retail sales counter is still another. Mills, et al., 1961 (17) conducted retail sales tests in Lansing, Michigan supermarkets in order to determine the validity of the panel results. They reported that the sales tests confirmed the consumers preference (panel results) for the grade labels "Prime" and "Choice" to Grade A. Further, about 69% of total sales were turkeys labeled with word grade labels, and 25% of total sales were at a 2 cents per pound higher price. They concluded that the panel results were valid.

Makens, et al., 1960 (13) reported that consumers said that they would be willing to pay an additional amount for properly graded and labeled birds. Personal observation was a major determinant in the selection of turkeys and consumers preferred grade labels "Prime", "Choice", and "Good" to letter grade labels A-B-C.

Swanson and Hess, 1961 (19) reported that "in addition to size, the most important features considered in the individual turkey when the consumer makes a purchase were 'plumpness' and skin color". In the same study they stated, "of the 21 percent who have purchased a parts-missing turkey and the same percentage who have purchased skin tears, all but 13 and 10 percent, respectively, would buy parts missing and skin tear turkeys again. Chief reasons were low price and the feeling that those turkeys were just as tasteful and of the same quality as other turkeys." (underlining added).

No other research work was found pertaining to word versus letter grades on turkeys.

PROCEDURE

Sales Experiments

In order to enlarge upon earlier work and in an attempt to arrive at a better understanding of price influence on purchases and the effect of "Prime" and "Choice" as grade designations on purchases of turkey hens over a wider geographical and a more representative cross section of the American consumer market, a market research project was undertaken.

Two primary investigations made were: (1) How much of a price difference per pound the consumer would pay for turkeys labeled "Prime" and/or "Choice", (2) Consumer preference for turkey grade labels "Prime", "Choice", and "Good" contrasted with Grade A and brand name (Grade B).

To eliminate time and spatial factor influences, various combinations of grade designations and prices were tested simultaneously within a single market area and/or between market areas. USDA Grade A turkeys were used as controls, i.e., results were compared to the movement of Grade A turkeys at the prevailing retail market price.

In most stores Grade A turkeys were sold in competition with turkeys labeled either "Prime" or "Choice", Figure 1. In some Detroit stores, turkeys labeled "Choice" were used as controls and "Prime" as the experimental classification. In other Detroit stores, turkeys labeled "Good" were the controls and turkeys labeled "Choice" were the experimental, Figure 2. In still other Detroit stores, turkeys with a brand name (no grade label) were the controls, and turkeys labeled "Good" were the experimental classification.

Figure 1. Illustration Showing Turkeys as Labeled for Sales Test (Charlotte, Lansing and Grand Rapids).

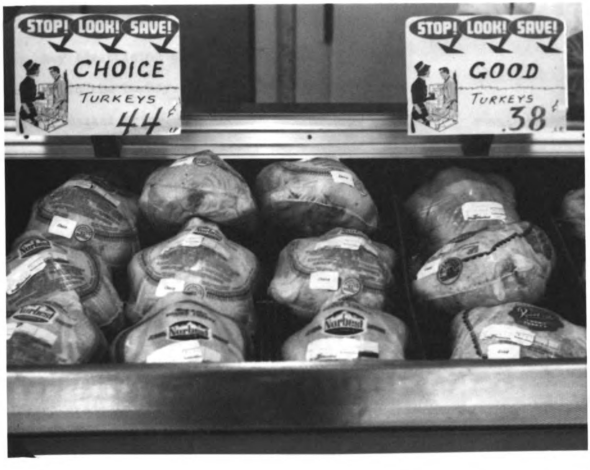

Figure 2. Illustration Showing Turkeys as Labeled for Sales Test (Detroit).

Point of sale posters were used to call attention to the selection of turkeys available under different grade labels and at different prices, Figure 2. No attempt was made to deceive the customer; on the contrary, the meat market managers were cautioned against this.

Any advertising that was done by the store management calling attention to the turkey sale was the advertising of Grade A turkeys at the regular market price. No mention of the test was made in any advertisement, or to the customer, unless the customer inquired as to the difference between the turkeys. In this case the meat market manager was instructed to tell the customer that the store was cooperating with the University on a market research project in which they were testing a proposed new grading system for turkeys. He was cautioned to be perfectly honest in his answer to the customer and to preserve the customer's good will toward the store.

Insofar as possible, equal numbers of turkeys labeled with the different grade labels being compared were maintained in the frozen food display area. This made it possible for the customer to have a variety of turkeys from which to make his or her selection. In addition, a variety of weights, within the 10-14 pound range being tested, was maintained insofar as possible.

Only selections actually made by the customer were recorded. That is, no telephone orders were counted in the results (many such orders were noted in Lansing), and no instances in which the customer was aided in his or her selection by any employee of the store were counted in the results. The meat market managers were asked to report to the investigator any comments favorable or unfavorable regarding the study so that consumer reactions and attitudes could be noted.

The main reason for selecting the August-October sales period was the desire to secure information about off-season sales in response to the stimuli of prices, and the grade labels "Prime" and "Choice". It was believed, however, that little sales volume would be obtained during this period, and this subsequently proved to be the case.

November is a heavy turkey sales month and was naturally included. The Easter season is a time when many turkeys are purchased; therefore, this period was also selected in which to conduct the studies.

Some researchers in consumer marketing studies begin with a zero price differential and increase prices until they can observe a resistance to increasing prices. In this experiment, all price differentials to be investigated were used simultaneously. In this manner both resistance to price increases and the effect of decreasing prices could be observed. Even-numbered price differentials were used in order to follow the usual merchandising practice of off cent pricing (29¢, 43¢, $1.69, etc.).

Price differentials of 2¢, 4¢, and 6¢ per pound were used. In all cases the differential was above the retail market price prevailing at the time the tests were conducted in a particular market area. Where Grade A turkeys were used as the controls, they were priced at the prevailing retail market price and turkeys labeled "Prime" or "Choice" were priced at specified differentials.

Price differentials and treatments in each store were changed each Monday morning during the test. For the most part the base price was constant during the test; however, in some instances prices changed due to competitive forces, and the price also changed after Thanksgiving. This caused no problems since the main price factor under investigation was

the price differential. Price levels, while they would probably alter sales figures, were of secondary importance in this study.

For this experiment, grade labels and price differentials were essentially the main factors under investigation. This is not meant to imply that other factors are of no importance but only that no attempt was made to control these factors. Since turkeys are sold under diverse conditions it was believed that a more representative and accurate appraisal of grade label and price influence could be obtained only if these two variables were controlled.

An attempt was made, however, to secure a cross section of the shoppers within each market area. This was done in the selection of the stores to be included in the test. Purposive or judgment sampling techniques were used in selecting the stores because it was believed that a better representation of the city could be obtained in this manner. In each market area, the management of the supermarket chain was asked to select the stores in his organization that would be the most representative of the income, ethnic groups, and educational levels within the city.

In conducting market research, one of the main factors involved is finding management that is willing to cooperate with the investigator in conducting marketing tests. This was one of the factors influencing the selection of the cities in which to conduct the tests. In addition, the cities selected were convenient to the investigator, thus reducing the cost of the project, and the cities were judged to be representative of the geographical area in which they were located.

Charlotte, North Carolina, was judged to be representative of the Southeast; Grand Rapids, Michigan, of the Northern Mid-western area. Lansing had been used by Mills, et al., 1961 (17), and was used in order to obtain a comparison of sales between 1960 and 1962. Detroit, Michigan, was judged representative of the large metropolitan areas of the United States with a diversity of educational and income levels and ethnic groups.

In all test areas, the turkeys labeled "Prime" and "Choice" were selected for appearance (conformation, flesh, finish, serious defects); that is, these were the best turkeys in the USDA Grade A shipment. The author selected the birds used in the Charlotte, North Carolina, study at the processing plant prior to their being frozen. In the Lansing and Grand Rapids, Michigan, studies, the selections were made within the retail stores by the meat market manager after he was instructed by the author in how the selection should be made. However, due to the small number of turkeys available for the study, quality differences were minor. There was more uniformity within the "Choice" and "Prime" classifications where the birds were selected in the processing plant. In the Detroit tests, however, supplies of turkeys were not large enough to make adequate selections; therefore, essentially no separation was possible and the "Prime", "Choice", and Grade A turkeys were of comparable quality.

In the Charlotte, North Carolina; Lansing and Grand Rapids, Michigan, tests, the USDA Grade A label was not covered, but was left plainly visible on the package. Grade identification of "Prime" and "Choice" turkeys was accomplished by means of a shipping tag wired on to the posterior end of the package around the metal clip used to seal the pack-

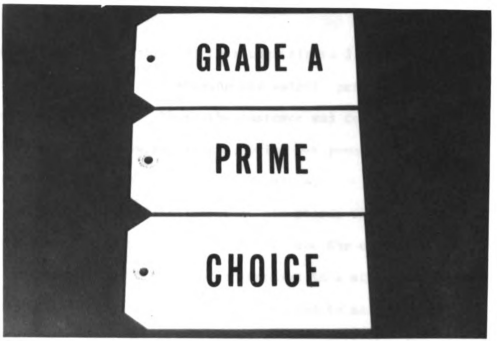

Figure 3. Illustration of Labels Used in Charlotte, Grand Rapids and Lansing.

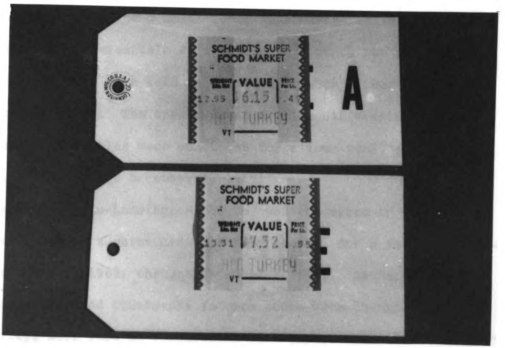

Figure 4. Illustration of Store Label Attached to Grade Labels.

age. The grade label was stamped on this tag, Figure 3. On the other side of this tag the store label showing the weight, price per pound, and total price was attached. Thus, the customer was forced to look at the label in order to know the weight, price per pound, and total price before making his or her selection, Figure 4.

In the Charlotte, North Carolina, test six stores were available from a local chain of supermarkets. The design for the experiment was set up as a Latin Square with six stores involved in a six-weeks test. In this manner all three price treatments were used in each store, and "Choice" and "Prime" were used with each price differential. Two six-week periods were set as a test during the period August 5, 1962, through October 15, 1962.

Three stores were used in the test in Grand Rapids, Michigan. These stores were a part of a small local supermarket chain. In this market area price differentials of 4 cents and 6 cents per pound were used. Grade A turkeys were sold in competition with either "Prime" or "Choice" in each store. The treatments and price differentials were changed weekly. The sales were conducted for a four-week period from November 5, 1962, through December 1, 1962.

The market test in Lansing, Michigan, was conducted in cooperation with a local chain of supermarkets, in four stores, for a four-week period from November 5, 1962, through December 1, 1962. As in the other sales tests, prices and treatments in each store were changed weekly. Grade A turkeys were sold in competition with either "Prime" or "Choice" turkeys. The customer had a choice of a Grade A turkey at the regular retail price or a "Prime" or a "Choice" turkey at the specified price differential above Grade A prices.

In Detroit, fourteen stores from a national chain of supermarkets were made available to the investigator. The study was thus more valuable since both large and small supermarkets were used and the reactions to the study were available from the respective managements.

Again, Grade A turkeys were used as the control birds with turkeys labeled "Choice" and "Prime" priced at 4 cents and 6 cents per pound above the prevailing retail market price. In some Detroit stores, turkeys labeled "Choice" were used as controls and "Prime" as the experimental birds. In others, Grade B turkeys labeled as "Good" were the controls at the prevailing retail price for Grade A turkeys, and Grade A turkeys labeled as "Choice" were the experimental birds. In still other stores, turkeys with a Brand Name (no grade label) were the controls, again at prevailing Grade A prices, and turkeys labeled "Good" were the experimental birds (in this instance, both were USDA Grade B turkeys packed under the processor's brand reserved for B grade turkeys).

In the Detroit test, the USDA Grade A label was covered on the experimental turkeys with a white, rectangular pressure sensitive adhesive label. On this label the word "Prime", "Choice", or "Good" was printed in blue ink as near to the shade used in the USDA grade label as possible. See Figure 5 for sample of labels. No additional label was attached to the USDA Grade A turkeys to signify the grade.

The regular supermarket label was used to inform the customer as to the weight, price per pound, and total price of the turkey. This label was attached directly to the carcass near the grade label.

Figure 5. Illustration of Turkeys Labeled in Detroit Sales and actual labels used.

In summary, the sales experiments were designed as follows:

City	Number of Stores	Time in Weeks	Price Differentials	Grade Label Variables
Charlotte	6	12	2¢, 4¢, 6¢	Grade A, Prime, Choice
Grand Rapids	3	4	4¢, 6¢	Grade A, Prime, Choice
Lansing	4	4	4¢, 6¢	Grade A, Prime, Choice
Detroit	14	2	4¢, 6¢	Grade A, Prime, Choice Good, brand name (no grade label)

Prices and labels were changed weekly, i.e., store no. 1 would sell turkeys labeled Grade A @ 35¢, and "Choice" @ 39¢ for one week. The next week the same store would offer Grade A turkeys @ 35¢ and "Prime" @ 41¢. Each week changes were made in like manner until the end of the test period.

The sales data were analyzed by the Chi Square method and the "t" test. The Chi Square method was used to test the hypothesis that the sales ratio of Grade A to "Prime" and/or "Choice" would be 2:1. The 2:1 sales ratio was used to determine the theoretical sales for the purpose of analyzing the sales data. Further analysis by Chi Square using a calculated sales distribution frequency was made, Dixon and Massey, 1957 (7).

The "t" test was used to determine confidence intervals for the sales proportions. This method was used also to determine sales differences between cities and between stores within cities as well as to determine which of these differences were greatest. The "t" test was used also to determine confidence intervals for the difference in sales pro-

portions between cities and between stores within cities, Dixon and Massey, 1957 (7).

Preference Panel Studies

No investigation had been found relative to the influence of word grade designations on turkey parts and cooked turkey; therefore, it was decided to test the influence of "Prime", "Choice", "Good", and Grade A as grade labels on turkey parts, rolls, and cooked sliced rolls.

The Detroit Preference Panel was reported by Mills, et al., 1960 (16), to be a valid means of measuring preference for turkeys. Therefore, it was decided to utilize this Panel for this portion of the study.

In this experiment there were 146 panel members (male and female) who came to Wayne State University and evaluated the turkey parts as to their acceptability or ranked them in order of preference. About one-half of the panel members made their rankings in the afternoon, and the remaining members made their rankings in the evening (12).

Typewriter symbols %, &, #, *, () were used to identify the turkeys to eliminate any possible meaning which might have been associated with letters or numbers if they had been used in identifying the products being ranked. These symbols together with the word or letter grade were attached to the package by means of pressure-sensitive adhesive labels. The consumer ranked the products in order of preference from most to least acceptable by merely putting the number 1 by the symbol on the panel report card that corresponded to his or her first preference, and the number 2 by the symbol that corresponded to his or her second choice, etc. A tie for first or any other preference could occur.

Four turkeys were selected as a source of the parts which were evaluated by the Detroit Consumer Preference Panel. Three of these turkeys

were of Grade A quality and one of Grade B quality. The bird selected for the "Prime" parts was of excellent conformation, fleshing, and finish with an absence of defects. The two birds selected as a source of parts for the "Choice" and Grade A parts were of good conformation, well fleshed, but were lacking in the degree of finish evident on the "Prime" turkey. No defects were present. The bird selected for the "Good" parts was of Grade B quality and somewhat lacking in flesh, finish, and conformation, but with no serious defects. It was slightly red due probably to improper bleeding.

These turkeys were divided into parts as follows: whole breasts, thighs and legs; packaged in Cryovac bags; sealed with a metal clip and heat treated. Then, they were placed in the liquid freezing facilities of Michigan State University until the desired color was attained, after which they were held in the air blast freezer at -20° F. until ready to use.

The rolls used in this study were purchased from the manufacturer, roasted in the original package material to an internal temperature of 160°F. and transferred hot to a plain Cryovac bag and sealed with a metal clip. The heat from the rolls was sufficient to shrink the Cryovac to make a neat package. The rolls were held at a temperature of 35°F. until evaluated by the panel.

For this series of tests, no prices were placed on the products in the afternoon; however, for the evening panel, prices were included as a part of the labeling. The prevailing retail market price was used as the base price and price differentials were used. The parts and products labeled "Good" were priced at the prevailing retail price; Grade A and

"Choice" were 2 cents per pound higher in price, and "Prime" was 4 cents per pound higher in price.

In Series I, cooked turkey rolls, prices for the evening panel were: Grade A and "Choice" , $1.55 per pound; and "Prime", $1.59 per pound, Figure 6.

In Series II, cooked sliced turkey roll, the "Prime", "Choice", and Grade A packages consisted of four uniform slices that were placed on clear white paper board, wrapped in cellophane and heat sealed. For the "Good" package, slices that had become separated during slicing were used. All packages had a net weight of 6 ounces and were made from the same roll. For the evening panel, prices were: "Good", 75¢ per package; Grade A and "Choice", 77¢ per package; and "Prime", 79¢ per package, Figure 7.

Series III consisted of raw turkey breasts. In the afternoon no prices were used. For the evening panel the turkey breasts were priced as follows: "Prime", 79¢ per pound; Grade A and "Choice", 77¢ per pound; and "Good", 75¢ per pound, Figure 8.

Series IV consisted of raw turkey thighs. In the afternoon no prices were used. Prices attached in the evening were: "Prime", 79¢ per pound; Grade A and "Choice", 77¢ per pound; and "Good", 75¢ per pound, Figure 9.

Series V was made up of raw turkey legs (drumsticks). In the afternoon, preference was tested with no price differentials. In the evening, the following prices were added: "Prime", 69¢ per pound; Grade A and "Choice", 67¢ per pound; and "Good", 65¢ per pound, Figure 10.

Figure 6. Turkey Rolls as Labeled for Panel Test.

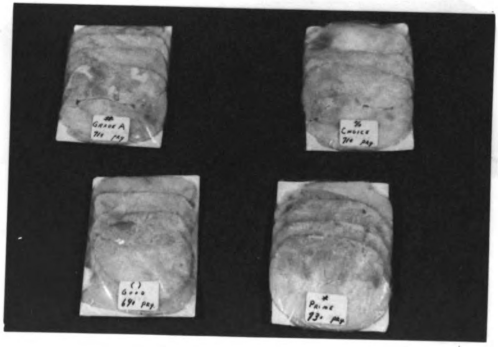

Figure 7. Cooked, Sliced Turkey Roll as Labeled for Panel Test.

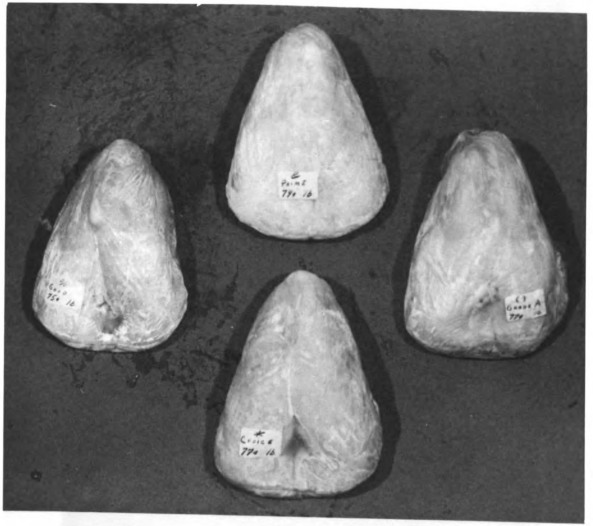

Figure 8. Raw Turkey Breasts as Labeled for Panel Test.

Figure 9. Raw Turkey Thighs as Labeled for Panel Test.

Figure 10. Raw Turkey Legs as Labeled for Panel Test.

For analyzing the Detroit Preference Panel data, the coefficient of concordance was used Kendall, 1955 (10). This method of analysis measures the correlation (0 to 1 scale) or communality of preference of a group of respondents. The larger the coefficient, the probability that the rankings could have happened by chance is less. Significance by this method does not necessarily mean that there is, or is not, a significant difference between any two classes in a series. The coefficients were tested for significance by the Chi Square method. (See appendix page 98 for calculation example.)

RESULTS

Sales Tests

In order to evaluate consumer preference for the words "Prime", "Choice", and "Good" as grade labels for turkeys, and to investigate how much of a price difference per pound the consumer would pay for turkeys labeled "Prime", "Choice", and "Good", a series of sales tests were conducted in Charlotte, North Carolina; Detroit, Grand Rapids, and Lansing, Michigan. See Tables 23, 24, and 25, appendix pages 93-95 for sales prices in each store, by cities.

Table 1. Summary, by Cities, comparing Sales of Grade A Turkeys with Turkeys Labeled "Prime" (4¢ per Pound Price Differential).

City	Number Sold		Total by City	Per cent of Total Sales	
	Grade A	Prime		Grade A	Prime
Detroit	23	22	45	51	49
Grand Rapids	107	80	187	57	43
Lansing	91	34	125	73	27
Totals	221	136	357	62	38

Table 1 shows the summary of the sales in three Michigan cities where Grade A turkeys were sold in competition with turkeys labeled "Prime" and priced 4¢ per pound above the Grade A retail price. The data show a sales ratio of Grade A to "Prime" of 62:38.

When these data were analyzed by the Chi Square method using the theoretical sales ratio of Grade A to "Prime" of 2:1, the difference is significant at the 1 per cent level. When analyzed by the same method, using a calculated sales frequency, the results are also highly significant (appendix page 97).

Using the "t" test, confidence intervals were obtained to measure the range of Grade A sales, expressed in percentage of total sales, which could be expected from repeated experiments. The 95 per cent confidence intervals are 57 to 67 per cent, and 55 to 74 per cent are the 99 per cent confidence intervals (see appendix page 98 for calculations).

Based upon these data the expected sales of turkeys labeled "Prime" will be from 26 to 45 per cent of the total 99 per cent of the time, and from 33 to 43 per cent of the total 95 per cent of the time.

These data show that if this experiment were repeated many times, one can be confident that the sales of turkeys labeled "Prime" and priced at 4 cents per pound higher than Grade A turkeys would constitute one-third of the total sales 95 per cent of the time. Further, one can be confident that the sales of turkeys similarly labeled will constitute 26 per cent of total sales 99 per cent of the time.

From the data obtained in these tests, it is obvious that about one-third of the hen turkeys may be sold at a higher price when the grade designations are changed to those used in this study and at the prive level prevailing during this study.

Table 2 shows the sales summary comparing Grade A turkeys with turkeys labeled "Prime" and priced at 6¢ per pound higher than the Grade A retail price.

Table 2. Summary, by Cities, Comparing Sales of Grade A Turkeys with Turkeys Labeled "Prime" (6¢ per Pound Price Differential).

City	Number Sold		Total by City	Per Cent of Total Sales	
	Grade A	Prime		Grade A	Prime
Detroit	34	16	50	68	32
Grand Rapids	192	112	304	63	37
Lansing	72	23	95	76	24
Totals	298	151	449	66	34

These data show a sales ratio of Grade A to "Prime" of 66:34. Analysis of these data by the Chi Square method revealed a significant difference from the theoretical sales ratio (2 Grade A:1 "Prime") at the 5 per cent level but not at the 1 per cent level. This also was true when the calculated sales ratio was used as the theoretical expectation. (See appendix page 99 for calculations.)

Confidence intervals were obtained for Grade A sales by means of the "t" test. The 95 per cent confidence intervals were 62 to 70 per cent, and the 99 per cent confidence intervals are 60 to 72 per cent (see appendix page 98 for calculations).

A price resistance was noted in the above analysis. When the price differential was increased from 4 to 6¢ per pound, there was a decline in percentages of sales in the "Prime" grade designation. This also was shown by the statistical analysis as measured by the failure of the sales to be significantly different from the theoretical ratio of 2:1 at the 1 per cent level, whereas at 4¢ per pound the sales were different. This difference was due to an excess of "Prime" turkey sales over what was expected.

Although a price differential of 6¢ per pound was sufficiently broad to cause an incipient decline in preference for the "Prime" labeled turkeys, these data show that from 25 to 35 per cent of the hen turkeys were sold for 6¢ per pound more than the price of the Grade A labeled turkeys.

Table 3 shows the summary of sales when Grade A turkeys were sold in competition with turkeys labeled "Choice" and priced at a 4¢ per pound price differential.

Table 3. Summary, by Cities, Comparing Sales of Grade A Turkeys with Turkeys Labeled "Choice" (4¢ per pound Price Differential).

City	Number Sold		Total Sold by City	Percentage of Total Sales	
	Grade A	Choice		Grade A	Choice
Detroit	37	29	66	56	44
Grand Rapids	134	140	274	49	51
Lansing	114	37	151	75	25
Totals	285	206	491	58	42

These data show a sales ratio of Grade A to "Choice" of 58:42. When these data were analyzed by the Chi Square method, a highly significant difference was found from both the theoretical ratio of 2:1 as well as the calculated ratio. This difference was due to the excess sales of "Choice" turkeys over the expected sales (see appendix page 100 for calculations).

Confidence intervals were also obtained from these data. The 95 per cent confidence intervals for the range of Grade A sales are 54 to 62 per cent, and the 99 per cent confidence intervals are 52 to 64 per cent (see appendix page 102 for calculations).

These data show that when Grade A turkeys were sold in competition with "Choice" turkeys (selected for quality) priced at 4¢ per pound above Grade A turkeys, 35 per cent of the hen turkeys now being sold as Grade A were sold at a higher price when labeled "Choice". Further, one can be confident, based upon these data, that this will occur 99 per cent of the time as shown by the 99 per cent confidence limits.

Table 4 shows the summary of the sales when Grade A turkeys were sold in competition with turkeys labeled "Choice" and priced at a 6¢ per pound price differential.

Table 4. Summary, by Cities, Comparing Sales of Grade A Turkeys with Turkeys Labeled "Choice" (6¢ per Pound Price Differential).

City	Number Sold		Total Sold by City	Percentage of Total Sales	
	Grade A	Choice		Grade A	Choice
Detroit	35	12	47	75	25
Grand Rapids	64	75	139	46	54
Lansing	136	41	177	77	23
Totals	235	128	363	65	35

These data show a total sales ratio of Grade A to "Choice" of 65:35. When these data were analyzed by the Chi Square method, the differences were found to be highly significant from the theoretical ratio of 2:1. This significance is due largely to city differences between Grand Rapids and Lansing. Sales of Grade A turkeys (percentage) in Grand Rapids were consistently lower than sales in Lansing. (See appendix page 101 for calculations.)

Confidence intervals of these data for Grade A turkey sales compared with "Choice" sales are almost identical with the confidence in-

tervals comparing Grade A with "Prime" at the same price differential. The 95 per cent confidence intervals are 60 to 70 per cent and the 99 per cent confidence intervals are 59 to 71 per cent. This means that, based upon these test data, one can expect the percentage of Grade A sales to fall within these limits with the appropriate confidence under the conditions of this experiment.

Again, these data show that with a price increase from 4¢ per pound to 6¢ per pound above Grade A prices, the percentage sales of turkeys labeled "Choice" declined, which demonstrates the effect of wide price differentials. However, even at 6¢ per pound above Grade A prices, these data show significant differences in the sales when compared to the expected ratio of 2:1. When "Prime" was compared with Grade A, there was a highly significant difference between cities which indicates that the sales ratio of 2:1 should not be expected in all cities, but it may be expected from aggregate sales from several cities.

Table 5 shows the summary of Grade A turkey sales compared with turkeys labeled "Prime" and "Choice" at a 4¢ per pound price differential.

Table 5. Sales Summary, by Cities of Grade A Turkeys with Combined Sales of "Prime" and "Choice" Turkeys (4¢ Per Pound Price Differential).

	Number Sold			Percentage of Total Sales	
City	Grade A	Prime & Choice	Total Sold by City	Grade A	Prime & Choice
Detroit	60	51	111	54	46
Grand Rapids	241	220	461	52	48
Lansing	205	71	276	74	26
Totals	506	342	848	60	40

These data show highly significant differences from the theoretical sales ratio of Grade A to "Prime" and "Choice" of 2:1. Based on these results one-third of the turkeys now being marketed as Grade A may be sold for at least 4¢ per pound higher price if they are labeled "Prime" or "Choice".

Table 6 shows the summary of Grade A turkey sales compared with turkeys labeled "Prime" and "Choice" at 6¢ per pound price differential.

Table 6. Sales Summary, by Cities, of Grade A Turkeys with Combined Sales of Prime and Choice Turkeys (6¢ per Pound Price Differential).

City	Number Sold		Total Sold by City	Percentage of Total Sales	
	Grade A	Prime & Choice		Grade A	Prime & Choice
Detroit	69	28	97	61	39
Grand Rapids	256	187	443	58	42
Lansing	208	64	272	76	24
Totals	553	279	812	66	34

These data show highly significant differences from the theoretical sales ratio of Grade A to "Prime" and "Choice" of 2:1 by cities, but the total sales ratio is almost identical to the theoretical ratio. Based upon these data, approximately one-third of the turkeys now being sold as Grade A may be labeled "Prime" or "Choice" and sold for 6¢ per pound higher price. The results (total sales) are not significantly different from the theoretical ratio.

Table 7 shows the combined sales data.

Table 7. Summary of Turkey Sales (Price Differentials Combined).

City	Number Sold		Total Sold by City	Percentage of Total Sales	
	Grade A	Prime & Choice		Grade A	Prime & Choice
Detroit	129	79	208	62	38
Grand Rapids	497	407	904	55	45
Lansing	413	135	548	75	25
Totals	1039	621	1660	63	37

The "t" test was used to compute 95 per cent confidence intervals from these data. Based upon these data, it is expected that from 35 to 39 per cent of total sales would be "Prime" and "Choice" in repeated tests. The 99 per cent confidence intervals are 33 to 40 per cent.

Earlier work with consumer panels showed that there was no difference between the preference for turkeys labeled with the words "Prime" and "Choice" at the 5 per cent level of significance. To further test this observation in actual sales tests, two Detroit stores were selected. Turkeys labeled "Choice" were the controls and turkeys labeled "Prime" carried the higher price. The sales results are shown in Table 8.

Table 8. Turkey Sales Comparing "Choice" and "Prime" as Grade Labels.*

Grade Label	Price Per Pound	Number Sold	Grade Label	Price Per Pound	Number Sold
Choice	.39	11	Prime	.43	7
Choice	.39	35	Prime	.45	2

*All turkeys Grade A quality.

These data show that when the price differential was 4¢ per pound there was no difference between sales, from a statistical point of view (5 per cent level). However, from the point of view of

this experiment, they show that with product differentiation by grade labels "Prime" and "Choice", returns can be increased. Further, the data support earlier work showing that there is little or no difference in preference between the two terms as grade labels for turkeys.

At a 6¢ price differential, these data show that there was a decided shift in preference in favor of turkeys labeled "Choice". No doubt much of this shift is a direct influence of the 6¢ price difference. These data show that after the 4¢ price differential is passed, an incipient decline in consumer preference occurs due to price.

To test the movement of Grade B turkeys labeled with the word "Good" when sold in competition with Grade A turkeys labeled with the word "Choice", two stores were selected. The results are shown in Table 9.

Table 9. Turkey Sales Comparing "Good" and "Choice" as Grade Labels.*

Grade Label	Price per Pound	Number Sold	Grade Label	Price Per Pound	Number Sold
Good	.38	38	Choice	.42	26
Good	.39	2	Choice	.45	12

* "Good" turkeys were B quality; "Choice" turkeys were A quality.

These data in Table 9 show that at a 4¢ per pound price differential, turkeys labeled "Good" outsold the turkeys labeled "Choice". When the price differential was 6¢ per pound, turkeys labeled "Choice" outsold the turkeys labeled "Good". These data show that if Grade B turkeys are labeled as "Good" they will sell in volume at prevailing Grade A retail prices, and many turkeys presently referred to as Grade A turkeys might sell for 4¢ per pound more when they are labeled "Choice".

It should be pointed out that the Grade B turkeys in this test had better conformation, fleshing, and finish than did many of the Grade A turkeys that were labeled "Choice". The exact cause of down-grading could not be determined except in a few instances. Some had missing skin and tears on the legs and backs. Others were reddish in appearance. The consumers demonstrated in this test that "red" turkeys are highly undesirable and unacceptable. Sales of turkeys labeled "Good" practically ceased when a box of red turkeys was displayed. When these were finally sold, sales of turkeys labeled "Good" returned to a high level. This unacceptable condition probably accounts for some of the "Choice" sales.

These data were subjected to statistical analysis at a theoretical ratio of 1:1 and were found to be statistically different at the 5 per cent level. This difference probably is due to the small number of "Good" sold at 39¢ in comparison to the larger number of "Choice" sold at 45¢.

One store had some turkey fryer-roasters and toms in stock, all of which were USDA Grade B. It was decided to test the preference relationship between Brand Name (no grade label) and the grade label "Good". The results are shown in Table 10.

Table 10. Turkey Sales Comparing "Good" with No Grade Label - Grade B Turkeys

Grade Label	Price Per Pound	Number Sold	Grade Label	Price per Pound	Number Sold
Brand Name#	.53	6	Good#	.57	6
Brand Name*	.39	4	Good*	.43	6

#Beltsville Small White Turkeys 6-8 pounds.

*Tom Turkeys 16-18 pounds.

These very limited data indicate that consumer preference for word grade labels as consumer grade designations is probably just as applicable to fryer-roaster and toms as to hens. The most important thing in this table is the price level of the fryer-roasters and toms. These data would seem to indicate that the general price level is of lesser importance in determining whether consumers will pay a price differential for turkeys labeled with preferred grade labels than formerly thought. One will note that the toms were priced the same as Grade A hens in other stores. No statistical analysis was made of the results in this table.

The volume of sales in Charlotte, North Carolina, was insufficient for statistical analysis. When sales at all three price differentials (2¢, 4¢, 6¢) were combined, 62.5 per cent of the total sales were turkeys labeled with either "Prime" or "Choice" as compared to turkeys labeled Grade A during the first six-weeks period. During the second six-weeks period sales of turkeys labeled "Prime" and "Choice" were 51 per cent of the total.

No conclusions can be drawn from these data. At best it is inferred that "Prime" and "Choice" are preferred by many consumers to Grade A as grade labels. Word grade labels appear to have more meaning as quality communicators than does Grade A. It is also inferred from these data that one might expect consumers in the South to respond to the grade labels "Prime" and "Choice" as consumers in other sections.

While the percentage of sales of "Prime" and "Choice" were higher than in other areas tested in this study, it is doubtful if any particular significance should be attached to this since the number of sales was small. If sales volume had been large, it is doubtful if Grade A turkeys would have sold in sufficient numbers to cause any change in the total findings of this study.

Preference Panel Studies

In order to obtain information on consumer preference for raw turkey parts and cooked turkey rolls (whole and sliced) labeled with the grade label "Prime", "Choice", or "Good", a series of tests were conducted with the Detroit Preference Panel. For the afternoon section of the Panel, no price was used on the rolls. Grade A, "Prime", and "Choice" were used as the grade designations with each roll being as identical as possible except for the grade designation.

For the evening section, prices were added to the grade label. A price of $1.59 was placed on the roll labeled "Prime", and $1.55 was placed on the Grade A and "Choice" rolls. The base price of $1.55 was selected, based upon the wholesale price of raw rolls at 75¢ per pound plus 80¢ per pound to compensate for weight loss and the service of cooking. No other change was made between the afternoon and evening.

Results of Series I are shown in Tables 11 and 12.

Table 11. Influence of Grade Label on Preference for Cooked Turkey Rolls by the Detroit Preference Panel. Afternoon April, 1963.

Symbol	Grade Label	% 1st Place	Rank 1	Rank 2	Rank 3
			Persons		
%	Prime	65.0	39	12	6
*	Grade A	20.0	12	21	24
()	Choice	15.0	9	23	25

Table 12. Influence of Grade Label and Price on Preference for Cooked Turkey Rolls by the Detroit Preference Panel. Evening, April, 1963.

Symbol	Grade Label	Price per Pound	% 1st Place	Rank 1	Rank 2	Rank 3
					Persons	
%	Prime	$1.59	45.3	39	18	27
*	Grade A	1.55	24.4	21	32	31
()	Choice	1.55	30.2	26	37	20

The data in Table 11 show that 65 per cent of the respondents preferred the roll with the "Prime" grade designation. This percentage declined, probably due to the influence of price, to 45 per cent in the evening section (Table 12). While the roll labeled "Choice" in the afternoon was the least preferred, when price was added it was preferred by 6 per cent more respondents than the roll labeled Grade A.

In Series II, cooked, sliced turkey rolls were labeled with a variety of grade labels to observe indicated preference.

In the afternoon no prices were used on the packages, while at the evening panel prices were added. No other changes were made. Results

are shown in Tables 13 and 14.

Table 13. Influence of Grade Label on Preference for Cooked, Sliced and Packaged Turkey Roll by the Detroit Preference Panel. Afternoon, April, 1963.

Symbol	Grade Label	% 1st Place	Rank 1	2	3	4
			Persons			
*	Prime	32.8	20	14	13	10
#	Grade A	16.4	10	13	23	11
%	Choice	36.1	22	21	10	4
()	Good	14.7	9	13	8	27

The data in Table 13 shows little or no difference in preference between the packages labeled "Prime" and "Choice", and little or no difference in preference between the packages labeled Grade A and "Good" as per cent of first place.

Table 14. Influence of Grade Label and Price on Preference for Cooked, Sliced and Packaged Turkey Roll by the Detroit Preference Panel. Evening, April, 1963.

Symbol	Grade Label	Price per Pkg.	% 1st Place	Rank 1	2	3	4
				Persons			
*	Prime	$.73	22.4	19	8	28	30
#	Grade A	.71	12.9	11	30	35	9
%	Choice	.71	35.2	30	38	12	5
()	Good	.69	29.4	25	13	10	37

When prices were added, as the data show in Table 14, indicated preference shifted somewhat. The package labeled "Choice" was then preferred by most respondents, with the package labeled "Good" in second place, and the package labeled Grade A was clearly preferred

by the least number of respondents. This emphasizes the fact that the quality of cooked, sliced turkey meat is difficult to distinguish. Products from deformed carcasses and carcasses lacking in flesh would appear to be acceptable in cooked form. It also appears that standards of quality for raw turkey meat are relatively useless as a measure of the quality of cooked turkey meat where little or no nutritional or tenderness differences exist, unless grades have a merchandising advantage and do not needlessly downgrade the product.

These data show that price was an influence in the purchase of cooked, sliced turkey meat, and that consumers had a tendency to be somewhat conservative when purchasing this product. However, the 48 per cent who indicated a willingness to buy the same meat at 2¢ per package higher price, and the 22 per cent who indicated a willingness to pay 4¢ per package more is important from the standpoint of profit maximization to the manufacturer. Seventy-one per cent indicated a willingness to pay more for the meat in the package of their preference. These data were subjected to statistical analysis (coefficient of concordance) which showed the coefficient's significance at the 1 per cent level.

From time to time it may be profitable to offer cut-up turkey for sale. Several series were included to evaluate the relative preference for turkey parts labeled with word grades as compared to Grade A label.

Table 15 shows the preference scores for raw turkey breasts (Series III). In this series, the turkeys were selected as to quality. The breast labeled "Prime" had better conformation and better finish than the breast labeled "Choice" and Grade A, both of which were of

comparable A quality. The breast labeled "Good" was from a Grade B turkey which was lacking in flesh and finish, and slightly red on the sides. No processing defects such as pin-feathers, cuts or bruises were present on any of the breasts. As in previous tests, no price was attached to the packages in the afternoon, but was added for the evening panel. Results of this series are shown in Tables 15 and 16.

Table 15. Influence of Grade Label on Preference for Raw Turkey Breast by the Detroit Preference Panel. Afternoon, April, 1963.

Symbol	Grade Label	% 1st Place	Rank			
			1	2	3	4
			Persons			
()	Grade A	11.7	7	15	25	10
%	Good	3.3	2	6	16	33
*	Choice	33.3	20	22	12	3
&	Prime	51.7	31	14	4	8

Table 16. Influence of Grade Label and Price on Preference for Raw Turkey Breast by the Detroit Preference Panel. Evening, April, 1963.

Symbol	Grade Label	Price per Pound	% 1st Place	Rank			
				1	2	3	4
				Persons			
()	Grade A	$.77	10.6	9	22	33	21
%	Good	.75	15.3	13	15	14	43
*	Choice	.77	34.1	29	35	14	7
&	Prime	.79	40.0	34	15	24	12

These data in Table 15 show a clear preference for the breast labeled "Prime", and the breast labeled "Choice" preferred to the one labeled Grade A. These data in Table 16, with prices added, showed a

reduced preference for the "Prime" package, but it was still ranked first by most respondents. The breast labeled "Choice" gained in preference score when prices were added.

Probably the most notable change occurred with respect to the breast labeled "Good". The gain in preference score of the breast labeled "Good" was almost exactly equal to the decline in preference score of the breast labeled "Prime". These data also show that price on turkey breasts was an influence on preference and that a high percentage of the consumers indicated that they would pay more for turkey breasts when they were labeled with the word grade labels used in this study. Analysis of coefficients of concordance showed significance at the 1 per cent level.

Series IV was included to evaluate the relative influence of word grade labels on preference for raw turkey thighs. The thighs were from the same respective birds as the breasts. In the afternoon no prices were attached. In the evening prices were included in the labeling. Results are shown in Tables 17 and 18.

Table 17. Influence of Grade Label on Preference for Raw Turkey Thighs by the Detroit Preference Panel. Afternoon, April, 1963.

Symbol	Grade Label	% 1st Place	Rank			
			1	2	3	4
			Persons			
#	Prime	43.1	25	14	15	3
()	Good	1.7	1	1	5	50
%	Grade A	34.5	20	18	17	2
*	Choice	20.7	12	24	20	1

Table 18. Influence of Grade Label and Price on Preference for Raw Turkey Thighs by the Detroit Preference Panel. Evening, April, 1963.

Symbol	Grade Label	Price per Pound	% 1st Place	Rank			
				1	2	3	4
				Persons			
#	Prime	$.79	32.2	28	16	26	14
()	Good	.75	11.5	10	8	11	55
%	Grade A	.77	35.6	31	25	24	4
*	Choice	.77	20.7	18	35	23	8

These data in Table 17 again show a preference for the thighs labeled "Prime". In this test, thighs labeled Grade A outranked thighs labeled "Choice" in number of first place rankings. These data in Table 18 show that when prices were added the thighs labeled Grade A received more first place rankings than did the thighs labeled "Prime". The thighs labeled "Choice" received the same percentage of first place rankings in the afternoon and evening.

As in the case of the breasts, the preference for thighs labeled "Good" showed the greatest shift in relative preference. These data also show that a high percentage of the consumers indicated a willingness to pay more for turkey thighs when they were labeled with a word grade label. This further supports price influence in purchasing turkey parts. Coefficients of concordance showed significance at the 1 per cent level.

Tables 19 and 20 show the results of Series V when raw turkey legs were labeled with a variety of grade labels. In the afternoon panel, no prices were included in the labeling; however, as in previous series,

prices were added in the evening. The price addition was the only change.

Table 19. Influence of Grade Label on Preference for Raw Turkey Legs by the Detroit Preference Panel. Afternoon, April, 1963.

Symbol	Grade Label	% 1st Place	Rank 1	2	3	4
			Persons			
&	Choice	25.0	14	27	10	4
*	Good	5.4	3	7	11	34
#	Prime	60.7	34	13	6	2
%	Grade A	8.9	5	12	27	11

Table 20. Influence of Grade Label and Price on Preference for Raw Turkey Legs by the Detroit Preference Panel. Evening, April, 1963.

Symbol	Grade Label	Price per Pound	% 1st Place	Rank 1	2	3	4
				Persons			
&	Choice	$.67	32.9	28	32	15	10
*	Good	.65	17.6	15	10	15	45
#	Prime	.69	31.8	27	25	19	14
%	Grade A	.67	17.6	15	21	37	12

These data in Table 19 show a clear indication of preference for the legs labeled "Prime" and "Choice" in that order. When prices were added as shown in Table 20, these data show a marked change in preference rankings. There was no significant difference between the number ranking the legs labeled "Prime" and "Choice" as first place, and no difference in the per cent ranking legs labeled Grade A and "Good" as their first choice. These data show that with turkey legs a high per cent of the consumers indicated that they would pay more for turkey

legs when labeled with grade designations "Prime" and "Choice" rather than Grade A. They also show that with a small price differential the turkey legs from a Grade B turkey labeled as "Good" may sell about equally with turkey legs from Grade A turkeys labeled as Grade A. Coefficients of concordance showed significance at the 1 per cent level.

DISCUSSION

Sales Tests

Mills, et al., (1961) used Lansing stores in a preliminary sales study and reported that 25 percent of the turkeys of comparable quality could be labeled "Prime" or "Choice" and sold for at least 2 cents per pound higher price. This thesis supports that work, however, in this study the price differentials were increased to 4 and 6 cents per pound. The same turkey sales ratio as reported by Mills, et al., (1961) was observed. This similar finding in Lansing appears to be important because it indicates that the same results obtained in the other cities are likely to reoccur in repeated tests. It further increases the probability that the results of this study was valid. At the 1 per cent level of probability there is no difference in the ratio of turkey sales in Lansing in 1960 and in 1962.

Combined turkey sales observed in this study differed from the theoretical sales ratio of 2 Grade A:1 "Prime" or "Choice" at the 1 per cent level of probability. This difference was due to the excess sales of turkeys labeled "Prime" and "Choice" over that which was expected.

The differences in the sales ratio in the various cities used in this study were much greater than the differences between stores within cities as shown by the "t" value in the analysis, although some stores within a city might have a noticably different sales ratio. When Grand Rapids and Detroit were tested against Lansing, the differences had "t" values of 8 and 7 respectively. This shows that the differences between these cities are highly significant and could not have happened by chance based upon the data obtained in the experiment. At the 99

per cent level of confidence, the "t" value would have been 2.58.

When the difference between Detroit and Grand Rapids was analyzed, the "t" value was 1.87. Since a "t" value of 1.98 is the 95 per cent confidence level, there appears to be no significant difference in the sales ratio of Grade A turkeys to "Prime" or "Choice" in these cities.

Store differences in Grand Rapids were analyzed and "t" values of 2.39, 2.53 and 0 were obtained. Comparing these values with the "t" values obtained for the analysis between Grand Rapids and Lansing, it is observed that the differences between stores within Grand Rapids are much smaller than the differences between the two cities. See appendix pages 104-108.

Store differences in Lansing showed "t" values of 2.52, 0.67 and 2.998. Two of these comparisons are significantly different at the 5 per cent level (a "t" value of 1.98), and the other is not. While there are some differences between stores within Lansing, this difference is not as great as between Lansing and Grand Rapids. Store number 4 in Lansing was not tested for differences because of insufficient sales to make the comparison meaningful.

Although the sales per store in Detroit were too small for adequate statistical analysis, the "t" test for differences was used for indications as to the nature of the differences. These differences followed the same trend as those between stores in Lansing and Grand Rapids.

The meaning of these differences is that one should not expect each market area to behave in the same manner or to show the same sales ratio. However, one should expect, based upon these data, that the stores within each market area would experience quite similar sales ratios. The

aggregate sales from several cities, should follow a similar pattern as was discovered in this study.

Two competitive price levels were involved in this experiment. In Grand Rapids, the prevailing retail Grade A price was 35 cents per pound. In Lansing, the prevailing retail price during the same period was 39 cents and in Detroit the base price level (Easter) was also 39 cents. Price differentials above these levels were added.

The Detroit market appeared to be more sensitive to a price differential of 6 cents than was either Grand Rapids or Lansing. In Detroit, the decline in purchases of turkeys labeled "Prime" or "Choice" at the 6 cents price differential averaged 18 per cent as a percentage of total sales. This could have been due to the actual price increase of the turkeys or it could have been due to the city-wide promotion of hams during the Easter season. Another factor that may have had some influence in this decline was the fact that one major food chain sold Grade A turkeys at 37 cents per pound although this would appear doubtful except in instances where the consumer shops strictly by advertised prices. The ratio of sales in Detroit at the 6 cents price differential was practically the same as in Lansing.

In Grand Rapids and Lansing, there was little net change in the sales ratio when the price differential was increased from 4 cents to 6 cents per pound. The fact that there was some decline in purchases of the "Prime" and "Choice" labeled turkeys indicates that maximum sales at differentiated prices may occur at about a 4 cents per pound higher price than the next lower grade. Any increase above this there will perhaps be a decline in purchases.

Figures 11 and 12 illustrate the percentage sales of "Prime" and "Choice" labeled turkeys at the price differentials used in this study. For example, in Figure 11, when turkeys labeled Grade A and "Prime", with the "Prime" priced 4 cents per pound above the Grade A, the number of "Prime" sold was 39 per cent of the total. When the price differential was 6 cents per pound, the number of "Prime" sold was 34 per cent. Figure 12 reflects the relationship when "Choice" and Grade A turkeys were offered with the two price differentials.

Lines d connect the two points that link the per cent of sales at two different prices during the study and lines d' and d" represent the range within which one might expect the per cent of sales to occur in repeated sales (95 per cent confidence intervals). By dropping a perpendicular line from the confidence intervals to the base line, one can observe that at each price differential there is a possibility that at either price differential some overlapping of sales may occur. This overlap is represented by the letter o in each figure.

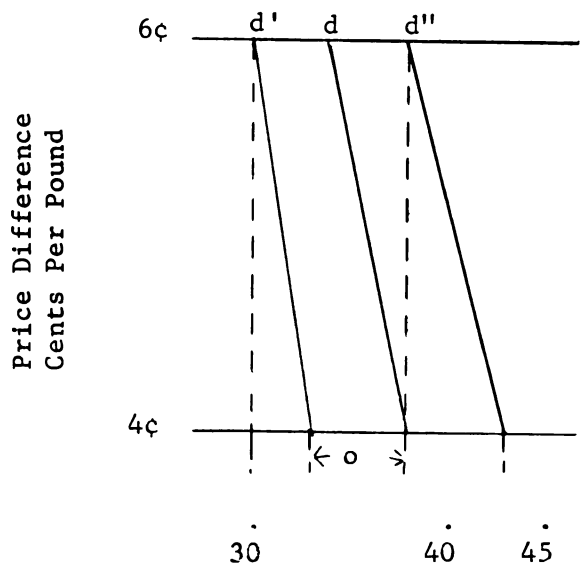

Figure 11. Percentages of Total "Prime" Turkey Sales.

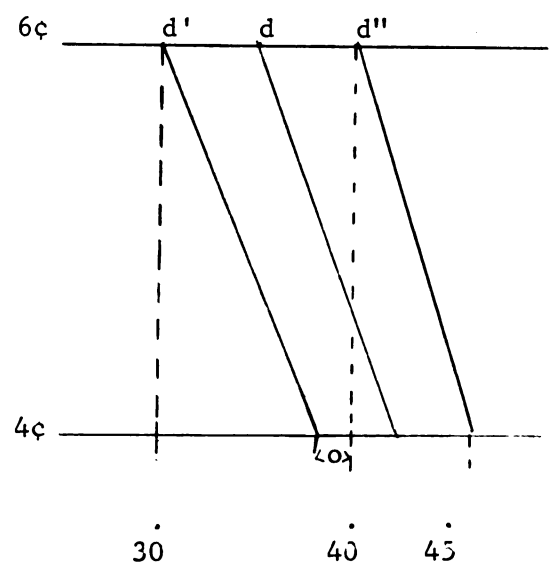

Figure 12. Percentages of Total "Choice" Turkey Sales.

Figures 13 and 14 illustrate the movement of the price-quantity sold relationships (demand curve) as occurred in this study when the turkeys were differentiated by grade label and price. Line d represents a hypothetical demand curve based on two points of the price-quantity sold relationship if all turkeys had been sold as Grade A. This would represent the common trade practice today. Line d' represents the demand curve as a result of blending the prices at the two price levels in these sales tests. The blend price was obtained in the following manner:

$$\frac{\text{Grade A sales X Price X weight + Word Grade sales X Price X weight}}{\text{Total sales X weight}}$$

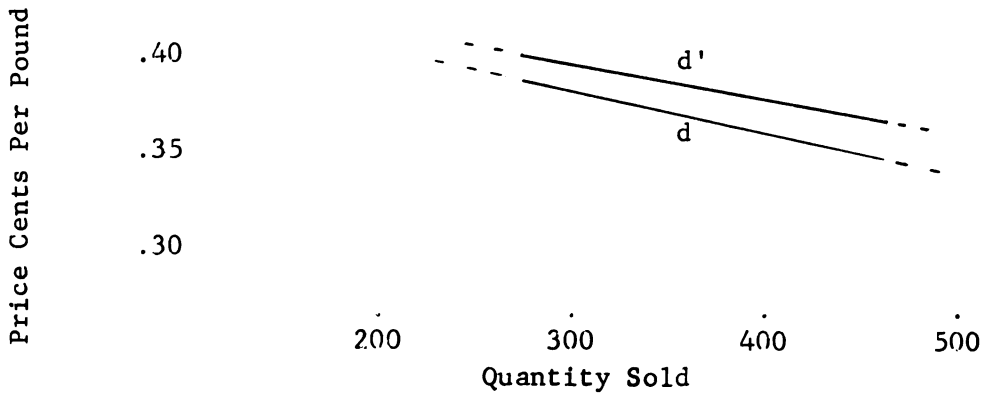

Figure 13. Illustration of Demand Curve Movement (4 Cents Price Differential).

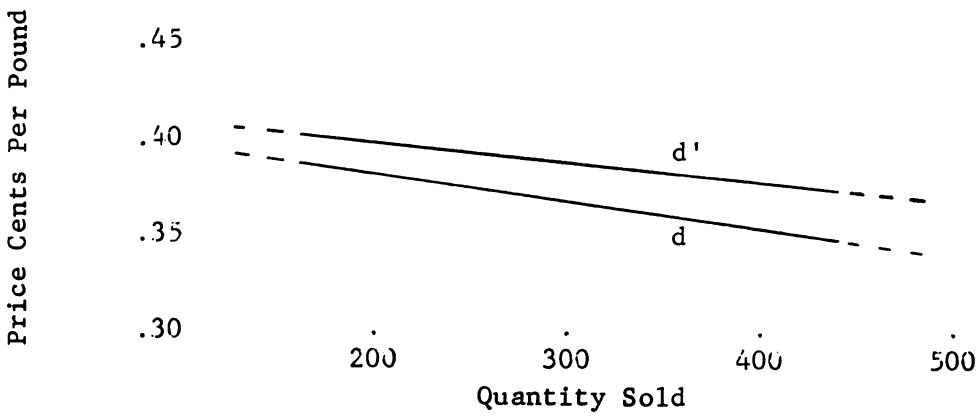

Figure 14. Illustration of Demand Curve Movement (6 Cents Price Differential).

By product differentiation and pricing, the demand curve was shifted to the right on the basis of this study. This is based on the assumption that all sales occurred in the same market. The assumption that Grand Rapids and Lansing are the same market appears to be a valid assumption since the sales ratios in Grand Rapids changed very little between the two price differentials. The Lansing sales ratio was practically identical at both price differentials.

Grading in General

In our competitive system, every turkey producer has the right to establish and market his own private brand and promote it in the market place to build consumer confidence in his brand. Conversely, his distributors or retailers may develop their private brands from his turkeys. This freedom of producing, brand labeling, and marketing assures both producer's and consumer's freedom of choice.

The confidence which the producer of turkeys places in the consumer makes it possible for him to plan his production in a more business like manner. It enables him to invest in capital improvements, to support research designed to improve quality and to reduce production and marketing costs, to enter into contractual arrangements with suppliers and processors so that they will be supplied with an adequate amount of turkeys, and to engage in advertising to keep consumers informed about turkeys. These activities which are designed to provide the consumer with high quality turkeys at reasonable prices help maintain and promote greater confidence.

With a system built upon mutual confidence, albeit highly competitive, safeguards against possible abuse of their freedom must be built into the system. These safeguards have taken the form of laws and

regulations providing protection against fraud, adulterated food, unwholesome products, misrepresentation, and monopoly. Enforcement of these safeguards is a function of the State and Federal Governments. The Congress of the United States, in providing basic legislation, has been broad in its scope, constructive, and cognizant of the needs of an expanding industrial society and agriculture and the rising level of living.

Under our free enterprise system, American agriculture has provided the consumer with a prodigality of products resulting in an opulence of opportunities beyond anything the world has ever seen. In arriving at this affluent state, there has been such a proliferation of brands and products that the consumer frequently experiences difficulty in deciding what to buy, where to buy, and indeed understanding one's own needs in the complexity of a free society, as contrasted to the simplicity of living in a totalitarian state with its paucity of consumer goods. The art of spending money, when faced with so many alternatives, appears to have developed at a much slower pace than production and marketing technology.

What confusion that exists in the minds of the consumer may be due in part to the variety of choices available, in part to the slowness of consumers to keep pace with developing technology and to learn their own needs and congruently to develop their buying skills. Competitive advertising may also contribute to the backward art of spending money.

The amount of money that a farmer receives for his turkeys depends upon: (1) The economic level of society in general or the amount of money consumers have to spend, (2) The total volume of turkeys marketed, and (3) The cost of getting turkeys to market. Many feel that

production costs determine retail prices. Others, including the author, believe that prices are determined by consumers at the retail level. The power which the consumer wields at the retail supermarket shelf is the major key to price determination.

Trade demand is derived from consumer demand; therefore, consumer preferences should play a vital role in determining effective consumer grades. To the extent that consumer grades reflect consumer preferences, then it might be said that the problem of developing consumer grades is one of harmonizing acceptable consumer quality with grades. The central problem in consumer grade labeling appears to be one of selecting the system of identifying quality, as the consumer perceives quality, and labeling it in the manner which has real significance to her as a quality label.

One might well ask, what is the function of a grading system? Is the function that of describing and identifying quality to facilitate marketing? Or, is the function that of setting standards of quality to which the marketing system should adjust? It would appear that the grading system should be flexible and embrace as its main function that of facilitating marketing by differentiating the product according to factors of quality which the consumers look for in purchasing the product, and labeling these quality factors with such grade labels that adequately reflect acceptable quality and that have meaningfulness as quality labels.

Grades, whatever they may be called, imply consumer evaluations of qualities that apparently give different degrees of satisfaction to the individual. It can be said from this study that many consumers are more tolerant of defects causing variations in turkey quality than many

quality-conscious experts think they are.

It is apparent from this study (as Mills et. al., found earlier) that quality and value of a product are what the individual perceives as quality and value, nothing more. Tastes vary. So does the quality image of a product and the value generalizations attached to it.

It would be presumptuous to inflict upon others one's own idea of quality and the value which should be attributed to it. For example, who is to say that a turkey which has been classified as B quality because of some missing skin, a broken bone, or one that is lacking in finish is not a high quality turkey? Is it any different nutritionally? Perhaps there might be a few less calories because of the lack of finish. There has been no difference reported in the nutritive value of turkeys that do not conform to the present standards of A quality and those that do. Yet, there are some who would say that such a turkey is of "inferior" quality and place a Grade B label on it. Certainly the consumer did not reject such turkeys in this study. In fact, when such Grade B turkeys were labeled "Good" and sold in competition with Grade A turkeys labeled "Choice", Grade B turkeys outsold the Grade A's (Table 9). As Grade B's, they would not have sold because such a label would have "shouted" to the customer "inferior quality, do not buy!" This was shown to occur in research investigations by Mills, et.al., (1960).

The Grade B turkeys used in the above test were actually superior to the Grade A turkeys in appearance in the eyes of the consumer as well as the author's. They (Grade B turkeys) had better conformation, were more meaty, and with a grade label which did not cause mental anguish, the consumers bought them and at no reduction in price!

Some questions that should be considered when grades are established are listed below:

1. Can the factors be measured?
2. Does each factor reflect quality as desired by consumers?
3. Are the factors independent of personal preference?
4. Do the factors approach a reasonably complete measure of quality?
5. Does the emphasis given each factor accurately reflect that factor's importance to a majority of consumers?
6. How definite are the differences in factors between grades?
7. Are these differences clear and no more arbitrary than necessary?
8. Are the tests for quality factors objective?
9. Does the final grade differentiate the product in such a way that the consumer can tell the relative difference in how good the product is?
10. Has the nutritional factor been included?
11. Has the taste factor been included?
12. Can the grade be easily understood and used by marketers?

Present System

In the light of the foregoing grade criteria, one can examine the present A-B-C system. This system is analogous to a chain. It is a chain of technical procedures, and like the old proverb states, no chain can be any stronger than its weakest link. If one of the criteria for the grade standard is in doubt, then there may be doubt in all of them. If the combination of grade factors have little to do with consumer quality preference, if the factors add up such that a portion of the product is discriminated against unjustly, then the grading system

is in doubt. If one or more of each step is open to doubt, the whole system is doubtful. It is difficult to visualize how a system of doubts can be fused into a valid scientific grading system.

From the results obtained in controlled experiments, the present letter grading system does not fulfill all the objectives of a sound grading system. It does not measure quality by the same standards as do consumers. The scoring system of tolerances do not combine in a way that accurately reflects consumer preference of the 1960's. It discriminates against a portion of the crop unjustly. It does not differentiate the product in such a way that the consumer can tell the relative difference of how good the product is. It does not take into account the increasing importance of nutrition as a quality determinant. The grade specifications appear to be more arbitrary than necessary. When the A-B-C system is analyzed in light of the proponent's claims presented on page 16, the answer comes out the same.

Based upon the results of this study, the scientific reliability and objectiveness of the system as measuring quality is in doubt. Grade A, in the mind of 37 per cent of the consumers (Table 7) certainly does not represent the finest turkey available. If a letter grade label is simple, it is deceptively simple. There is a more pragmatic way of selling by grades that gives higher consumer satisfaction and higher producer returns. Letter grades can be misunderstood. While it may give the consumer an opportunity to compare prices, it is doubtful if it enables her to compare value. It does, however, give her a minimum guarantee of quality.

The problem of grading and labeling for consumers requires an utterly different set of requirements and philosophy than grading and labeling for the wholesale trade. One often hears the terms grades, standards, and specifications used interchangeably. Although these terms are intimately related, they are different and have different functions. Grading is one thing, and "quality" grading for consumers is a different thing. Simply stated, grading is separating a mass of products into different classifications. Standards refer to the factors which make up quality. Specifications refer to exacting quality standards to which a product must conform.

A quasi-simple word like quality may have one meaning, or it may have a dozen, or it may have none at all when applied to comparable grades for the purpose of comparison.

It can be seriously questioned whether there is a need for wholesale grades under today's turkey marketing system. There <u>is</u> a need to have grades more nearly reflect consumers' opinions about turkey quality. Effective grading must be done on factors, but which factors are important? What is important about each factor, and to whom is it important? Is the factor related to value? Whose value? Is the perception of the grade label and the character of the product congruent? These questions cannot be avoided in grading and grade labeling.

This study showed that the main factors consumers look for in purchasing turkeys are: appearance, meatiness, shape, wholesomeness, serious defects, and finish. In addition, consumers are now thinking in terms of flavor, tenderness, and nutritional value more than formerly. While no objective test for flavor and tenderness (prior to purchase) is available at the present time, they are important adjuncts to grades.

Many consumers dramatically demonstrated their preference for better quality differentiation as used in this study by paying premiums of 4 and 6 cents per pound for turkeys labeled with word grade labels. If an item is perceived to have no higher value than another item, or to give no more satisfaction, one does not pay more for the item. Conversely, if one perceives an item to provide greater satisfaction than another, then that item is purchased even at a higher price. In this study, 37 per cent of the consumers paid the extra price to get turkeys labeled "Prime" or "Choice". The discernable differences in the grades and price would aid in adequately differentiating apparent quality. Both terms are merchandisable, and the turkeys so labeled would represent acceptable consumer quality. Such differentiation makes possible legal price discrimination, that both increases total revenue to the industry and apparently increases consumer satisfaction. Since the "Choice" Grade would constitute over one-half of the crop, it is suggested that under the proposed system that the general level of competitive pricing would be the "Choice" Grade. The "Prime" grade then could be priced 4 cents or more above the competitive grade. This study has shown that in the general price level of from 35 cents to 49 cents per pound, price premiums are possible when a grading and grade labeling system is used that reflects acceptable consumer quality.

It appears to the author that letter grades do not adequately differentiate turkeys as to quality, and therefore, are not truly representing value as perceived by the consumer. For if such grade labels are accurately representing value, why then would 37 per cent of the consumers in this study pay a higher price for turkeys? In some cases, ("Good" vs. "Choice") they even bought more Grade B turkeys than Grade A.

The answer is that the grade label was a positive quality image creator and communicator. Such word grade labels apparently are more meaningful to the consumer. They are better communicators of quality without connotations of inferiority as some letter grades are apt to be.

It should be pointed out that while Grade B turkeys are being sold under private brands, they are not labeled as Grade B. This casts a reflection on the whole system. Why have a system if only one grade label from it will be used? Why is the industry not using the Grade B label? The answer to this one is reeking in simplicity. Grade B turkeys labeled as such will not sell! Why label a product as inferior when, in fact, it is not inferior in the eyes of the consumer. At present, a firm has to rely upon brand labeling to sell its Grade B turkeys.

Many economists have engaged upon crusades to encourage producers to sell their turkeys by grades as a method by which they could receive a greater return for their turkeys. Under the present system of grading, this has met with little success. Among the reasons for this is the fact that the Grade B turkeys are discriminated against in price by from 3 to 5 cents per pound. Many of these Grade B birds are due to processing damages and no price consideration is usually given to the producer when this occurs. The procurement procedure of buying by flocks results in some producers being overpaid for their turkeys while other producers are underpaid. No satisfactory method has as yet been negotiated by which the farmer can be convinced that he is better off to sell on grade.

If the proposed grade labeling system is adopted, based upon consumer preferences as shown in this study, about 50 per cent of the

turkeys now being classified as Grade B can be sold at non-discounted prices. This will make it possible for farmers to be paid by grade and would result in increased returns to them. Under this system, only the lowest classification will be discounted in price. Buying by grade is the preferred way of paying the farmer for what he produces. The proposed system will make this possible without penalizing him unduly.

Proposed System

The author is in favor of grade labeling for all turkeys. He believes in product differentiation by quality factors, grades, grade labels, and price in order to sell turkeys for the most economic benefit to the producers and higher satisfaction for consumers. Product differentiation by grades and grade labels should be based upon current standards. The standards defining turkey quality in 1940 are archaic and unsuited to today's world. They do not represent the quality-conscious consumer's conception of quality and her willingness to pay. This willingness to pay results in part from having more discretionary income than in former years. Word grade labels more nearly represent the true character of the product.

The author is not under the illusion that a system of grading and grade labeling embracing the words "Prime", "Choice", and "Good" is the final answer to the problem of truly representing turkey quality, neither is he naive enough to believe that the A-B-C system is anywhere near today's requirements as a grade labeling system for turkeys.

Few, if any, of the strongest advocates for the A-B-C grade labeling system will make claims for its perfection, and they have conceded that when a better system is available, which takes into account

consumer preferences in a more realistic way, then the system should be changed. Such a system is now available. The proposed system is believed to be a more objective way of correlating quality with consumers preferences. This proposed grading system is designed primarily to point out how turkeys can be differentiated into grades in line with expressed consumer acceptance, and with price discrimination with respect to grades as shown in this study.

PROPOSED MINIMUM GRADE STANDARDS FOR

INDIVIDUAL, READY-TO-COOK HEN TURKEYS

(Maximum Defects Permitted)

Prime

SYMMETRY - Natural

Breast - slight curve or dent

Back - practically straight

Legs and Wings - natural

FLESHING - Superior fleshing with a minimum breast width of 5 inches.

FINISH - Well finished, no excess fat.

DEFECTS -

a. Pinfeathers
   1. Protruding - none.
   2. Non-protruding - practically free.

b. Cuts, tears and missing skin - none.

c. Bruises - none.

d. Other discolorations - slight skin abrasions may be present if not on breast.

e. Other[1] - None, except wing tip, removed to prevent flying, if properly healed

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[1]No freezer burn permitted. No breeder hens permitted.

PROPOSED MINIMUM GRADE STANDARDS FOR INDIVIDUAL, READY-TO-COOK HEN TURKEYS

(Maximum Defects Permitted)

Choice

SYMMETRY -

a. Breast - Curved or dented, not to seriously detract from appearance.

b. Back - Curved or dented, not to seriously detract from appearance.

c. Legs and Wings - Slightly deformed, not to seriously detract from appearance.

FLESHING - Well fleshed, minimum breast width 3.5 inches.

FINISH - Well finished, may have slight excess fat.

DEFECTS -

a. Pinfeathers
   1. Protruding - None
   2. Non-protruding - few, not to seriously detract from appearance.

b. Cuts, tears and missing skin - Minor.
   1. Breast - not to exceed 1 inch.
   2. Legs - not to exceed 1 inch.
   3. Elsewhere - not to exceed 4 inches if clean.

c. Bruises - Minor
   1. Breast - not to exceed 1 inch in diameter, if slight; ½ inch if dark.
   2. Legs - same as breast.
   3. Elsewhere - not to exceed 4 inches in aggregate if none are serious.

d. Other discolorations - pigment discoloration permitted not to exceed 1 inch on breast and 2 inches elsewhere.

e. Other[1] - No broken bones permitted, except wing tips.
   Dislocated bones - 2 permitted if no serious discolorations are associated.
   Missing parts - none, except wing tip.

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[1]Freezer burn - slight freezer burn permitted.

The "Prime" Grade would consist of about the top one-third of the total crop, and command a price of 4 cents per pound higher than the "Choice" Grade. At times of scarcity this price differential could be as high as 6 cents per pound, and the "Prime" Grade should still clear the market. The "Choice" Grade would consist of the lower two-thirds of the present Grade A turkeys and the top one-half of the present Grade B turkeys. The specifications have been devised so as to approach this division.

All other wholesome turkeys would go into the "Good" Grade. This grade, while no specifications are proposed, could be divided into two divisions. One division might be "Good" - Parts Missing, the other simply "Good". This might become necessary if the further processing industry could not absorb all of this grade. This would not appear to be a cause for unnecessary alarm in the future because of the developing field of cooked turkey products. The United States Department of Agriculture, Statistical Reporting Service, 1962 (18), in their report of poultry slaughtered under Federal inspection reported a total of 1,379,043,000 pounds of turkeys slaughtered, and 147,549,000 pounds inspected for canning and other processed foods. This shows that during 1962, 10.7 per cent of the total inspected turkeys was used for canning and other processing.

It is proposed that only the "Prime" and "Choice" Grades be sold at retail and the "Good" Grade go into further processing. This is in no way an attempt to push "low quality" turkeys onto the manufacturer. It is simply a suggestion as to the best potential market for the turkeys. Canned and other processed turkey products are the best available methods for utilizing the less acceptable turkeys for retailing. The nutrition,

flavor, and tenderness factors; cost, availability, and wholesomeness are the main criteria on which the quality for canned and other turkeys are based. Of course, meat yield is important, but this is offset by price considerations under the proposed plan.

At present, many manufacturers probably avoid using Grade B turkeys because of the connotation of this grade in the minds of the consumer should the consumer discover that Grade B turkeys are being used in their products. This would not occur with the use of turkeys labeled "Good" because the consumer has demonstrated that this label is acceptable and does not have the inferior connotation as does Grade B.

By restricting retail sales to "Prime" and "Choice", the consumer would have two levels with which to measure quality and value.

Table 21 shows calculated gross returns to producers based upon the present grading system and the proposed system. The percentages of A, B, and C turkeys as shown in Table 21 are the approximate average breakdown by the USDA.[18/] The prices as shown form the basis for comparison. The percentage of "Prime", "Choice", and "Good" are based upon a projection of this study and with the price differential of 4 cents per pound for the top grade. The number in the "Choice" Grade was determined by taking the top 50 per cent of the Grade B turkeys and combining them with the bottom 66.7 per cent of the Grade A turkeys. The remainder of the crop would make up the "Good" Grade.

18/ Lester Kilpatrick, Acting Chief, Standardization and Marketing Practices Branch, Poultry Division, Correspondence, April, 1962.

Table 21. Calculated Gross Returns to Producers for Two Grading Systems, Turkey Hens.* (Letters vs. Proposed).

Grading System	Number Sold Millions	Price per Pound	Per cent of Crop	Revenue Million Dollars
A	41	.24	82	118.08
B	6.5	.20	13	15.6
C	2.5	.15	5	4.5
Total	50		100	138.18
Prime	16.7	.28	33.3	56.112
Choice	27.55	.24	55.1	79.344
Good	5.75	.19	11.6	13.11
Total	50		100	148.566
Gain in Revenue				10.386

*Assumptions: 1. 50,000,000 turkey hens
2. 12 pounds average weight

This table shows a gain in revenue to producers of $10.386 million (7.516 per cent increase) as a result of reorganizing the consumer grades of ready-to-cook turkey hens to more accurately reflect consumer preferences as expressed in this sales experiment. Much of this gain would be due to the non-discounting of the price paid for turkeys now classified as Grade B, when 50 per cent of these turkeys would go into the "Choice" Grade.

Although under the proposed system of grading, the "Good" grade shows a large increase in numbers, this does not mean that the percentage of low quality turkeys will necessarily increase. It means that the quality in this lower grade has increased by virtue of the lower 50 per cent of the Grade B turkeys, being reclassified as "Good". Correspondingly, the price of the "Good" Grade has increased.

Similar results would be expected with toms although the percentages and prices per pound would be different.

Table 22 shows the retailers calculated income from this study, comparing the returns actually received with the incomes that would have been received if all turkeys had been sold as Grade A at the prevailing retail price.

Table 22. Calculated Returns to Retailers in This Study vs. All Turkeys Sold as Grade A.*

City	Returns from Grade A	Returns from Prime and Choice	Returns if All Grade A	Gain
Detroit	$1052.70	$ 729.84	$1752.54	$ 30.00
Grand Rapids	2111.40	1962.12	3836.28	237.24
Lansing	1932.84	711.76	2564.64	79.96
Totals	$5096.94	$3403.72	$8153.46	$347.20

*Assumptions - middle of the weight ranges sold.

Of the 1660 turkeys sold, the retailers realized an income of $8500.66 compared with $8153.46 if all turkeys had been sold as Grade A. This gives a net gain of $347.20 (4.25 per cent) as a result of price and grade differentiation.

During this sales test, in all instances where Grade B turkeys were sold either as "Good" or as private brands, the price was the prevailing retail Grade A prices. If this is a common practice among retailers, then the proposed grading system would in no way be short changing the consumer by either price or quality. Assuming that all retailers make no price difference between Grade A and Grade B turkeys, there would be no price adjustment necessary by the consumers under the proposed system.

Since about one-half of the present Grade B turkeys would now be classified as "Good", some of the "Good"Grade of turkeys may be sold at retail. If this were the case, then the consumer would be getting them at a reduced price from what she is now paying. However, it is proposed that only the two grades "Prime" and "Choice" be sold at retail and the "Good" Grade is proposed to be diverted into manufactured products such as pies, rolls, etc.

Season turkey movement in this study (Thanksgiving, Easter and August-October) was similar with respect to the percentage of turkeys labeled "Prime" and "Choice" sold. Although the sales volume in Charlotte, North Carolina was insufficient for statistical analysis, it is doubtful if the sales of Grade A turkeys would have been sufficient to change the total picture. This particular phase (North Carolina) would indicate that the findings of this study would be valid in the South as in the Midwest. It would further indicate that similar results may be obtained in the off season and throughout the United States. These dianoetic extrapolations are predicated upon the assumption that consumers would react in the same manner to the stimuli of grade labels and price. Such extrapolations appear plausible since, in the marketing of products, merchandising techniques are essentially the same in all parts of the United States.

The price differential should be used to ration the top birds in a particular crop. By this the author is referring to removing the top one-third of the crop from the bulk of the turkeys and increase the price, thereby, increasing total revenue from all birds. Total revenue will be increased if the trade will differentiate the product by the suggested grades and using comparable price differentials ranging near the 4 cents and 6 cents price per pound differentials used in this study.

RECOMMENDATIONS FOR FURTHER RESEARCH

It would appear that the next step in researching this particular type of study would be to develop a bag using the proposed grade labels, differentiating the grades at the processing plant and selling turkeys nationwide for a year. From the results obtained in this study, it would appear that regional studies would not be as desirable as national studies as a source of additional information.

During this study it became apparent that one aspect of marketing heretofore considered by many to be solved has not as yet been perfected. PACKAGING! In the opinion of the author this subject deserves immediate attention by the turkey industry. Many turkeys sold in this study would not meet the Grade A standards of quality due to excessive freezer burn and other damage; yet, they were sold under the Grade A label. A large percentage of the heat shrinkable bags used to package the turkeys were coming apart at the front of the carcass so that a ring of freezer burn appeared all across the breast. Excessive freezer burn also was very noticeable over the legs and wings.

It could be that the bags are not strong enough; it could be that too much vacuum was applied during packaging; or, it may be due to careless handling. Whatever is the problem, it is costing the turkey industry money. A missed sale of one turkey does not simply mean that there is one more turkey to sell. It means that this turkey that would have been sold and consumed, if not for this unsightly condition, may have resulted in more sales either to that particular customer or to his or her friends. Instead, this turkey is still in the grocer's freezer discouraging others who might want a turkey from buying one. A missed

sale is expensive! Especially one lost from excessive freezer burn. Some of these turkeys are in such bad condition that it is amazing they sell at all.

The selling job is not finished when the producer or processor gets his check for a shipment of turkeys. The sale is successfully completed only when the turkey is purchased by the consumer and it is satisfactory. Perhaps too often neglect in the market place has cost the turkey industry much more than is readily apparent to a casual observer. At any rate, the problem of poor packaging is still with us where it does the most damage - the retail supermarket.

The consumer is paying more and more attention to taste, flavor, and tenderness of turkeys. In addition, she is becoming more aware of the nutritional aspect of her meat purchases. It would appear to this author that more attention should be given to flavor than is being given to it at the present. Many consumers remarked during this sales test that some turkeys just did not have the flavor they should have. There may be many reasons why that particular turkey did not have the flavor it should, and one might be inclined to shrug it off as just one of those things. The turkey industry cannot afford to do this. It must be ever alert to the consumer's wishes if it is to prosper. Of what benefit is it to produce turkeys for 18 or 19 cents per pound if the consumers do not buy them? The basic purpose of turkey production is consumption. To lose sight of this fact is to make a grave mistake. Based upon the information obtained from this study, there appear to be more important things to worry

about than the incessant pursuit of lower production costs. The consumer appears to be more concerned with the eating qualities of turkeys than she is with a few cents per pound lower price.

SUMMARY AND CONCLUSIONS

The purposes of this study were to determine consumer acceptance of and preference for grade labels and what were consumers' opinions regarding turkey quality as reflected by purchases.

Two primary investigations were made: (1) How much of a price difference per pound above Grade A prices would the consumer pay for turkeys labeled "Prime" and/or "Choice"; (2) Do consumers prefer turkey grade labels "Prime", "Choice", and "Good" to the labels Grade A and Brand Name (Grade B - no grade label).

The experiment was designed to test the following hypotheses: (1) The consumer will purchase turkeys based primarily upon appearance and labeled with the grade label which has the highest perceived quality meaning to her; (2) A portion of the consumers will pay a higher price for turkeys labeled "Prime", "Choice", or "Good" than they will for turkeys of comparable quality labeled Grade A or Grade B.

Retail sales were conducted in Charlotte, North Carolina, during August-October, 1962; in Grand Rapids and Lansing, Michigan, during November, 1962; and in Detroit, Michigan, during the Easter period, April, 1963. Price differentials of 2, 4, and 6 cents per pound above the prevailing retail Grade A price were used.

Consumer preference for grade labels on raw turkey parts, turkey rolls, and cooked and sliced turkey rolls were tested by means of the Detroit Consumer Preference Panel. Price differentials of 2 and 4 cents per pound were used at one section of the panel for comparison with the

other section where no prices were used.

The results of the sales tests were analyzed by the Chi Square method and the "t" test. Confidence intervals for all proportions were obtained. The theoretical sales ratio of Grade A to "Prime" or "Choice" was 2:1.

The sales ratio of Grade A turkeys to "Prime" and "Choice" when price differentials of 4 and 6 cents were combined were as follows: Grand Rapids 55:45; Detroit 62:38; and Lansing 75:25. The combined sales ratio was 63:37 and did not differ significantly from the theoretical ratio. The differences between the theoretical sales ratio and the actual observed store sales in different cities were highly significant. The differences between the several store sales ratios within each city were much less than the differences between cities.

The analysis of the panel data showed that the coefficients of concordance were highly significant and that the rankings were unlikely to have occurred by chance. It does not mean that there is, or is not, a difference between any two classes within a particular series.

A new turkey grading system was developed incorporating the terms "Prime", "Choice", and "Good" as grade designations and quality specifications for each grade were set forth. The proposed grading system would be another stride toward uniformity of grades for all meat. For years, red meats have been known as Prime , Choice , and Good . The transition would be simple for the consumer because of the familiarity with red meat grades, and less confusion regarding meat grades would exist.

Based upon the results obtained in this study and the statistical analysis of these data it is concluded that:

1. One-third of the turkey hens can be sold for 4 cents per pound more than the current price of Grade A turkeys when adequately differentiated and labeled "Prime".

2. Consumer satisfaction was apparently increased as measured by the willingness of some consumers to pay premium prices for turkeys in this study.

3. Some of the criteria by which consumers judged turkey quality in this experiment are: appearance, meatiness, wholesomeness, minor defects.

4. Consumers reacted favorably to grade labels "Prime", "Choice", and "Good" as labels for whole turkeys as well as for raw turkey parts and cooked turkey products.

5. One might expect aggregate sales of turkey hens in the United States to be similar to the sales ratios obtained in this experiment.

6. Consumer grades for turkey hens should be "Prime" and "Choice".

7. All other turkeys not meeting the specifications for the grades of "Prime" and "Choice" should be classified as "Good" and used for canning and other processed foods.

8. The proposed grading system apparently more nearly reflects consumers' opinions of quality than the present grading system.

9. Total industry revenue from a given size of crop would likely be increased under the proposed grading system.

This study has pointed the way to possible increased profits for producers, processors, retailers, and greater satisfaction for the

consumer. The turkey industry can profit by grade revision, product differentiation, and proper pricing.

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APPENDIX

Table 23. Detroit Turkey Sales by Stores, Grade Designation, and Price. (April, 1963).

Store	Grade A		Prime	
	Number Sold	Price per Pound	Number Sold	Price per Pound
1	34	$.38	16	$.44
13	23	.39	22	.43
			Choice	
3	16	.39	4	.45
4	15	.39	4	.45
7	4	.39	4	.45
7	12	.39	12	.43
8	5	.39	4	.43
14	15	.39	9	.43
10	5	.39	4	.43
	Choice		Prime	
5	35	.39	2	.45
6	11	.39	7	.43
	Good		Choice	
12	38	.38	26	.42
11	2	.39	12	.45
	Brand Name		Good	
10	6	.53	6	.57
10	4	.39	6	.43

Table 24. Grand Rapids Turkey Sales by Stores, Grade Designations and Price. (November, 1962).

Store	Grade A		Prime	
	Number Sold	Price per Pound	Number Sold	Price per Pound
1	91	$.35	74	$.39
1	101	.35	65	.41
2	88	.35	44	.41
2	11	.43	4	.47
3	5	.43	2	.47
3	3	.43	3	.49
			Choice	
1	2	.43	1	.47
1	4	.43	3	.49
2	59	.35	66	.39
2	0	.43	0	.49
3	73	.35	73	.39
3	60	.35	72	.41

Table 25. Lansing Turkey Sales by Stores, Grade Designation, and Price. (November, 1962).

Store	Grade A		Prime	
	Number Sold	Price per Pound	Number Sold	Price per Pound
4	57	$.39	17	$.43
1	34	.39	17	.43
1	65	.39	14	.45
2	7	.39	9	.45
			Choice	
3	102	.39	29	.43
3	116	.39	29	.45
4	20	.39	12	.45
2	12	.39	8	.43

Computation of Coefficient of Concordance and Chi Square for Panel Data

Table 11. Influence of Grade Label on Preference for Cooked Turkey Rolls by the Detroit Preference Panel. Afternoon, April, 1963

Symbol	Grade Label	% 1st Place	Rank 1	Rank 2	Rank 3
			Persons		
%	Prime	65.0	39	12	6
*	Grade A	20.0	12	21	24
()	Choice	15.0	9	23	25

Symbol	Rank times number in rank, summed
%	81
*	126
()	130

$$\bar{X} = \frac{\text{ranks of all samples}}{\text{number of ranks}}$$

$$\bar{X} = \frac{337}{3} = 112$$

M = persons making rankings 57

N = number of samples 3

$81 - 112 = (-31)^2$

$126 - 112 = (14)^2$

$130 - 112 = \underline{(18)^2}$

$1481 = d^2$

$$W = \frac{12(d)^2}{M^2(N^3-N)} = \frac{1772}{77976} = .227916$$

$X^2 = M(N-1)W = 57(3-1)\ (.227916) = 25.98242^{**}$

** = Significant at the 1% level

Chi Square for Table 1

City	Grade A				Prime			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	23	30	-7	1.6333	22	15	7	3.2667
Grand Rapids	107	125	-18	2.5920	80	62	18	5.2258
Lansing	91	83	8	.7711	34	42	-8	1.5238
	221	238		4.9964	136	119		10.0163

fi = observed frequency

Fi = theoretical frequency ratio 2A: 1 Prime

$X^2 = \sum \frac{(fi-Fi)^2}{Fi} = 4.9964 + 10.0163 = 15.0127^{**}$

** = significant at the 1% level

Chi Square for Table 1

City	Grade A				Prime			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	23	28	-5	.8929	22	17	5	1.4706
Grand Rapids	107	116	-9	.6983	80	71	9	1.1408
Lansing	91	77	14	2.5455	34	48	-14	4.0833
	221	221		4.1367	136	136		6.6947

$X^2 = 4.1367 + 6.6947 = 10.8314^{**}$

** = significant at the 1% level

fi = observed frequency

Fi = calculated frequency = $\frac{\text{Row Total X Column Total}}{\text{Grand Total}}$

Confidence Interval for Table 1

$$S = \sqrt{\frac{(.62)\ (.38)}{357}} = \sqrt{.000659} = .025671$$

$$.62 - 1.96\ (.02567) \leq p' \leq .62 + 1.96\ (.02567)$$

$$.62 - .05 \leq p' \leq .62 + .05$$

95% Limits $.57 \leq p' \leq .67$

99% Limits $.55 \leq p' \leq .74$

p' = probability that the proportion of Grade A Turkey Sales will be between these limits based upon this data.

Confidence Intervals for Table 2

$$S = \sqrt{\frac{p\ (1-p)}{n}} = \sqrt{\frac{(.66)\ (.34)}{449}} = \sqrt{.000499} = .022338$$

$$.66 - 1.96\ (.022) \leq p' \leq .66 + 1.96\ (.022)$$

$$.66 - .04 \leq p' \leq .66 + .04$$

95% Limits $.62 \leq p' \leq .70$

99% Limits $.60 \leq p' \leq .72$

p' = probability that the proportion of Grade A Turkey Sales will be between these limits based upon this data.

Chi Square for Table 2

City	Grade A				Prime			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	34	33	1	.0303	16	17	-1	.0588
Grand Rapids	192	203	-11	.596	112	101	11	1.1980
Lansing	72	63	9	1.2857	23	32	-9	2.5313
	298	299		1.912	151	150		3.7881

$X^2 = \sum \frac{(fi-Fi)^2}{Fi} = 1.912 + 3.7881 = 5.7001*$

fi = observed frequency

Fi = theoretical frequency

* = significant at the 5% level

Chi Square for Table 2

City	Grade A				Prime			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	34	33	1	.0303	16	17	-1	.0588
Grand Rapids	192	202	-10	.4950	112	102	10	.9804
Lansing	72	63	9	1.2857	23	32	-9	2.5313
	298	298		1.8110				3.5705

$X^2 = 1.811 + 3.5705 = 5.3815$

$Fi = \frac{\text{Row Total X Column Total}}{\text{Grand Total}}$

fi = observed frequency

Chi Square for Table 3

City	Grade A				Choice			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	37	44	-7	1.1136	29	22	7	2.1364
Grand Rapids	134	183	-49	13.1202	140	91	49	26.3846
Lansing	114	101	13	1.6733	37	50	-13	3.3800
	285	328		15.9071	206	163		31.9010

$X^2 = \sum \frac{(fi-Fi)^2}{Fi} = 15.9071 + 31.9010 = 47.8081^{**}$

fi = observed frequency

Fi = theoretical frequency

** = significant at the 1% level

Chi Square for Table 3

City	Grade A				Choice			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	37	38	-1	.0263	29	28	1	.0357
Grand Rapids	134	159	-25	3.9308	140	115	25	5.4348
Lansing	114	88	26	7.6818	37	63	-26	10.7302
	285	285		11.6389	206			16.2007

$X^2 = 11.6389 + 16.2007 = 27.8396^{**}$

fi = observed frequency

$Fi = \frac{\text{Row Total X Column Total}}{\text{Grand Total}}$

** = significant at the 1% level

Chi Square for Table 4

City	Grade A				Choice			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	35	31	4	.5161	12	16	-4	1.0000
Grand Rapids	64	93	-29	9.0430	75	46	29	18.2826
Lansing	136	118	18	2.7458	41	59	-18	5.4915
	235	242		12.3049	128	121		24.7741

$X^2 = \sum \frac{(fi-Fi)^2}{Fi}$ = 12.3049 + 24.7741 = 37.0790**

fi = observed frequency

Fi = theoretical frequency

** = significant at the 1% level

Chi Square for Table 4

City	Grade A				Choice			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	35	30	5	.8333	12	17	5	1.4706
Grand Rapids	64	90	-26	7.5111	75	49	26	13.7959
Lansing	136	115	21	3.8348	41	62	-21	7.1129
	235	235		12.1792	128	128		22.3794

X^2 = 12.1792 + 22.3794 - 34.5586**

** = significant at the 1% level

fi = observed frequency

Fi = calculated frequency = $\frac{\text{Row Total X Column Total}}{\text{Grand Total}}$

Confidence Intervals for Table 3

$$S = \sqrt{\frac{p - (1-p)}{n}} = \sqrt{\frac{.58\ (.42)}{491}} = \sqrt{.0005} = .022361$$

$$p - t_{1-\frac{a}{2}}\ (S) - p' - p + t_{\frac{a}{2}}\ (S)$$

$$.58 - 1.96\ (.022361) \leq p' \leq .58 + 1.96\ (.022361)$$

$$.58 - .04 \leq p' \leq .58 + .04$$

95% Confidence Intervals $.54 \leq p' \leq .62$

99% Confidence Intervals $.52 \leq p' \leq .64$

p = observed proportion of Grade A sales

p' = probability that observed sales of Grade A turkeys will fall within the range shown based upon this data.

S = variance of proportion

Confidence Intervals for Table 4

$$S = \sqrt{\frac{p\ (1-p)}{n}} = \sqrt{\frac{(.65)\ (.35)}{363}} = \sqrt{.000626} = .025$$

$$.65 - 1.96\ (.025) \leq p' \leq .65 + 1.96\ (.025)$$

$$.65 - .05 \leq p' \leq .65 + .05$$

95% Confidence Intervals $.60 \leq p' \leq .70$

99% Confidence Intervals $.59 \leq p' \leq .71$

Chi Square for Table 7

City	Grade A				Prime and Choice			
	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$	fi	Fi	fi-Fi	$\frac{(fi-Fi)^2}{Fi}$
Detroit	129	139	-10	.7194	79	69	10	1.4493
Grand Rapids	497	603	-106	18.6335	407	301	106	37.3289
Lansing	413	365	48	6.3123	135	183	-48	12.5902
	1039	1107		25.6652	621	553		51.3684

$$X^2 = \sum \frac{(fi-Fi)^2}{Fi} = 25.6652 + 51.3684 = 77.0336^{**}$$

fi = observed frequency

Fi = theoretical frequency

** = highly significant at the 1% level

Confidence Intervals for Table 7

$$S = \sqrt{\frac{(.63)(.37)}{1660}} = \sqrt{\frac{.2331}{1660}} = \sqrt{.00014042} = .01185$$

$$.63 - 1.96(.01185) \leq p' \leq .63 + 1.96(.01185)$$

$$.63 - .02 \leq p' \leq .63 + .02$$

95% Limits $.61 \leq p' \leq .65$

99% Limits $.60 \leq p' \leq .66$

Differences between Stores - Grand Rapids

Store no. 1 $n_1 = 340$ $p_1 = .58$

Store no. 2 $n_2 = 272$ $p_2 = .58$

$$Sp_1 = \sqrt{\frac{(.58)(.42)}{340}} = \sqrt{.00071}$$

$$Sp_2 = \sqrt{\frac{(.58)(.42)}{272}} = \sqrt{.00089}$$

$$S(p_1-p_2) = \sqrt{.00071 + .00089} = .04$$

$$t(p_1-p_2) = \frac{p_1 - p_2}{Sp(p_1-p_2)} = \frac{0}{.04} = 0$$

Store no. 3 $n_3 = 291$ $p_3 = .48$

Store no. 2 $n_2 = 272$ $p_2 = .58$

$$Sp_3 = \sqrt{\frac{(.48)(.52)}{291}} = \sqrt{.000857}$$

$$Sp(p_2-p_3) = \sqrt{.000857 + .00089} = .0418$$

$$t = \frac{.58 - .48}{.0418} = 2.39$$

Store no. 1

Store no. 3

$$S(p_1-p_3) = \sqrt{.00071 + .00086} = .039623$$

$$t = \frac{.58 - .48}{.0396} = 2.53$$

t = 2.58 at 5% level of significance

Differences between Stores - Lansing

Store no. 1 $n_1 = 130$ $p_1 = .76$

Store no. 2 $n_2 = 36$ $p_2 = .53$

$$Sp_1 = \sqrt{\frac{(.76)(.24)}{130}} = \sqrt{.0014}$$

$$Sp_2 = \sqrt{\frac{(.53)(.47)}{36}} = \sqrt{.00691}$$

$$S(p_1-p_2) = \sqrt{.0014 + .00691} = .09116$$

$$t(p_1-p_2) = \frac{p_1-p_2}{Sp(p_1-p_2)} = \frac{.76 - .53}{.09116} = 2.52$$

Store no. 3 $n_3 = 276$ $p_3 = .79$

Store no. 2 $n_2 = 36$ $p_2 = .53$

$$Sp_3 = \sqrt{\frac{(.79)(.21)}{276}} = \sqrt{.0006}$$

$$S(p_3-p_2) = \sqrt{.0006 + .00691} = .0867$$

$$t = \frac{.79 - .53}{.0867} = 2.99$$

Store no. 1

Store no. 3

$$S(p_1-p_3) = \sqrt{.0014 + .0006} = .0447$$

$$t = \frac{.79 - .76}{.0447} = .67$$

t - 2.58 at 5% level of significance

Differences in Sales Ratios of Grade A Turkeys (between Cities)

Lansing $n_1 = 548$ $p_1 = .75$

Grand Rapids $n_2 = 910$ $p_2 = .55$

$$Sp_1 = \sqrt{\frac{(.75)(.25)}{548}} = \sqrt{.00034}$$

$$Sp_2 = \sqrt{\frac{(.55)(.45)}{910}} = \sqrt{.000271}$$

$$S(p_1 - p_2) = \sqrt{.00034 + .000271} = .024698$$

$$t = \frac{p_1 - p_2}{S} = \frac{.75 - .55}{.024698} = 8*$$

S = variance

* = reject hypothesis of no difference if the absolute "t" value is $\pm$ 1.98 at 5% level or $\pm$ 2.58 at the 1% level

Confidence Intervals for Real Difference in Grade A Sales, Lansing and Detroit

$.20 - 1.96(.0247) \leq$ Real Difference (D) $\leq .20 + 1.96(.0247)$

$.20 - .05 \leq D \leq .20 + .05$

95% Limits $.15 \leq D \leq .25$

99% Limits $.16 \leq D \leq .26$

Differences in Sales Ratios of Grade A Turkeys (between Cities) Continued

Detroit $n_3 = 208$ $p_3 = .62$

Grand Rapids $n_2 = 910$ $p_2 = .55$

$$Sp_3 = \sqrt{\frac{(.62)(.38)}{208}} = \sqrt{.001132}$$

$$S(p_2-p_3) = \sqrt{.001132 + .000271} = .0374$$

$$t = \frac{.62 - .55}{.0374} = 1.87$$

Confidence Intervals for Real Difference in Grade A Sales, Detroit and Grand Rapids

$$.07 - 1.96(.0374) \leq D \leq .07 + 1.96(.0374)$$

$$.07 - .07 \leq D \leq .07 + .07$$

95% Limits $0 \leq D \leq .14$

99% Limits $0 \leq D \leq .17$

Differences in Sales Ratios of Grade A Turkeys (between Cities) Continued

Detroit $n_3 = 208$ $p_3 = .62$

Lansing $n_1 = 548$ $p_1 = .75$

$$S(p_1-p_2) = \sqrt{.00034 + .001132} = .0165$$

$$t = \frac{.75 - .62}{.0165} = 7$$

Confidence Intervals for Real Difference in Grade A Sales, Detroit and Lansing

$$.13 - 1.96(.0165) \leq D \leq .13 + 1.96(.0165)$$

$$13 - .03 \leq D \leq .13 + .03$$

95% Limits $.10 \leq D \leq .16$

99% Limits $.09 \leq D \leq .17$