Production and Marketing Practices for

A Study of the Marketing of Frozen Desserts

Marketing Research Report No. 212

U. S. DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
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PREFACE

This report covers one phase of an economic analysis of the marketing of frozen desserts which contain fats other than milk fat. The Dairy Research Advisory Committee recommended such a study, to cover the "marketing practices, marketing organization, production and distribution costs, and legislation." The results give some understanding of competitive relationships among the various frozen desserts being sold in States in which the mellorine-type product is legal. Further studies are under way.

The work was done by the staff of the University of Kansas Bureau of Business Research under contract with the U. S. Department of Agriculture. Paul E. Malone, director, and Horace W. Harding, assistant director, of the Bureau of Business Research, supervised the research on which the report is based. Louis F. Herrmann, Head, Dairy Section, Marketing Research Division, Agricultural Marketing Service, represented the Department in negotiating and supervising the contract.

The study is one of many conducted by the Agricultural Marketing Service to provide better understanding of the marketing of farm products, as a basis for improved marketing in all phases of agriculture.

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SUMMARY

Frozen desserts made with fats other than milk fat are commonly known as mellorine. They have been made and sold in 12 States beginning at various dates during the past decade. Mellorine production in 1956 totaled 33 million pounds, compared to 651 million for ice cream. Production of mellorine in recent years has been increasing at a slower rate than in the beginning. This suggests that further large percentage increases in mellorine sales are unlikely in the markets where it is now sold.

The incentive to begin making mellorine, as reported by manufacturers responding to a survey questionnaire, was most commonly to meet competition. Many also added this product to their line of frozen desserts in order to increase their volume of business. Small plants often were the first in their areas to begin making mellorine. Larger plants apparently delayed entry into production until there was evidence that the product could be made successfully and that there was an effective demand.

The low price at which mellorine can be sold in comparison with ice cream, is an important factor in its growth. Not only is mellorine lower in price because less costly fats are used, but gross margins of many manufacturers and retailers are lower than on ice cream. The price structure appears to be influenced as strongly by competitive factors as by costs. A reflection of this is seen in the emphasis on price as the leading feature in advertising of the product. Also, the marketing outlets most emphasized are chainstores and independent supermarkets; here price competition is frequently intense, and the large volume of sales makes for lower marketing costs.

Mellorine production processes are nearly identical with those for ice cream. The most important production problems reported by manufacturers were those of overrun and shrinkage, which are common in the production of frozen desserts generally. A few problems peculiar to mellorine-type desserts were reported; problems of flavoring, emulsifying, and adhesion of fat to equipment. Small plants most frequently reported such difficulties.

PRODUCTION AND MARKETING PRACTICES FOR MELLORINE

A Study of the Marketing of Frozen Desserts

INTRODUCTION

Competition among food fats took a new turn in the United States in the late 1940's when a frozen dessert made with vegetable fats became established in Texas. The product was legally defined as "mellorine" in that State in 1951. To date, mellorine is legal in 12 States: Alabama, Arkansas, California, Illinois, Louisiana, Missouri, Montana, Nevada, Oklahoma, Oregon, South Carolina, and Texas. Laws regulating frozen desserts preclude its manufacture and sale in the remaining States. Between 1952 and 1955, the output of mellorine in these States grew from 11 million gallons to 33 million.

Nearly all the production of mellorine-type frozen desserts is carried on in plants which also manufacture ice cream. The equipment is identical, and only minor variations in the process are necessary when other fats are used in place of milk fat. The rapid growth of mellorine production was in large part a result of the lower selling prices made possible by the use of cheaper fats. The cost difference in fats would permit mellorine to sell at prices about 15 to 20 percent below ice cream prices. But frequently the amount by which mellorine undersold ice cream was greater than the difference in the cost of materials. Apparently other factors in production, distribution, promotion, or pricing policy contributed to the competitive status of the product.

This report describes some of the features of the marketing of mellorine which may be associated with its development.

The Broad Pattern of Development

It seems likely that the first step toward the introduction of mellorine was a mixing of vegetable oils and butterfat. Scattered producers of ice cream, borrowing ideas from the past and from abroad, attempted to reduce prices by using a cheaper raw material, so as to increase the volume of their sales and maintain or expand total profits. This mixing was facilitated by the fact that ice cream machinery can also make frozen desserts using vegetable oils or animal fats.

The second phase of development for the industry as a whole began with the production of mellorine as such in 1942. This period was characterized by growth in the number of manufacturers in several States, subject only to the general Federal and State laws pertaining to food products.

A third phase began in 1951, when the Texas State Board of Health, operating under its general authority, promulgated regulations for the production and distribution of mellorine 1/. These regulations gave the product a specific definition for the first time. The pertinent parts of that definition are:

> "Mellorine is a frozen or unfrozen product made from edible fat, milk solids, and sugar, with or without a natural flavoring, and contains not less than 6 percent edible fat, and not less than 30 percent of all solids including fats, and may contain not more than 1 percent of a stabilizer approved by State Health Officer; and may contain one or more of the following optional ingredients: Eggs, fruit, salt, nuts, extracts, harmless coloring, chocolate or cocoa, and sucrose, dextrose, fructose, and any other sweetener approved by State Health Officer.
>
> "Use of the word 'cream,' or its phonetic equivalent, however spelled, in connection with the labeling, advertising, branding, or sale of this product is prohibited by Article 708, Penal Code of Texas.
>
> "The manufacture of Mellorine shall meet the same rules and regulations that govern the production and manufacturing of ice cream and other manufactured milk products (as promulgated by the State Health Department, January 1, 1946)."

This third phase of development was extended in 1953 when Alabama, Arkansas, Illinois, Montana, and Oregon enacted legislation on the manufacture and sale of vegetable-fat frozen desserts. Authorized sale of the product in California also started in 1953, although laws pertaining to "imitation ice cream" had existed in the State statutes as early as 1929. These laws had been so restrictive that not until 1953, when the California courts removed the narrow interpretation previously placed upon them, were licenses to sell imitation ice cream issued by the State department of agriculture. In Louisiana, the product was sanctioned by law in 1954, but a number of injunctions and associated hearings have prevented development of the industry. The first permits to manufacture mellorine in Louisiana were issued in December 1956. South Carolina enacted legislation in 1955. In Texas, Missouri, and Nevada, no specific statutes regulating practices within the industry have been enacted. Each of these States relies on its general food laws and the regulations of its State board of health. Figure 1 shows the States where mellorine may be legally produced.

General conditions favoring the introduction of a new product, discussed later in this report, were favorable throughout all three periods.

1/ Ice Cream Trade Journal, Vol. 47, No. 10, October 1951, p. 46.

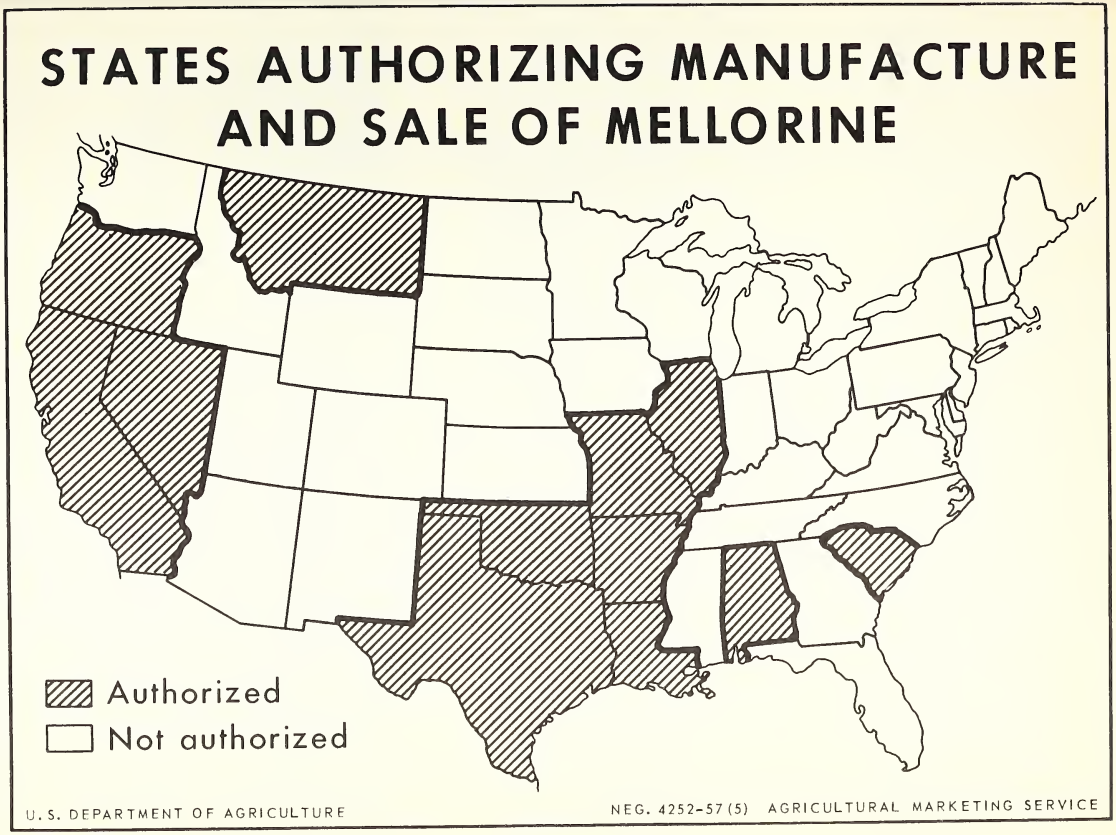
STATES AUTHORIZING MANUFACTURE AND SALE OF MELLORINE
Authorized
Not authorized
U.S. DEPARTMENT OF AGRICULTURE
NEG. 4252-57(5) AGRICULTURAL MARKETING SERVICE

Figure 1

THE LEGAL BASIS OF THE INDUSTRY

While there is some similarity among the laws of the several States in which mellorine may be produced, there are differences which may, in some degree, account for the different rates by which the industry has developed in different States. The character of specific legislation may be discussed in relation to a model bill prepared by the American Meat Institute. For convenience, this bill, designed "to establish definitions and standards of identity for, and to regulate the sale of mellorine," will be described in three parts: Identity standards; sale, labeling, and advertising; and licensing and enforcement.

American Meat Institute Model Bill

Standards of Identity

For purposes of this study, comment is limited to the major sections of the bill. Mellorine is defined therein as a frozen, pasteurized mix composed of edible animal or vegetable fats and milk solids-not-fat in a ratio of 10 percent food fats and 20 percent food solids including fats. This ratio is a minimum standard except where food flavoring is used, in which case the ratio may be lowered to 8 and 16, respectively. Minimum weights per finished gallon shall be 1.6 pounds of food solids and 4.5 pounds total. Vitamin A content shall be at least 8,400 U.S.P. units, with a proportional increase when food fat content is greater than 10 percent. The product may be homogenized.

Sale, Labeling, and Advertising

The bill provides that mellorine may be sold only in factory-filled novelties or packages of one-half gallon or less. No bulk sale or soda-fountain use is permitted. In effect, mellorine may be sold for home consumption only. No suggestion may be made, either in labeling or advertising, that mellorine is a dairy product, although a truthful and accurate statement of all the ingredients is permissible. Use of the word "cream" or its phonetic equivalent is prohibited. The following items are mandatory in labeling: "Mellorine" must appear in as large a type as any other word and in any case be readily legible under ordinary conditions of purchase, and there must be: A statement of whether the fat used is animal, vegetable, or a blend (no size requirement for this statement); a conspicuous statement of quantity of contents; the name and address of the manufacturer or distributor; the number of U.S.P. units due to addition of vitamin A.

Licensing and Enforcement

The bill provides for reasonable rules and regulations, to be promulgated by a designated State official. These rules and regulations shall be the same

as those for ice cream plants. Willful violation of the bill's provisions, or of the rules and regulations subsequently issued, is to constitute a misdemeanor punishable as follows: First conviction, a fine not to exceed $100, or imprisonment not to exceed 30 days, or both; subsequent conviction, a fine not to exceed $1,000, or imprisonment not to exceed 6 months, or both. The bill provides for manufacturing permits renewable yearly. Willful incorporation or causing the incorporation of milk fat into a product which would otherwise meet the standard of identification for mellorine is to be punishable by a 90-day suspension of the permit upon such a finding by the designated official. A second such finding would result in revocation of the permit.

Significance of the Bill to the Industry

The model bill has not been adopted as such by any State, but it apparently has been used as a guide by legislators who have adapted particular sections to local conditions as they saw them. The standard of identity is high in relation to the actual standard adopted by States with statutory regulations. This suggestion, probably to encourage consumer trust and acceptance of a new and unfamiliar food product, raises several questions which have not been settled by those in or associated with the industry. The literature, particularly the trade journals, indicates some differences of opinion concerning the amount of fat required for a high-quality product. It is difficult to evaluate this controversy, however, for it would seem that those advocating standards lower than those in the model bill are also concerned with the effect on the cost of materials. It is worth noting in connection with this controversy that in three of the States where mellorine has had its greatest success, Texas, Illinois, and Missouri, there is either no minimum fat content (Missouri) or it is lower than 10 percent (Texas, 6 percent, and Illinois, 8 percent).

The second major section of the model bill, concerning sale, labeling, and advertising, somewhat limits the choices of manufacturers when deciding among alternative methods of marketing. If adopted, this section would limit the distribution of mellorine to home use only, apparently to prevent its use as a substitute for ice cream in sundaes, malted milks, and other soda-fountain products. The limits on container size are based on the premise that the risk of fraudulent substitution is greatest where the product is dispensed from a bulk package. The container standard might discriminate against mellorine and affect the volume of distribution.

A second limitation in this section of the model bill raises a number of questions. Seemingly, if a manufacturer or dealer wishes to advise the public that his product contains nonfat dry milk solids (and he must), he must also provide enough space to list all ingredients. Such limitations are not included in the ice cream laws. This labeling requirement, prohibiting the use of the word "cream," is in conflict with Federal regulation, which provides that a product such as mellorine cannot be shipped legally in interstate commerce unless it is labeled as imitation ice cream.

The provisions for licensing and issuance of rules and regulations, tied as they are to ice cream laws, would seem to have no significant impact on marketing. All competitors would be held to the same standards. The section on penalties, however, is a different matter. Permits can be revoked for blending in milk fat, while failure to meet the standard for mellorine is punishable only as a misdemeanor. In other words, a producer can be prohibited from doing business for using some milk fat in mellorine but he can only be fined and given a short jail sentence for falling grossly below the minimum percent for nonmilk fats.

An inferior mellorine product, by the provisions of the model bill, requires court action before a proprietor can be punished, while the use of milk fat can lead to the loss of a permit on a finding and motion of a properly designated official. In this case, there is no provision for judicial review.

A permit may be revoked when milk fat is incorporated into a product ". . . which would otherwise conform to the definition and standard of identity for mellorine." In some circumstances, this might permit a producer to vary his product so that it differs from the definition and standard of identity for mellorine. He could, then, according to this section of the model bill, blend all the milk and vegetable or animal fats he wishes to, running only the risk of a misdemeanor penalty, unless, of course, he were subject to some specific provision of the ice cream laws.

This section of the model bill, particularly the provisions for penalties, seems to lay the groundwork for some confusion.

State Variations from the Model Bill

Mellorine products are legally salable in 12 States: Alabama, Arkansas, California, Illinois, Louisiana, Missouri, Montana, Nevada, Oklahoma, Oregon, South Carolina, and Texas. Since no State has adopted the model bill, it seems appropriate to consider the essential aspects of State law. Only the important variations from the model bill and their significance will be discussed, but minor variations and State-to-State comparisons may be seen in tables 1, 2, and 3.

Alabama

Standards of identity in Alabama are the same as those in the model bill. Only factory-filled pints, quarts, or half gallons may be sold. This eliminates factory-filled novelties from the market for mellorine. The type of fat used must follow the word "mellorine" on the label. The word "mellorine" not only must be as large and as prominent as any other word on the label, except the brand name, but it must also be at least 30-point Gothic type. When artificial flavoring is used, it must be so stated on the label.

The rules and regulations are not tied to ice cream laws; they could be made different than those for the manufacture and sale of ice cream. The

Table 1.--Standards for animal- or vegetable-fat frozen desserts

Standards	Model mellorine bill	Ala.	Ark.	Calif. 1/	Ill.	Mo.	Mont.	Nev.	Okla. 1/	Oreg.	S. C.	Tex.	La. 1/
Minimum percentage (by weight):													
Edible food fat	10	10	10	10	8	2/	10	---	6	3.2	10	6	10
With flavor added	8	8	8	10	6	---	---	---	6	3.2	8	6	8
Total food solids	20	20	20	---	20	---	---	---	16	28.0	20	30	20
With flavor added	16	16	16	---	20	---	---	---	16	28.0	16	30	16
Minimum weight (gallon):													
Food solids (pounds)	1.6	1.6	1.6	1.6	---	---	---	---	1.3	---	1.6	---	1.6
Total (pounds)	4.5	4.5	4.5	---	---	---	---	---	4.5	4.5	4.5	---	4.5
Vitamin A required	Yes	Yes	Yes	No	No	No	No	No	No	No	Yes	No	Yes
Must be pasteurized	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	Yes	Yes	No	Yes
Type of edible fat:													
Animal	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vegetable	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Emulsifiers and stabilizers (percent of active ingredients).	3/ 1	0.5	1	0.6	1	---	---	---	3/0.5	---	0.5	1	1
Optional ingredients:													
Sweetening	Yes	Yes	Yes	Yes	Yes	---	---	---	Yes	Yes	Yes	Yes	Yes
Flavoring	Yes	Yes	Yes	Yes	Yes	---	---	---	Yes	Yes	Yes	Yes	Yes
Egg	Yes	Yes	Yes	Yes	Yes 4/	---	---	---	Yes	Yes	Yes	Yes	Yes
Salt	Yes	Yes	Yes	Yes	Yes	---	---	---	Yes	Yes	Yes	Yes	Yes
Water	Yes	Yes	Yes	Yes	Yes	---	---	---	Yes	Yes	Yes	Yes	Yes
Coloring	Yes	Yes	Yes	Yes	Yes	---	---	---	Yes	Yes	Yes	Yes	Yes

1/ Also have standards for a lower fat frozen dessert.
2/ Dashes indicate that the law or regulation does not specify on the point in question.
3/ Percent of total weight.
4/ 1.4 percent of total weight is maximum.

Source: The various State statutes, rules, and regulations issued as authorized under those statutes, and administrative interpretations.

Table 2.--Merchandising standards for vegetable- and animal-fat frozen desserts

State	Form sold		Labeling requirements						
	Factory-filled container only	Size of container	Name	Type size of name	Ingredients	Manufacturer's name	"Cream" or phonetic equivalent	Advertising as a dairy product	Adulterated if standard not met
Model mellorine bill 1/	Yes	Half gallon or less	"Mellorine" and give type of fat used	As large as any other words on label	Number of U.S.P. units of vitamin A	Yes	Barred	Barred	Yes
Alabama	Yes	Pints, quarts and half gallons	"Mellorine - containing ------ fat"	At least 30 point Gothic. As large as any word except brand name	Number of U.S.P. units of vitamin A	Yes	Barred	Barred	Yes
Arkansas	Yes	Pints, quarts, and half gallons	"Mellorine - a vegetable oil product"	At least 3/8". As large as any word except brand name	Number of U.S.P. units of vitamin A	Yes	Barred	Barred	Yes
California	No bulk sale for resale	Half gallon or less	"Imitation Ice Cream"	Conspicuously. At least ½ as large as trade name	All ingredients	Yes	Barred	Barred	Yes
Illinois	Yes	Half gallon or less	"----- Fat Frozen Dessert"	12-point caps. Color contrasting with trade name	All ingredients. None given undue prominence	Yes	Barred	Barred	Yes
Missouri	No provision	No provision	"Imitation ice cream"	No provision	No provision	Yes	No provision	No provision	No provision
Montana	No provision	No provision	"----- Fat Product"	Bold face	All ingredients except "flavoring" may be used	No	Barred	Barred	No provision

See footnote at end of table.

Continued-

Table 2.--Merchandising standards for vegetable- and animal-fat frozen desserts - Continued

State	Form sold		Labeling requirements						
	Factory-filled container only	Size of container	Name	Type size of name	Ingredients	Manufacturer's name	"Cream" or phonetic equivalent	Advertising as a dairy product	Adulterated if standard not met
Nevada	No provision	No provision	No provision	No provision	No provision	Yes	No provision	No provision	No provision
Oklahoma ...	No	No color or flavor if over half gallon	"Mellorine - A -----Fat Product"	2" in retail store. 3/8" on package	No provision	Yes	No misleading terms	Permitted	Yes
Oregon	Yes	No limit	"Mellorine-- Containing ----- Fat"	Mellorine as large as any other word. The rest at least 3/8"	Number of U.S.P. units of vitamin A and fat percentage	Yes	Barred	Barred	Yes
South Carolina..	Yes	Pints, quarts, or half gallons	"Frozen Dessert --- A ---- Fat Product"	At least 30-point Gothic. As large as any words except brand name	Number of U.S.P. units of vitamin A	Yes	Barred	Barred	Yes
Texas	No provision	No provision	No provision	No provision	No provision	Yes	Barred	No provision	Yes
Louisiana...	Yes	Half gallon or less	"Mellorine, an imitation ice cream made with vegetable or animal fat"	"Mellorine, Vegetable or Animal Fat" as large as any other letters. The rest $\frac{1}{2}$ as large	State fact when artificial coloring or flavoring used	Yes	Barred	Barred	Yes

1/ Sponsored by American Meat Institute for adoption by States.

Source: The various State statutes, rules, and regulations issued as authorized under the statutes, and administrative interpretations.

Table 3.--Regulation and enforcement procedures on animal- and vegetable-fat frozen desserts

State	Permit or license required	Term of permit or license	Fee for permit or license	Periodic report required	Taxation	Power to revoke permits given	Power to seize product
Model mellorine bill 1/	Yes	1 year	---	No	No	Yes	No
Alabama	Yes	1 year	$1	No	No	No	Yes
Arkansas	Yes	1 year	$10	Quarterly report on gallonage made and sold	$0.75 per thousand to a total payment of $150, $0.50 for each additional thousand to an additional $100, and $0.25 per thousand for any further quantity, quarterly	Yes	Yes
California	Yes	1 year	$35	Monthly report on amount of fat used and on gallonage produced	$3 for every 10,000 gallons over 20,000 gallons produced in the preceding year	---	---
Illinois	Yes	1 year	$25	No	No	Yes	Yes
Missouri	---	---	---	---	---	---	---
Montana	Yes	1 year	Based on gallonage for previous year	Monthly (by 10th) on amount handled in preceding month	1,000 gallons or less--$10 1,001 gallons to 10,000--$20 Add $5 for every 10,000 or fraction thereof over the first 10,000 gallons	No	Yes
Nevada	---	---	---	---	---	---	---
Oklahoma	Yes	1 year	Based on future gallonage	No	$5 for up to 25,000 gallons Over 25,000 to 50,000 is $10 Over 50,000 to 100,000 is $15 Over 100,000 is $20	No	Yes
Oregon	Yes	1 year	Based on number of machines in use	No	No	Yes	Yes
South Carolina	Yes	1 year	None stated	No	No	No	No
Texas	Yes	1 year	$1	No	No	No	Yes
Louisiana	Yes	1 year	---	No	No	No	Yes

1/ Sponsored by American Meat Institute for adoption by States.

Source: The various State statutes, rules, and regulations issued as authorized under the statutes, and administrative interpretations.

penalty for violation is that prescribed for a misdemeanor, regardless of the offense. This provision eliminates the discriminatory penalties already noted in the model bill. Alabama's law also provides for condemnation and seizure of adulterated or misbranded mellorine.

Arkansas

Standards of identity in Arkansas are the same as in the model bill with two major exceptions. Arkansas authorizes a "mellorine-mix" with the same standard as mellorine except that each gallon must contain 3.2 pounds of total food solids, weigh not less than 9 pounds, and contain at least 16,800 U.S.P. units of vitamin A. If the mix exceeds 10 percent food fats, the vitamin A content must be increased proportionately.

The other major variation in identity standards in Arkansas is found in the fact that the act prohibits the use of animal fats. This could well be a barrier to interstate commerce both from and to the State. Also, it prevents a manufacturer from taking advantage of any significant price variations in animal and vegetable fats, and so potentially lowers his profit margin.

Packages must be labeled "Mellorine--A Vegetable Oil Product." The generic name must be as large and prominent as any word except the brand name, and at least 3/8-inch high. Quarterly reports on gallonage are required. Taxes, based on gallonage, are the same as for ice cream.

Enforcement provisions provide for revocation of license after a hearing, which is subject to judicial review. Violations are also punishable as misdemeanors.

California

California presents a major departure from the model bill and from the norm. A vegetable- or animal-fat product may be sold as "imitation ice cream" or "imitation ice milk." Thus, labeling requirements agree with Federal standards. Sale in bulk is prohibited, but retailers may use the product in mixing fountain drinks provided they display a sign in plain block letters at least 6 inches high so informing the public. Also when the packaged mellorine is sold, a sign of similar size and wording must be displayed. The products may not be manufactured or sold in the same place as ice cream. The meaning of the word "place" in this section of the statute was under attack and not settled at the time this was written.

Obviously, the foregoing provisions have a restrictive tendency on the manufacture and sale of mellorine. Requiring it to be labeled "imitation" has a debatable effect. Some would express the opinion that such a practice is detrimental to the product while others contend that the practice would allow mellorine to utilize the same promotion as ice cream. "Imitation" must appear conspicuously and be at least half as large as the trade name.

Monthly reports on production gallonage and amount of fat used are required, as is the case with ice cream. The director of the State department of agriculture has the power to establish necessary standards. The only major ones known to be in effect at present are requirements of a 10 percent minimum of fats for imitation ice cream, 4 percent minimum of fats for imitation ice milk, 1.6 pounds of food solids per gallon of imitation ice cream, 1.3 pounds of food solids per gallon of imitation ice milk, and the product must be pasteurized. All ingredients must be named on the label. Although California requirements are generally compatible with Federal regulations, differences from the legislation of other States would probably hamper interstate shipment.

Illinois

A major variation in standards of identity is found in Illinois. Minimum fat content is lowered to 8 percent, and to 6 percent when special flavorings such as fruits or nuts are used.

The State does not require vitamin A to be added to the product, and no weight requirements are fixed. The generic name "mellorine" is not adopted. Instead, the product must be labeled in 12-point capital letters "Vegetable and/or Animal Fat Frozen Dessert" in a color contrasting with that used for the brand name. This requirement neither satisfies Federal regulations nor is it in conformity with the labeling used in most other States. Although it may afford adequate protection for consumers and competing foods, it also poses problems in interstate shipment and sale.

All ingredients must be stated on the label, with no one ingredient given any undue prominence. Sale is restricted to factory-filled containers of two fluid quarts or less. No device tending to suggest a dairy product by word or its phonetic equivalent may be used. This provision appears to afford slightly more protection to consumers and competitors than similar provisions in some of the other States. It is, at least, more explicit.

Enforcement provisions are quite comprehensive. Criminal penalties are equivalent to those for a misdemeanor, and injunctive relief is expressly provided. Certificates of approval may be refused or revoked by the director of the State department of agriculture, subject to judicial review. Inspection of plants is expressly authorized, and rules and regulations are not tied to ice cream laws.

Missouri

There are no laws prohibiting the manufacture or sale of mellorine in Missouri. The ice cream and filled milk laws of the State do not cover mellorine (filled milk is milk in which the butterfat has been replaced with vegetable fat). No standards of identity or enforcement procedures are in force but labeling requirements have been established administratively by the Division of Health. Seemingly, there are no limitations on the manufacture and

sale of vegetable- or animal-fat frozen desserts, aside from the general food and drug provisions. However, the product must be labeled "imitation ice cream."

Montana

Standards of identity for mellorine have not been established by statute and cannot be established without legislation under the Montana frozen food product laws. The name "mellorine" is not adopted, but labels must carry, in boldfaced letters, the legend "_____ Fat Product" (Animal, Vegetable, or Animal-Vegetable). All ingredients except colorings, flavorings, or spices must be listed specifically, and no suggestion that the product is ice cream can be made.

The label "Imitation Ice Cream" required by Federal regulations might possibly constitute such a suggestion. In a sense, that was the Food and Drug Administration argument, rejected by the majority of the justices, in the "Imitation Jam Case" 2/. This situation, however, definitely poses a problem relative to interstate commerce for the Montana product.

No restrictions on the form in which the product may be marketed are found in the statutes. This, of course, gives the product a much larger potential market than is true under the model bill and most State statutes. Sanitary requirements, reporting, and licensing are the same as for all other frozen food products. Enforcement is obtained through court action, civil and criminal, on motion of the commissioner of agriculture, who has been granted inspection powers.

Nevada

In Nevada, mellorine was formerly listed as illegal, but it is now a legal product under regulation by the public service division, department of food and drugs. Products simulating ice cream must be labeled "Imitation Ice Cream." Further regulation is contemplated, but at the time of this study none had been promulgated.

Oklahoma

Provisions in Oklahoma differ considerably from the model bill. The standard of identity requires only 6 percent fat and 10 percent milk solids. However, no provision is made for lowering fat content when flavorings are added. Vitamin A need not be added, and the product need not be pasteurized.

2/ 62 Cases of Jam, et. al., v. United States, 340 U. S. 593 (1951).

Oklahoma also authorizes a low-fat product comparable to mellorine except that it may contain no less than 3.25 percent edible fat and 7.75 percent milk solids. Mellorine may enter any market with only these restrictions: When sold in containers larger than a half gallon, it cannot be flavored or colored. "Mellorine" or "Mellofreeze--A ----- Fat Product" must appear on the label in letters at least 3/8-inch high. A sign naming the product in letters at least 2 inches high must be displayed wherever the product is dispensed at retail. Containers filled at retail from labeled mellorine bulk containers are exempt from the labeling requirement. No misleading labeling or misleading advertising is permitted. Nevertheless, under the Oklahoma law, mellorine may be advertised and labeled as "A Frozen Dairy Product," but the use of the term "dairy" would violate Federal law. Taxation, based on gallonage, is the same as for ice cream. No provision is made for revocation of licenses. Enforcement may be had by injunction, seizure, and prosecution as a misdemeanor.

Oregon

Standards of identity in Oregon vary from the model bill in several respects. Vitamin A need not be added. Food fat minimum is set at 3.2 percent, with at least 10.8 percent milk solids and 28 percent total food solids. The product may be sold only in factory-filled containers, but there is no restriction on the size of containers in which it is to be sold. The label must bear the word "mellorine" in letters no smaller than the largest ones used on the package. The generic term must be followed by the phrase "containing animal fat" or "containing vegetable fat" in letters at least 3/8-inch high. The percentage of fat used must be disclosed. Enforcement is handled by the powers of seizure and license revocation.

South Carolina

The pertinent law of South Carolina is a replica of the model bill with four exceptions. First, sale is limited to pints, quarts, or half gallons, thus eliminating factory-filled novelties. Second, the term "frozen dessert" is substituted for "mellorine" in labeling. Third, the rules and regulations which the commissioner of agriculture is empowered to promulgate are not tied to existing ice cream law. Fourth, power to revoke licenses is not given. This eliminates the constitutional problem found in the model bill, but it also weakens enforcement machinery.

Texas

The legal basis for mellorine in Texas is greatly different from the model bill. The only regulations existing pertain to a standard of identity and a prohibition against the use of the word "cream" or its phonetic equivalent. The standard of identity provides for a minimum of 6 percent food fat and a minimum of 30 percent total food solids. Other than for these regulations, only the general food and drug laws apply to the product. No other restrictions

are placed on the markets which the product may enter, the form in which it may be sold, or the way in which it is labeled and advertised, except that use of the word "cream" is prohibited.

Louisiana

Standards of identity for mellorine in Louisiana are the same as in the model bill. Package size requirements also are the same. Labels must contain the phrase "mellorine--an imitation ice cream made with vegetable or animal fat." The words "mellorine, vegetable or animal fat" must be in letters as large as any on the package. The other words in the phrase must be half as large as the name of the product. A label must be approved by the State board of health before use.

Other nonmilk-fat products are also standardized. "Olarine" is the same as mellorine except that fat content may be lowered to 3.5 percent, food solids to 10 percent, vitamin A to 2,940 U.S.P. units, with 1.3 pounds of total food solids. Other products authorized are "Sherine" and "Fruit Sherine," both low-fat products.

Special enforcement provisions are not included in the rules and regulations for frozen desserts. Such enforcement is apparently to be carried out under general food and drug statutes.

Summary of State Laws

There is considerable variation from State to State regarding the manufacture and sale of mellorine. Its competitive position relative to ice cream varies considerably as standards of identity and markets open to the product vary.

Perhaps the major problem is posed (at least for the future) in the realm of interstate commerce. Only two of the States permitting sale of mellorine have the same labeling requirements as those required by Federal authorities. In addition, variations in standards of identity may well minimize the possibility of manufacturing in one State and selling in another. This would be particularly true of smaller operators who could not afford to make two or more kinds of products or to purchase and use two or more types of containers.

Literature on the subject indicates that one of the greatest problems faced in setting ice cream standards has been the great variation in State standards. From the present trend, mellorine could well find itself faced by the same problem.

SURVEY OF THE INDUSTRY

A mail questionnaire was sent to makers of mellorine to learn the facts about plants entering the industry, production, manufacturing processes, and marketing. All known manufacturers of the product were circularized.

The return of completed schedules reached 30 percent before the cut-off date. Careful analysis indicated the return to be adequate for a representative sample of the whole industry, but limitations should be applied to smaller breakdowns of the sample.

Data are presented for five plant size categories where these data are applicable. Plant sizes are based on each manufacturer's total output of frozen desserts, including only the output of finished product. Many plants produce and sell "mix," which is the semi-finished combination of ingredients ready for freezing. Some plants produce only the mix. Class I includes those plants whose annual production of frozen product was less than 250,000 gallons; class II, 250,000 to 500,000 gallons; class III, 500,000 to 800,000; class IV, in excess of 800,000. Class V includes those plants whose annual production could not be ascertained. Most of them appear to have produced only mix.

State data are given for Illinois, Missouri, Oklahoma, Texas, and "all other States," except where data from the "all other States" category are clarified or stressed, in which case the States are listed separately. Classification of the States in this manner is not intended to minimize the importance of the remainder of the States, but rather to recognize the limitations of the sample.

Initial Manufacture

The benchmark for the beginnings of mellorine in a given area is the date when the respondent first found the product on sale in the market area. Of the respondents, 15 percent reported that mellorine appeared in their market areas before 1950 (table 4); 16 percent said it entered their market areas in 1950; 18 percent, in 1951; 29 percent, in 1952; and 13 percent, in 1953. In 1954 and 1955, 9 percent of the vegetable-fat frozen dessert producers reported the first appearance of the product in their regions.

The year 1952 accounted for the largest annual appearance of mellorine in the market areas. In the following year, 1953, the majority of the States where mellorine is legal passed legislation regulating the production and distribution of mellorine.

Distribution of the data by States shows the first reported market appearance occurred in California in 1943. This does not contradict the claim that mellorine as it is now known was first produced in Corsicana, Tex., in 1942. It indicates only that for those plants replying to the questionnaire, the first observation of the presence of the product, probably a "mix," was in

California in 1943. Table 5 shows the appearance in the various market areas as reported in the questionnaires.

Table 4.--Year of mellorine appearance in market areas of responding plants, by size of plant

Year	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	All plants
1943	1	---	---	---	---	1
1944	---	---	---	---	---	---
1945	---	---	---	1	---	1
1946	2	---	---	---	---	2
1947	2	---	---	---	---	2
1948	2	---	---	2	1	5
1949	2	2	---	1	---	5
1950	6	2	1	4	4	17
1951	5	4	4	3	3	19
1952	11	3	5	5	6	30
1953	5	4	2	2	---	13
1954	4	---	1	---	2	7
1955	---	1	---	1	---	2
Total	40	16	13	19	16	104

1/ Size based on 1955 production.

When Plants Began Producing

Respondents to the questionnaire also reported the year when they began the manufacture of mellorine in their own plants. The year manufacturers began production generally coincides closely with the year that the product first appeared in the market area. Forty-four percent of the replies indicated that the companies began the manufacture of vegetable-fat frozen desserts in 1952 (table 6).

Only 8 percent began operations prior to 1950. Seven percent began in 1950, and 12 percent in 1951. Following the peak of 1952, the number entering the industry declined; only 16 percent entered the field in 1953, and from 1953 to 1956, only 13 percent of the manufacturers replying to the question began making the product. Five percent of the respondents did not reply to the question. The data indicate that the larger plants entered the industry at a later date than did the smaller producers.

Table 5.--Year of mellorine appearance in market areas of responding plants, by States

Year	Illinois	Missouri	Oklahoma	Texas	Other States 1/	Total
1943	---	---	---	---	1	1
1944	---	---	---	---	---	---
1945	---	---	---	1	---	1
1946	---	---	1	1	---	2
1947	---	---	1	1	---	2
1948	---	---	---	5	---	5
1949	2	---	1	2	---	5
1950	3	6	2	6	---	17
1951	4	1	3	11	---	19
1952	17	4	4	3	2	30
1953	3	---	---	1	9	13
1954	---	---	1	---	6	7
1955	---	---	---	---	2	2
Total	29	11	13	31	20	104

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. No data were reported from Nevada, and no plants were licensed in Louisiana until late in 1956.

Illinois had the largest number of starts in any one year, 20 plants beginning operations there in 1952. Texas reported 12 in the same year. The Illinois figure represents 69 percent of the total replies from that State. The 12 starts in Texas represent 39 percent of the total; however, 48 percent of the Texas plants were already manufacturing mellorine by that year. The "all other States" group had the highest entrance into the field in 1953 and 1954 (table 7).

From the foregoing information, it was possible to ascertain something about the time lag between the appearance of the product in market areas and the time when manufacture began there. Questionnaire data indicate that the two smaller producing categories differed from the two higher groups. Fewer of the smaller producers entered the field in the same year the product was introduced in the area. In the lowest two producing groups together, less than half of the plants reporting began making the product the year it was introduced in their immediate areas.

The two larger groups, the class III and class IV plants, indicated that 61 percent and 58 percent, respectively, began production the same year the product appeared in the plant market area. Table 8 illustrates the data.

Table 6.--Year in which responding plants began manufacture of mellorine, by size of plant

Year	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	All plants
1943	1	---	---	---	---	1
1944	---	---	---	---	---	---
1945	---	---	---	---	---	---
1946	1	---	---	---	---	1
1947	---	---	---	---	---	---
1948	2	---	---	---	---	2
1949	2	1	---	1	---	4
1950	3	1	1	1	1	7
1951	5	2	1	2	2	12
1952	11	6	7	12	10	46
1953	8	3	3	2	1	17
1954	5	2	1	---	2	10
1955	1	1	---	1	---	3
1956	1	---	---	---	---	1
Total	40	16	13	19	16	104

1/ Size based on 1955 production.

If the time-lag data presented above are considered by States, the relationships become all the more interesting. Of the 4 leading States producing mellorine, only 1, Illinois, indicated that more than half of the plants responding began the manufacture of mellorine in the same year it appeared in the market area. In Texas, on the other hand, only 35 percent began operations during the same year, with another 35 percent starting operations the following year. Missouri had 45 percent in the same year, and Oklahoma only 23 percent.

These data indicate that most of the plants in the larger producing States waited until some time after the product appeared before beginning the manufacture of mellorine. The reasoning behind this time lag is a matter for conjecture, and can only be indicated through personal interviews with manufacturers. However, later in the study, when the reasons given for entering the mellorine field are presented, some explanation for the lag is brought to light. Table 9 presents the time-lag data by States.

Manufacturers of mellorine were questioned about their reasons for entering the field. The responses indicated that 66 percent of the producers began making mellorine to meet competition of other manufacturers making the product.

Table 7.--Year in which responding plants began manufacture of mellorine, by States

Year	Illinois	Missouri	Oklahoma	Texas	Other States 1/	Total
1943	---	---	---	---	1	1
1944	---	---	---	---	---	---
1945	---	---	---	---	---	---
1946	---	---	1	---	---	1
1947	---	---	---	---	---	---
1948	---	---	1	1	---	2
1949	1	---	---	3	---	4
1950	1	2	1	3	---	7
1951	3	---	1	8	---	12
1952	20	7	5	12	2	46
1953	3	2	2	3	7	17
1954	1	---	1	---	8	10
1955	---	---	1	---	2	3
1956	---	---	---	1	---	1
Total	29	11	13	31	20	104

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see note 1/, table 5.

Table 8.--Length of time after mellorine appeared in their market areas that responding plants started manufacture, by size of plant

Time	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	All plants
In same year	21	6	8	11	10	56
One year after	14	10	4	2	2	32
Two years after	1	---	---	3	1	5
Three or more years after	4	---	---	3	2	9
No answer	---	---	1	---	1	2
Total	40	16	13	19	16	104

1/ Size based on 1955 production.

Table 9.--Length of time after mellorine appeared in their market areas that responding plants started manufacture, by States

Time	Plants in--					
	Illinois	Missouri	Oklahoma	Texas	Other States 1/	Total
	Number	Number	Number	Number	Number	Number
In same year	19	5	3	11	18	56
One year after ...	9	1	9	11	2	32
Two years after ..	1	3	---	1	---	5
Three or more years after	---	1	1	7	---	9
No answer	---	1	---	1	---	2
Total	29	11	13	31	20	104

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see note 1/, table 5.

An additional 25 percent indicated that the hope to increase the market for their frozen desserts was their basic motive. The remaining 9 percent either did not answer the question or indicated that their entrance was due to other and minor causes.

It should be noted in the following two tables that the total number of respondents is 114 rather than the 104 indicated in the previous tables. This difference is due to the fact that 10 of the returned schedules placed an equal weight on the 2 factors of meeting competition and increasing the market for frozen desserts.

Of the class I plants, which are the smallest producers, 53 percent stated that desire to meet competition caused them to enter the industry. Of the class II, III, and IV producers, 87.5, 85, and 70 percent, respectively, indicated that competition influenced their decision to produce the product. Table 10 presents these data by plant size.

When the same data are considered on the basis of returns by States, the situation is like that presented on the basis of plant size. In all these States, the major reason for starting to make mellorine was to meet competition. It therefore seems that many manufacturers must have waited and observed the actions of their competitors before starting manufacture of mellorine. Such hesitation for observation would account for some of the time lag between the introduction of the product in market areas and the date on which particular plants began producing mellorine.

Several of the responding operators of plants stated unusual reasons for entering the industry. Among these were the desire to be first in the area with a new product, and the desire to increase profits by supplying a popular

demand and by catering to the lower income groups. Table 11 lists by States the reasons reported for entering the industry.

Table 10.--Reasons responding plants cited for starting mellorine manufacture, by size of plant

Reason	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	Total
To meet competition ...	25	14	11	14	12	76
To increase market	14	1	2	6	5	28
Other	7	1	--	--	1	9
No answer	1	--	--	--	--	1
Total 2/	47	16	13	20	18	114

1/ Size based on 1955 production.
2/ Some plants gave more than one reason. Consequently, the total is greater than the number of plants in the sample.

Table 11.--Reasons responding plants cited for starting mellorine manufacture, by States

Reason	Plants in--					
	Illinois	Missouri	Oklahoma	Texas	Other States 1/	Total
	Number	Number	Number	Number	Number	Number
To meet competition ...	20	7	11	26	12	76
To increase market	10	3	2	5	8	28
Other	3	--	--	3	3	9
No answer	--	1	--	--	--	1
Total 2/	33	11	13	34	23	114

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see note 1/, table 5.
2/ Some plants gave more than one reason. Consequently, the total is greater than the number of plants in the sample.

Discontinuances

While the number of plants manufacturing mellorine has increased rapidly, the data indicate that several plants have discontinued making the product. New firms have entered year by year, and some old firms have left the field. No plants dropped out of production before 1955, but in that year four responding manufacturers decided to do so. In the following year, 1956, one other reporting company ceased manufacturing mellorine.

Three of these five plants leaving the field were in the smallest plant category (class I). The remaining two were in the unclassified category.

One firm in Illinois ceased making the product, while two firms in Missouri ceased operations. In the "all other States" category, there were two plants recorded. These were in Alabama and Montana. The reported reasons for discontinuing mellorine manufacture indicate that 4 of the 5 plants stopped making the product because consumer demand decreased. The remaining plant in the list was sold, and no further data on its operations are available.

Available data show other plants in the same, or nearby, market areas were continuing to operate; in fact, some were showing increases in the production of mellorine. It seems possible, therefore, that the four respondents listing lack of consumer demand as the reason for ceasing operations may have had some other reason, known or unknown, that caused the decision to cease production.

PRODUCTION VOLUME

Since practically all of the plants surveyed make either some or all of the other frozen desserts--ice cream, sherbet, and ice milk--their mellorine production volume is more significant when related to the volume of the other products.

Frozen Products

Total production of mellorine in the States where manufacture is permitted has been growing in recent years, but by a smaller percent each year. In 1952, production totaled 11,188,000 gallons; in 1953, 24,207,000 gallons; in 1954, 31,419,000 gallons; and in 1955, 33,009,000 gallons (table 12, fig. 2). The estimate for 1956 is 33,345,000 gallons. In each of these years, the percentage increase has become smaller; and in the last two, it was below the gain shown for ice cream. Total production of ice cream in 1956 was 650,935,000 gallons.

It should be noted that mellorine production in 1953 and 1954 made the most spectacular percentage gains of all the products. However, the production figures show an increase of 15,409,000 gallons in ice milk production in 1954, which was only 23.7 percent; while a production increase of only 7,212,000 gallons of mellorine was a percentage increase of 29.8 percent. The relatively spectacular percentage rise of mellorine results from the comparatively small base.

Still another relationship between mellorine and other frozen desserts in the 12 States where mellorine is legal should be brought out. The plants in these States responding to the questionnaire furnished not only data on their mellorine production, but also on the gallonage output of other types of frozen desserts. Table 13 is based on these data, and shows what percentage mellorine was of total frozen dessert production in these plants. For all

Table 12.--Production of frozen desserts by type, United States, 1952-1955
(thousands of gallons)

Year	Ice cream		Ice milk		Sherbet		Mellorine	
	Volume produced	Percent change	Volume produced	Percent change	Volume produced	Percent change	Volume produced	Percent change
1952	592,705	---	53,702	---	25,637	---	11,188	---
1953	605,051	+2.1	64,710	+20.5	31,079	+21.2	24,207	+116.4
1954	596,821	-1.4	80,019	+23.7	34,170	+ 9.9	31,419	+ 29.8
1955 1/	628,559	+5.3	88,966	+11.2	37,036	+ 8.4	33,009	+ 5.1
1956 2/	650,935	+3.6	96,949	+ 9.0	36,050	- 2.7	33,345	+ 1.0

1/ Preliminary.
2/ Estimated.

Source: 1952-55 Production of Manufactured Dairy Products 1955. Agricultural Marketing Service, Statistical Bulletin No. 199, November 1956. Table 2, page 5; 1956 Milk Production on Farms and Statistics of Dairy Plant Products, 1956. Agricultural Marketing Service, February 1957. Table 8, pp. 8-9.

Table 13.--Mellorine production as a percent of all frozen dessert production in responding plants, by size of plant

Year	Size of plant 1/					All plants
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	
	Percent	Percent	Percent	Percent	Percent	Percent
1949	27.1	4.7	---	15.2	---	16.2
1950	21.4	2.4	---	10.9	---	13.9
1951	25.6	1.2	1.3	10.3	---	11.5
1952	31.2	11.9	4.1	13.5	45.5	15.7
1953	33.3	18.5	10.9	19.2	70.0	22.8
1954	34.3	24.0	15.9	22.2	37.3	24.5
1955	31.1	20.7	17.2	23.0	37.3	24.4

1/ Size based on 1955 production. See p. 16.

responding plants in these States during the years 1949 through 1955, mellorine ranged from 11.5 percent to 24.5 percent of total output. From 1950 through 1955, the percentage rose steadily, and in the last 2 of these years was almost one-fourth of their total production. Mellorine was a consistently larger percentage of the output of the smaller plants than of larger plants.

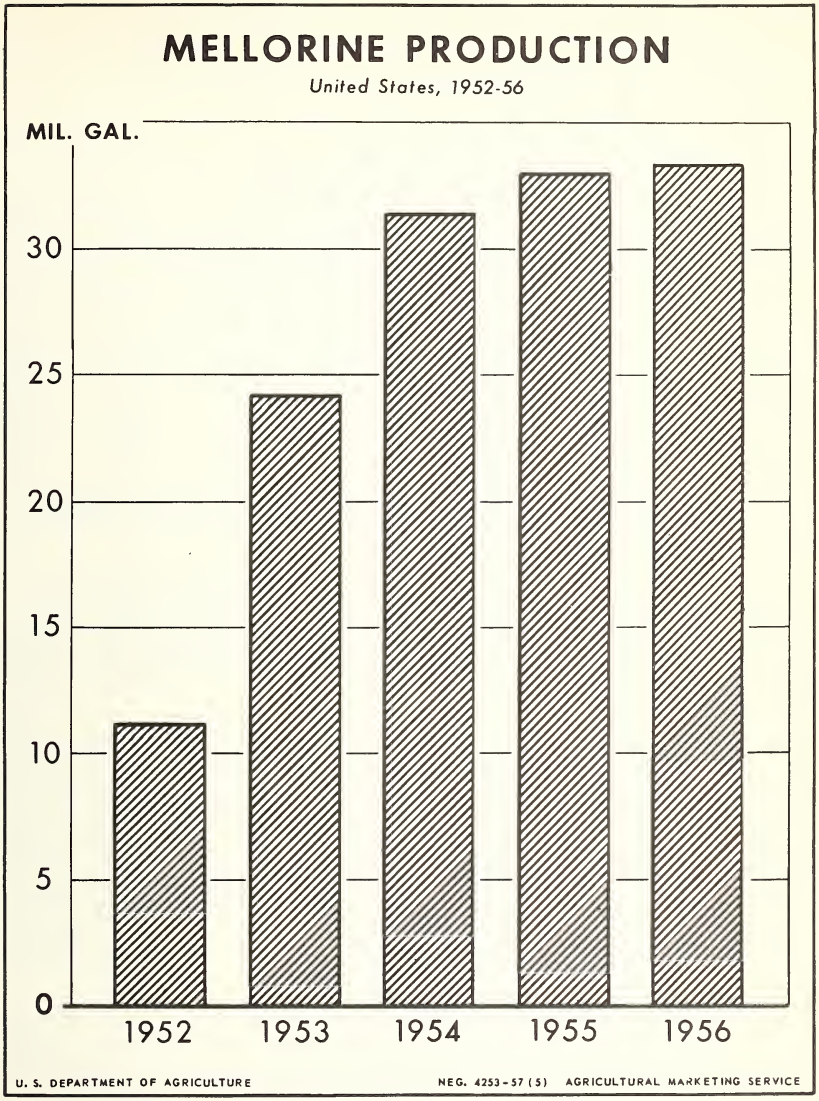
MELLORINE PRODUCTION
United States, 1952-56
MIL. GAL.
30
25
20
15
10
5
0
1952
1953
1954
1955
1956
U. S. DEPARTMENT OF AGRICULTURE
NEG. 4253-57 (5) AGRICULTURAL MARKETING SERVICE

Figure 2

The data presented by States in table 14 show that Texas plants in recent years have devoted more of their production to mellorine than have plants in other States, and Oklahoma plants made more than 2.6 gallons of mellorine out of every 10 of all frozen desserts. The portion has been smaller in the other States, but nevertheless significant.

Table 14.--Mellorine production as a percent of all frozen dessert production in responding plants, by States

Year	Illinois	Missouri	Oklahoma	Texas	Other States 1/	All States
	Percent	Percent	Percent	Percent	Percent	Percent
1949	0.3	---	38.7	14.6	---	16.2
1950	3.9	0.5	37.8	20.5	---	13.9
1951	3.8	0.5	21.6	12.6	---	11.5
1952	10.0	9.7	24.5	24.1	---	15.7
1953	16.2	13.4	22.7	38.4	4.3	22.8
1954	14.8	14.3	27.7	44.5	4.4	24.5
1955	13.0	21.1	26.3	44.3	7.3	24.4

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see note 1/, table 5.

In interpreting these figures, one must not assume more than their actual meaning. They signify only the percentage of mellorine in the plants sampled. They do not indicate a percentage for all frozen dessert plants or for total frozen dessert production in each of the States. Not all frozen dessert plants manufacture mellorine.

Mellorine production data by States indicate the location of gains during the period 1952-1955 (table 15). The only States showing a reduction in mellorine production during a specific year were California, Missouri, and Illinois. Illinois registered a decline from 1953 to 1954, but gained again in 1955. From 1952 to 1953, Illinois had an increase in volume of mellorine. California has never shown a marked increase in production. This may be due to the State law barring the manufacture and sale in the same place where ice cream is made and sold. Missouri's rather sharp decrease in 1955 is not easy to explain. There has been, however, a strong effort in the legislature to bar production of mellorine in the State, making for uncertainty both for present manufacturers and those thinking of entering the industry.

Production gains from 1953 to 1954 ranged from a low of 14.2 percent in Oregon to a high of 157.1 percent in Alabama (there was a decline in Illinois alone). United States production increased by 116.4 percent between 1952 and 1953, and by 29.6 percent from 1953 to 1954 (table 15). The range of increases in 1955 from 1954 was wide and reflected substantially the changes that might be expected. In the newer producing areas, percentage increases would tend to

Table 15.--Ice cream and mellorine production, 11 States, 1952-1955

State	1952		1953		Change from 1952 to 1953		1954		Change from 1953 to 1954		1955		Change from 1954 to 1955	
	Ice cream	Mellorine	Ice cream	Mellorine	Ice cream	Mellorine	Ice cream	Mellorine	Ice cream	Mellorine	Ice cream	Mellorine	Ice cream	Mellorine
	Thous. gal.	Thous. gal.	Thous. gal.	Thous. gal.	Pct.	Pct.	Thous. gal.	Thous. gal.	Pct.	Pct.	Thous. gal.	Thous. gal.	Pct.	Pct.
Alabama	7,155	---	7,264	56	+1.5	---	7,974	144	+9.8	+157.1	8,575	458	+7.5	+218.1
Arkansas	2,458	---	2,679	166	+9.0	---	2,640	329	-1.5	+98.2	2,454	524	-7.0	+59.3
California	45,370	---	45,722	1,130	+.8	---	43,152	2,260	-5.6	+100.0	44,969	2,070	+4.2	-8.4
Illinois	32,435	2,459	29,802	5,300	-8.1	+115.5	29,286	4,681	-1.7	-11.7	31,200	5,141	+6.5	+9.8
Missouri	16,348	1,780	15,858	2,493	-3.0	+40.0	15,829	2,975	-.2	+19.3	16,568	2,624	+4.7	-11.8
Montana	3,020	---	2,699	79	-10.6	---	2,479	124	-8.2	+57.0	2,519	159	+1.6	+28.2
Nevada	749	---	888	---	+18.6	---	721	1/	-18.8	---	615	1/	-14.7	---
Oklahoma	6,280	542	5,225	2,215	-16.8	+308.7	5,152	2,927	-1.4	+32.1	5,149	3,033	-.1	+3.6
Oregon	6,513	---	6,060	261	-7.0	---	5,588	298	-7.8	+14.2	5,559	368	-.5	+23.5
South Carolina	2,463	---	2,708	---	+9.9	---	2,579	---	-4.8	---	2,845	1/	+10.3	---
Texas	22,578	6,407	20,765	12,507	-8.0	+95.2	19,371	17,635	-6.7	+41.0	19,680	18,603	+1.6	+5.5
Total	145,369	11,188	139,670	24,207	-3.9	+116.4	134,771	2/31,379	-3.5	+29.6	140,133	2/33,009	+4.0	+5.2

1/ Production by States not shown when made by less than 3 plants. No plants licensed in Louisiana until late 1956.
2/ Includes production in Nevada and South Carolina.

Source: "Mellorine Type" Frozen Desserts, 1953, 1954, and 1955 (mimeo.), and Production of Manufactured Dairy Products, 1953, 1954, and 1955. USDA, AMS.

be larger, if for no cause other than a small base in the percentage calculation. In the States where production has a longer record, such as Texas, the increases would be smaller. Overall, a 5.2 percent increase was registered.

In order to ascertain the importance of mellorine in the States, the findings from the questionnaire and data regularly reported by the Agricultural Estimates Division of the Agricultural Marketing Service were used. The Division's enumerations of mellorine production began in 1952; however, it is possible to trace the data back to 1949 by utilizing findings from the questionnaire survey. A careful check of the results of the mail schedule returns indicated that the data were comparable to the enumerations. It is felt that no serious discrepancies arise from the combination.

Texas has been, and continues to be, the largest single producer of mellorine (table 16). Next in rank of importance comes Illinois, followed by Oklahoma and Missouri in that order. Alabama, Arkansas, California, Montana, Nevada, Oregon, and South Carolina combined accounted for 10.9 percent of total production in 1955. It should be recalled, however, that some States with small production have been making mellorine for only a short time. This would account, in part, for their small volume.

Table 16.--Percentage distribution of mellorine production for responding plants, by States, 1949-1955

State	Plants responding to questionnaire			USDA enumerations 1/			
	1949	1950	1951	1952 1/	1953 1/	1954 1/	1955 1/
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Alabama	---	---	---	---	0.2	0.5	1.4
Arkansas	---	---	---	---	.7	1.0	1.6
California	---	---	---	---	4.7	7.2	6.3
Illinois	1.2	10.8	6.6	22.1	21.9	14.9	15.6
Missouri	---	1.5	.7	16.0	10.3	9.6	7.9
Montana	---	---	---	---	.3	.4	.5
Oklahoma	19.5	10.6	11.0	4.9	9.2	9.3	9.2
Oregon	---	---	---	---	1.1	.9	1.1
South Carolina	---	---	---	---	---	---	2/ .1
Texas	79.3	77.1	81.7	57.0	51.6	56.2	56.3
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0

1/ Data from Production of "Mellorine Type" Frozen Desserts, 1952, 1953, 1954 (mimeo.) U. S. Department of Agriculture, Agricultural Marketing Service, 1955 (unpublished data).

2/ Includes production of Nevada.

Since very little mellorine enters into interstate commerce, production figures for any given State are in general contingent on the demand and supply relationships within that State.

Production data on the basis of size of plant show some interesting trends (table 17). After the initial years, when production was fairly evenly distributed between "small" and "large" plants, the trend has been for the "large" plants, with a capacity of 800,000 gallons or more, to produce an increasing share of the total. Prior to 1952, the plants with the smallest production produced a substantial part of the total mellorine made. From 1952 to the present, however, the relative importance of these smaller producers has declined to a point where they produce less than 12 percent of all the mellorine.

Table 17.--Percentage distribution of mellorine production for responding plants, by size of plant, 1949-1955

Year	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	Total
	Percent	Percent	Percent	Percent	Percent	Percent
1949	40.6	4.4	---	55.0	---	100.0
1950	55.0	1.6	---	43.4	---	100.0
1951	53.0	1.5	1.4	44.1	---	100.0
1952	19.4	6.3	3.2	55.3	15.8	100.0
1953	14.7	7.2	6.5	50.9	20.7	100.0
1954	14.1	7.7	8.4	51.6	18.2	100.0
1955	11.8	7.7	8.6	55.4	16.5	100.0

1/ Size based on 1955 production.

Mix Production for Others

Production of frozen mellorine and production of mellorine mix are both factors in the industry. Not all plants that manufacture frozen mellorine produce all the mix they use. On the other hand, many plants do not use all the mix they produce; they sell surplus production to other manufacturers. Still other plants manufacture mix only, and some make no mix at all but only freeze the mix they purchase from others.

Production by respondents of mix for sale to other users has greatly increased since 1951 (table 18). In that year, mix for sale constituted only 2.8 percent of the total mix produced. In 1952, this rose to 21.8 percent of the total. Mix for sale was 27.3 percent of the total in 1953, and then leveled off to slightly under 25 percent in 1954 and 1955. The plant size data indicate that the unclassified, or "size unknown" group produced the most mix for sale to other users. This product for sale constituted 100 percent or slightly less for this group for all the years they produced mix. Since plant size classification was based on the amount of frozen mellorine produced, and

since these plants in the "size unknown" category produced no frozen mellorine, it follows that their production was in mix for sale to other users (see p. 16 of this report).

Table 18.--Percent of total mellorine mix made by responding plants, by size, and sold to others for freezing, 1949-1955

Year	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	All plants
	Percent	Percent	Percent	Percent	Percent	Percent
1949	---	---	---	10.0	---	5.5
1950	---	---	---	8.8	---	3.8
1951	2.5	---	---	3.3	---	2.8
1952	10.8	0.2	10.8	6.5	99.3	21.8
1953	9.6	.4	21.1	7.8	99.3	27.3
1954	9.3	.0	5.3	9.4	100.0	24.8
1955	11.4	---	7.2	11.2	100.0	24.7

1/ Size based on 1955 production.

State percentages show that the largest portion of the mix for sale is produced in Texas (table 19). Oklahoma ranks second in this category, and Illinois and Missouri follow. Production of mix for sale in the "all other States" category is small. Respondents in Alabama, California, Oregon, and South Carolina indicated that they made no mix for sale to other users. These data raise the question whether there is a degree of specialization emerging in the mellorine field, but evidence from respondents is not conclusive.

The number of responding plants that sell mellorine mix to others for freezing is relatively small in comparison with the total plants producing mellorine in the 12 States (table 20). Not until 1952 did the number exceed 10 percent of all those reporting, and even in 1955 the number made up less than 20 percent of the respondents. The number has been so small through all of the years for which information was obtained that no real pattern emerges from the plant size categories.

The data by States in table 21 show that Texas has more plants selling mix to others than the other States. Illinois is the only other State whose number approaches significance.

Table 19.--Percent of total mellorine mix made by responding plants, by State of location, and sold to others for freezing, 1949-1955

Year	Illinois	Missouri	Oklahoma	Texas	Other 8 States 1/
	Percent	Percent	Percent	Percent	Percent
1949	---	---	---	6.9	---
1950	---	---	---	4.9	---
1951	---	---	---	3.4	---
1952	4.5	2.6	14.4	35.9	---
1953	4.1	.5	22.1	44.4	2.4
1954	4.2	.3	8.9	37.9	8.4
1955	4.5	6.0	10.0	38.2	3.8

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see note 1/, table 5.

Table 20.--Responding plants that sell mellorine mix to others for freezing, by size of plant

Year	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	Total
	Number	Number	Number	Number	Number	Number
1949	---	---	---	1	---	1
1950	---	---	---	1	---	1
1951	1	---	---	1	---	2
1952	3	1	2	4	4	14
1953	4	2	3	5	5	19
1954	5	1	3	5	6	20
1955	4	---	3	5	6	18

1/ Size based on 1955 production.

MANUFACTURING

The basic difference between mellorine and other frozen desserts lies in the type of fat utilized in the manufacture of the finished product. Mellorine producers use vegetable fats, animal fats, or a blend of the two instead of butterfat which is used in making ice cream and ice milk. However, the manufacturing process is not simple; it is closely related to that for ice cream.

Table 21.--Responding plants that sell mellorine mix to others for freezing, by States

Year	Illinois	Missouri	Oklahoma	Texas	Other States 1/	Total
	Number	Number	Number	Number	Number	Number
1949	---	---	---	1	---	1
1950	---	---	---	1	---	1
1951	---	---	---	2	---	2
1952	4	1	2	7	---	14
1953	5	1	3	9	1	19
1954	5	1	3	9	2	20
1955	5	1	3	8	1	18

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see note 1/, table 5.

Ingredients

Fats

Answers for 1955 to the mail questionnaire indicated that more than half the producers used a particular type of vegetable fat in making their product (table 22). An additional 28 percent used a blend of vegetable fats, and 3 percent used animal fats or a blend of animal and vegetable fats.

There does not appear to be any strong preference according to size of plant for particular types of vegetable fats. However, a greater percentage of plants in the two smaller size groups reported they use a blend of vegetable fats. Only in the smallest plants and those of unknown size did any of the plants report the use of animal fats or a blend of animal and vegetable fats.

An analysis by States of the fats used in mellorine production (table 23) shows that the largest producing State, Texas, reported a slight preference for a blend of vegetable fats over a particular type of vegetable fats. In Illinois, on the other hand, a particular type of vegetable fat was used by twice the number of manufacturers using all other types. Oklahoma responses showed most producers using a particular type of fat. In Missouri, there appeared to be a rather strong tendency to use the blends. In the "all other States" category, almost all the mellorine makers preferred a particular type of vegetable fat.

Figures for 1949-54 show no significant change, by plant size or by State, in the types of fats used.

Table 22.--Number of responding plants using various types of nonmilk fats 1/ in mellorine manufacture, by size of plant 2/

Size category and year	One specific type of vegetable fat	Blend of vegetable fats	Animal fat	Blend of vegetable and animal fats	No answer
Less than 250,000 gallons:					
1949	2	2	---	---	2
1950	3	2	2	1	3
1951	7	2	1	3	4
1952	11	5	---	2	7
1953	15	11	---	2	5
1954	17	11	1	3	7
1955	19	11	1	2	5
250,000-500,000 gallons:					
1949	1	---	---	---	---
1950	2	---	---	---	---
1951	2	2	---	---	---
1952	6	4	---	---	---
1953	6	5	---	---	2
1954	8	5	---	---	2
1955	8	6	---	---	2
500,000-800,000 gallons:					
1949	---	---	---	---	---
1950	---	---	---	---	1
1951	1	1	---	---	---
1952	7	2	---	---	---
1953	9	3	---	---	---
1954	9	3	---	---	1
1955	9	3	---	---	1
More than 800,000 gallons:					
1949	1	---	---	---	---
1950	1	1	---	---	---
1951	3	1	---	---	---
1952	10	5	---	---	1
1953	11	7	---	---	---
1954	10	8	---	---	---
1955	12	7	---	---	---
Size unknown:					
1949	---	---	---	---	---
1950	1	---	---	---	---
1951	2	1	---	---	---
1952	9	3	1	---	1
1953	9	5	1	---	1
1954	10	5	---	---	2
1955	11	4	---	---	---
All plants:					
1949	4	2	---	---	2
1950	7	3	2	1	4
1951	15	7	1	3	4
1952	43	19	1	2	9
1953	50	31	1	2	8
1954	54	32	1	3	12
1955	59	31	1	2	8

1/ Some plants reported the use of more than one type of fat during the year. Consequently, the columns added will sometimes exceed the number of plants responding.

2/ Size based on 1955 production.

Table 23.--Number of plants reporting use of various types of nonmilk fats 1/ in mellorine manufacture, by States

State and year	One specific type of vegetable fat	Blend of vegetable fats	Animal fat	Blend of vegetable and animal fats	No answer
Illinois:					
1949	---	---	---	---	1
1950	---	---	---	1	1
1951	2	---	---	1	2
1952	15	4	---	1	5
1953	15	8	---	1	5
1954	16	8	---	1	5
1955	16	7	---	1	6
Missouri:					
1949	---	---	---	---	---
1950	---	1	---	---	1
1951	1	1	---	---	---
1952	4	3	---	---	2
1953	4	6	---	---	1
1954	3	7	---	---	1
1955	3	6	---	---	---
Oklahoma:					
1949	1	1	---	---	---
1950	2	1	---	---	---
1951	3	---	---	1	---
1952	8	---	---	1	---
1953	8	1	---	1	1
1954	8	---	1	2	2
1955	10	---	1	1	1
Texas:					
1949	3	1	---	---	---
1950	5	1	2	---	1
1951	9	6	1	1	1
1952	14	12	1	---	1
1953	14	15	1	---	1
1954	14	16	---	---	---
1955	14	16	---	---	---
Other States 2/:					
1949	---	---	---	---	1
1950	---	---	---	---	1
1951	---	---	---	---	1
1952	2	---	---	---	1
1953	9	1	---	---	---
1954	13	1	---	---	4
1955	16	2	---	---	1

1/ Some plants reported the use of more than one type of fat during the year. Consequently, the columns added will sometimes exceed the number of plants responding.

2/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. Also, see footnote 1/, table 5.

Besides differences in the kinds of fats used, there are differences in the amounts used. The proportion of fat is one of the factors differentiating the premium and the regular-grade product. Minimum fat content is one of the basic requirements in standards for dairy products in most States.

Minimum fat content requirements for ice cream are regulated by the various States. For the States covered in this study, the requirements range from a high of 14 percent in Nevada to a low of 8 percent in Texas. Alabama, Arkansas, California, Missouri, Montana, Oklahoma, Oregon, and South Carolina have minimums of 10 percent, while the minimum in Illinois is 12 percent 3/.

Ice milk standards are not so clearly defined as are those for ice cream. Texas, Missouri, Illinois, and Nevada have no standards for ice milk. Alabama has a minimum of 2.5 percent fat; California's minimum is 4 percent. Oregon, South Carolina, and Montana set maximum as well as minimum fat content standards on ice milk.

Mellorine standards of fat content, as defined by the various States, are as follows: Minimum fat requirements for vegetable-fat frozen desserts in Alabama, Arkansas, California, Montana, and South Carolina are 10 percent. Illinois has a minimum of 8 percent, while Texas and Oklahoma each require that the product contain 6 percent fat. Oregon's minimum fat requirements are 3.2 percent, and Missouri and Nevada have no legal requirements. (See table 1, page 7.) Actual fat contents are reported in tables 24 and 25.

Vitamins

The vegetable fats used in making mellorine do not contain the vitamins that are present in butterfat. The model bill, in order to make the nutritive value of mellorine comparable to that of ice cream, sets forth a minimum addition of 8,400 U.S.P. units of vitamin A, with proportionate increases when the food fat content exceeds 10 percent.

Four States, Alabama, Arkansas, South Carolina, and Louisiana, require that the vegetable-fat frozen desserts made within their boundaries be fortified with vitamin A. Since no pertinent data are available from Louisiana, the data are drawn only from the first three States in the list and the other States where mellorine is legal. Most producers reported that they do not fortify their product (table 26).

No industry-wide pattern in the use or nonuse of vitamins appears when the responses are arranged according to plant size. In no category did the number of manufacturers using vitamins exceed those who did not. Only 18 percent of the respondents said they added vitamins to their product. Eleven percent did not answer the question.

3/ International Association of Ice Cream Manufacturers, Digest of State Standards of Identity for Ice Cream and Related Products, p. 1.

Table 24.--Number of responding plants reporting various percentages of fat content for frozen dessert products manufactured, by size of plant, 1955

Product and percent of fat content	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	All plants
Ice cream (premium grade):						
8 to 12 percent	3	---	---	---	---	3
12 to 16 percent	19	10	6	5	4	44
16 to 20 percent	3	5	5	12	4	29
20 percent or more	1	---	---	1	---	2
No answer	11	1	2	1	6	21
Ice cream (regular grade):						
8 to 10 percent	2	---	---	---	---	2
10 to 12 percent	11	10	6	10	2	39
12 percent or more	17	6	5	9	8	45
No answer	7	---	2	---	4	13
Mellorine (premium grade):						
8 to 12 percent	17	5	3	5	6	36
12 to 16 percent	4	1	---	---	---	5
No answer	16	10	10	14	8	58
Mellorine (regular grade):						
6 to 8 percent	4	4	2	4	4	18
8 to 10 percent	4	5	3	1	2	15
10 to 12 percent	12	4	5	11	4	36
12 percent or more	1	1	1	---	---	3
No answer	16	2	2	3	4	27
Ice milk:						
1 to 3 percent	4	1	---	1	---	6
3 to 5 percent	14	10	7	15	3	49
5 to 7 percent	6	---	1	1	1	9
No answer	13	5	5	2	10	35

1/ Size based on 1955 production.

Table 25.--Number of responding plants reporting various percentages of fat content for frozen dessert products manufactured, by States, 1955

Product and percent of fat content	Illinois	Missouri	Oklahoma	Texas	Other States 1/
Ice cream (premium grade):					
8 to 12 percent	---	1	---	---	---
12 to 16 percent	15	3	7	11	8
16 to 20 percent	6	5	4	9	5
20 percent or more	---	---	---	2	---
No answer	8	---	2	7	4
Ice cream (regular grade):					
8 to 10 percent	---	1	---	1	---
10 to 12 percent	3	3	10	16	7
12 percent or more	23	4	3	8	7
No answer	3	1	---	5	4
Mellorine (premium grade):					
8 to 12 percent	10	3	5	10	8
12 to 16 percent	1	---	---	2	2
No answer	18	6	8	18	8
Mellorine (regular grade):					
6 to 8 percent	2	---	5	11	---
8 to 10 percent	3	---	5	7	---
10 to 12 percent	14	8	---	5	9
12 percent or more	2	---	---	---	1
No answer	8	1	3	7	8
Ice milk:					
1 to 3 percent	3	---	---	3	---
3 to 5 percent	13	6	8	12	10
5 to 7 percent	4	1	1	---	3
No answer	9	2	4	15	5

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

Table 26.--Fortification of mellorine with vitamins by responding plants, by size of plant

Size of plant 1/	Use vitamins	Do not use vitamins	No answer
Under 250,000 gallons	6	27	7
250,000-500,000 gallons	3	11	2
500,000-800,000 gallons	2	10	1
More than 800,000 gallons	4	15	---
Size unknown	4	10	2
Total	19	73	12

1/ Size based on 1955 production.

On a State basis, 7 percent of the respondents in Illinois said they used vitamins (table 27), 9 percent in Missouri, 7 percent in Oklahoma, and 10 percent in Texas. In the "all other States" category, 60 percent of the respondents reported they fortified their products with vitamins. Three of the seven States in this category require manufacturers to fortify their product.

Table 27.--Fortification of mellorine with vitamins by responding plants, by States

State	Use vitamins	Do not use vitamins	No answer
Illinois	2	23	4
Missouri	1	9	1
Oklahoma	1	13	1
Texas	3	23	5
Other States 1/	12	7	1
Total	19	75	12

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

Manufacturing Problems and Cost

Problems

Even though production processes for mellorine and ice cream are basically the same, some mellorine producers have encountered production problems. Some of the problems are common to the frozen dessert industry as a whole, and others appear to be peculiar to the making of mellorine.

Almost half of the respondents said they had no production problems in manufacturing mellorine (table 28). Of the difficulties listed, the one most prominent was in flavoring the product. Twenty-one percent of all respondents reported they had had that trouble. This flavoring problem may have its basis in the fact that nonmilk fat products require more flavoring than do the butterfat products if they are to be comparable with the high-fat ice creams. One writer states " . . . the manufacturer who utilizes high-quality cream in his ice cream and flavors with a straight vanilla probably will use more flavoring in his vegetable fat product in order to give flavor to the bland fat." 4/

Table 28.--Number of responding plants reporting production problems in manufacture of mellorine, by size of plant

Type of problem 1/	Size of plant 2/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	Total
Failure of mix to wash clean in mixing vats and freezers	4	2	2	5	3	16
Difficulty in obtaining desired overrun	4	1	2	2	4	13
Difficulty in stabilizing and emulsifying	6	1	2	3	2	14
Nonuniformity of the fat	5	2	1	4	---	12
Shrinkage in package	7	1	3	4	3	18
Difficulty in flavoring	13	3	2	4	---	22
Other	2	1	1	1	1	6
No problems	19	10	7	7	8	51
No answer	---	---	---	---	1	1

1/ The table is based on replies for 104 plants, some of which reported more than one type of problem.
2/ Size based on 1955 production.

Shrinkage in the package was the next most common problem of the producers. This is not a new problem to frozen dessert manufacturers. An authority on ice cream making has the following to say about this difficulty: "The shrinkage of ice cream is a defect that has become increasingly more troublesome. The ice cream shrinks away from the sides and top of the package; in

4/ Thom, Edward, "What About Vegetable-Fat Frozen Desserts?" The Ice Cream Review, Vol. 36, No. 2, September 1952, p. 66.

5-gallon bulk cans, the level may drop as much as two or three inches. Trouble with the defect commonly extends to the entire output over a period of time." 5/

Since shrinkage is due primarily to the air in the product and the subsequent loss of this air, it is believed that the difference in the type of fat used in the frozen dessert would have no appreciable effect on the amount of shrinkage. Thus, shrinkage in mellorine does not appear to be a greater problem than shrinkage in ice cream.

Mellorine producers reported that they have a production problem involving failure of the mix to wash clean in the vats. Fifteen percent of the respondents listed this as a problem. The vegetable-fat globules have a tendency to adhere to the walls of the mixing vats more readily than do butterfat globules.

Obtaining the desired overrun, like shrinkage, is not a problem peculiar to the mellorine field, but seems to be prevalent throughout the frozen dessert industry. There appear to be varying opinions as to whether or not the fat content affects the overrun of a particular mix. It cannot be assumed, however, that vegetable or animal fats, or blends of these two fats, produce more problems than does butterfat. The problem is present throughout the industry and does not seem to be greater for mellorine than for any other frozen dessert.

Other problems were reported by the respondents. Of less importance were difficulties in stabilizing and emulsifying and in the nonuniformity of the fat, and the problems involving a longer mixing time and a lower freezing point.

Arrangement of the data by plant size shows that the smallest producers, those of class I, had the greatest number of problems. Forty percent of all problems reported by respondents came from this group. These problems do not appear to be altogether contingent on the size of the plant, however, because 23 percent of all reported problems were in plants in the highest production group.

The problems reported by the respondents can be divided into two broad groups: Those inherent in the frozen dessert industry, and those peculiar to the utilization of vegetable or animal fats in place of butterfat. Since many of the respondents stated that they had encountered no problems, the troubles may arise from inexperience or the inability to utilize experience. Experimentation with various fats and the utilization of new types or blends of fats may alleviate some of the problems that arise from the use of fats other than butterfat.

By States, the data show that 28 percent of the total problems reported were in Texas, and 24 percent in Illinois (table 29). There were 16 percent in Missouri, 14 percent in Oklahoma, and the remaining 18 percent in the "all other States" category.

5/ Sommer, Hugo H., Theory and Practice of Ice Cream Making, p. 401.

Table 29.--Number of responding plants reporting production problems in manufacture of mellorine, by States

Type of problem 1/	Illinois	Missouri	Oklahoma	Texas	Other States 2/	Total
Failure of mix to wash clean in mixing vats and freezers	4	2	2	6	2	16
Difficulty in obtaining desired overrun	4	3	---	2	4	13
Difficulty in stabilizing and emulsifying	2	3	3	4	2	14
Nonuniformity of the fat	1	2	2	4	3	12
Shrinkage in package	2	3	2	7	4	18
Difficulty in flavoring	7	3	5	4	3	22
Other	4	---	---	2	---	6
No problems	14	4	7	17	9	51
No answer	1	---	---	---	---	1

1/ The table is based on replies for 104 plants, some of which reported more than one type of problem.

2/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

Costs

The price differential between butterfat and vegetable fat is one of the basic reasons for cost differences, and presumably price differences, when mellorine and ice cream are compared. The fat cost, however, is not the only consideration in the overall cost of making the product.

According to the returns from the questionnaire, 92 percent of the respondents said the cost of the fat used in mellorine lowered the price of the product below that of ice cream (table 30). Four percent of the respondents said that the fat cost was the same for the two products while an additional 4 percent stated that the fat cost was higher for mellorine than for ice cream. The reasons for the high-cost reports cannot be determined from the available data.

None of the other cost factors was reported with the degree of unanimity registered for fat. For instance, one of the factors reported on was the cost of storage for raw ingredients going into the principal types of frozen desserts. Of the respondents answering this phase of the question, slightly over half (51 percent) indicated that storage costs for mellorine ingredients were lower than those for ice cream. Slightly less than half, or 47 percent, stated that storage costs were the same for the two products, and 2 percent said storage

Table 30.--Factors of mellorine production causing cost variations relative to ice cream production, reported by responding plants, by size of plant 1/

Factor and size of plant	Higher	Same	Lower	No answer
Less than 250,000 gallons:				
Cost of fat	2	2	34	2
Storage of raw ingredients	2	11	20	7
Invisible loss	---	21	9	10
Milk solids-not-fat	7	23	2	8
Emulsifiers and stabilizers	8	23	2	7
Production problems	5	25	4	6
Distribution	2	26	5	7
Other	1	1	2	36
250,000-500,000 gallons:				
Cost of fat	1	1	14	---
Storage of raw ingredients	---	8	6	2
Invisible loss	---	12	---	4
Milk solids-not-fat	3	10	---	3
Emulsifiers and stabilizers	---	12	2	2
Production problems	2	11	---	3
Distribution	1	12	---	3
Other	---	---	---	16
500,000-800,000 gallons:				
Cost of fat	1	1	9	2
Storage of raw ingredients	---	5	4	4
Invisible loss	1	7	1	4
Milk solids-not-fat	4	5	---	4
Emulsifiers and stabilizers	3	5	1	4
Production problems	2	6	1	4
Distribution	1	8	---	4
Other	1	---	---	12
More than 800,000 gallons:				
Cost of fat	---	---	19	---
Storage of raw ingredients	---	11	6	2
Invisible loss	---	13	2	4
Milk solids-not-fat	4	13	---	2
Emulsifiers and stabilizers	6	9	2	2
Production problems	2	16	---	1
Distribution	1	15	1	2
Other	---	1	---	18
Size unknown:				
Cost of fat	---	---	15	1
Storage of raw ingredients	---	5	8	3
Invisible loss	1	4	2	9
Milk solids-not-fat	---	9	1	6
Emulsifiers and stabilizers	2	9	---	5
Production problems	4	6	1	5
Distribution	4	7	---	5
Other	---	1	1	14
All plants:				
Cost of fat	4	4	91	5
Storage of raw ingredients	2	40	44	18
Invisible loss	2	57	14	31
Milk solids-not-fat	18	60	3	23
Emulsifiers and stabilizers	19	58	7	20
Production problems	15	64	6	19
Distribution	9	68	6	21
Other	2	3	3	96

1/ Size based on 1955 production.

costs were higher for the ingredients of mellorine than for the ingredients of ice cream. Since the fat used is the basic difference in ingredients between mellorine and ice cream, the basic difference in costs should be in the cost of storing the fat. According to E. M. Deck, "Hydrogenated vegetable fats can be stored at room temperature for several months; there is no need to store under refrigeration." 6/ If mellorine makers do not refrigerate their fats, or if they refrigerate the fats in the same storage facilities used for butterfat, storage costs would be lower or the same as those for ice cream ingredients. It is difficult, however, to see how storage costs could be higher for the raw ingredients of mellorine than for those of ice cream, unless additional storage facilities or other investments were needed to handle mellorine ingredients in addition to those already existing for other products.

The cost factors involved in invisible losses, i. e., by evaporation, shrinkage, and the like, appear to be similar to those involved in the manufacture of ice cream. Of the respondents answering questions on this subject, 78 percent indicated that the costs of invisible loss were the same in mellorine manufacture as they were in making ice cream. Nineteen percent stated that the costs of invisible loss were lower for mellorine, while 3 percent said they were higher.

Of the respondents, 74 percent considered that the cost of milk solids-not-fat (also called serum solids) was the same for both mellorine and ice cream. Twenty-two percent stated that the cost was higher for the solids in mellorine, and the remaining 4 percent stated that the cost of solids-not-fat was less for mellorine than for ice cream.

The amount of milk solids-not-fat used in the mix is based on the fat content of the mix. Generally, as the fat content rises, the amount of milk solids-not-fat declines. Conversely, when the fat content in a mixture is lowered, the tendency is to add more solids-not-fat. According to Dr. Sommer:

> A simple rule for figuring the maximum serum solids content is as follows: From 100 subtract the sum of the percentages of fat, sugar, gelatin, egg solids, and any other solids (except serum solids) which you propose to use; then divide the difference by the factor 6.9; the quotient will be the highest serum solids content that can be used safely as far as sandiness is concerned. 7/

It can be seen, therefore, that if all of the components of the mixture are held constant except for the fat and milk solids-not-fat, these two components will tend to fluctuate inversely to each other.

Since fat content is sometimes lower in mellorine than in ice cream, it follows that milk solids-not-fat content may be higher in some cases. This

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6/ E. M. Deck, "Working with Vegetable Oils," Ice Cream Field, Vol. 60, No. 6, December 1952, p. 62.

7/ Sommer, op. cit., p. 21.

fact could account for the relatively high percentage of respondents reporting a higher cost factor for milk solids-not-fat in mellorine than in ice cream. The relatively low fat content and the correspondingly high nonfat content of mellorine suggests also that the protein content of the product may be more stable than that of ice cream, and possibly higher 8/. If so, that factor might affect consumers' tastes and preferences, and producers' marketing and promotional practices.

Emulsifiers and stabilizers cost about the same in mellorine as in ice cream, according to 69 percent of the answers. Twenty-three percent of the respondents answering this question said costs for emulsifiers and stabilizers were higher for mellorine, and the remaining 8 percent said the costs were lower for mellorine than for ice cream. There appears to be no basis for an assumption that either more or costlier stabilizers and emulsifiers are required for nonmilk-fat frozen desserts. The reason or reasons for the reported high costs cannot be ascertained from available data.

Since production processes for mellorine and ice cream are fundamentally the same, it would be expected that production costs would be approximately the same. Seventy-five percent of the plants answering the question gave the expected report. Eighteen percent indicated higher production costs for mellorine, and the remaining 7 percent indicated that production costs for mellorine were lower than those for ice cream. Production problems in making mellorine have already been discussed.

Distribution costs for ice cream and mellorine were reported to be the same by 82 percent of the respondents. Eleven percent stated costs were higher for mellorine, and 7 percent indicated that their experiences showed a lower distribution cost for mellorine than for ice cream. Two items, the cost of fat and the storage of raw ingredients, make for lower cost for mellorine, according to most reports. Most respondents indicated that other cost factors for the two products were the same.

Neither the data by plant sizes nor the data by States indicate any radical departures from the total data examined. State data are shown in table 31 for purposes of comparison.

MARKETING

This section is devoted to mellorine sales, market outlets, packaging, advertising and promotion, and profit margins. A few of the implications from marketing findings also are discussed.

8/ Turnbow, Grover Dean; Tracy, Paul Hubert; and Raffetto, Lloyd Andres, The Ice Cream Industry, p. 436.

Table 31.--Factors of mellorine production causing cost variations relative to ice cream production, reported by responding plants, by States

Factor and State of location	Higher	Same	Lower	No answer
Illinois:				
Cost of fat	1	3	22	3
Storage of raw ingredients	1	12	8	8
Invisible loss	---	14	4	11
Milk solids-not-fat	6	13	1	9
Emulsifiers and stabilizers	5	13	3	8
Production problems	4	17	1	7
Distribution	2	19	---	8
Other	1	2	3	23
Missouri:				
Cost of fat	1	1	9	---
Storage of raw ingredients	---	4	5	2
Invisible loss	1	5	3	2
Milk solids-not-fat	2	6	---	3
Emulsifiers and stabilizers	3	4	1	3
Production problems	3	6	---	2
Distribution	2	7	---	2
Other	---	---	---	11
Oklahoma:				
Cost of fat	---	---	13	---
Storage of raw ingredients	1	5	5	2
Invisible loss	---	8	2	3
Milk solids-not-fat	3	8	---	2
Emulisifiers and stabilizers	2	9	---	2
Production problems	2	8	1	2
Distribution	1	8	2	2
Other	---	---	---	13
Texas:				
Cost of fat	2	---	28	1
Storage of raw ingredients	---	13	14	4
Invisible loss	---	19	1	11
Milk solids-not-fat	2	22	2	5
Emulsifiers and stabilizers	2	23	2	4
Production problems	2	23	2	4
Distribution	2	21	4	4
Other	---	1	---	30
Other States 1/:				
Cost of fat	---	---	19	1
Storage of raw ingredients	---	6	12	2
Invisible loss	1	11	4	4
Milk solids-not-fat	5	11	---	4
Emulsifiers and stabilizers	7	9	1	3
Production problems	4	10	2	4
Distribution	2	13	---	5
Other	1	---	---	19

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

Sales

Manufacturers of mellorine were asked to indicate whether their sales of mellorine, ice cream, ice milk, and sherbets had increased, decreased, or remained stable during the years from 1949 through 1955. Perhaps the best comparison of sales trends can be seen by taking each product and tracing its growth or decline through the years as reported by the responding plants who answered this particular question (table 32).

Table 32.--Number of responding plants reporting increases, decreases or stability in sales of their frozen dessert products, 1949-1955

Change	1949	1950	1951	1952	1953	1954	1955
Mellorine:							
Increase ...	3	6	19	46	61	59	46
Decrease ...	---	---	1	1	11	19	35
Stable	1	2	1	3	5	10	8
No answer ..	4	7	6	23	13	12	10
Ice cream:							
Increase ...	4	2	12	21	29	37	55
Decrease ...	3	4	6	18	35	36	23
Stable	---	---	1	7	7	7	5
No answer ..	1	9	8	27	19	19	16
Ice milk:							
Increase ...	---	---	2	19	27	31	36
Decrease ...	---	---	1	1	9	16	14
Stable	1	2	4	8	10	12	13
No answer ..	7	13	20	45	44	41	36
Sherbets:							
Increase ...	1	1	8	22	39	47	53
Decrease ...	2	2	2	6	10	14	7
Stable	1	3	6	15	11	12	17
No answer ..	4	9	11	30	30	27	22
All products:							
Increase ...	3	5	14	38	40	46	50
Decrease ...	---	---	3	4	17	19	16
Stable	---	---	---	1	3	3	4
No answer ..	5	10	10	30	30	32	29

Three of the four reporting plants stated that their mellorine sales had increased in 1949 over the previous year. The remaining plant stated that its sales remained stable, and no plants reported a decrease in mellorine sales.

In 1950 the percentages remained exactly the same as for 1949, but in 1951, 19 of the 21 plants answering the question stated that their sales had increased over the 1950 level. One said that sales had remained stable, and one that sales had declined.

The proportion of plants indicating an increase in mellorine sales over the previous year rose slightly in 1952, with 92 percent of the respondents experiencing increases. Decreases were reported by 2 percent, and the remaining 6 percent said there was no change in their sales from 1951 to 1952.

The proportion of the plants indicating decreases in mellorine sales from the previous year rose quite sharply in 1953. In this year, 14 percent of the plants that answered the question stated that 1953 sales were below 1952. Plants reporting increases accounted for 79 percent, and 7 percent indicated that their sales in 1952 and 1953 were approximately the same.

In 1954 there was another rise in the percentage of plants whose sales declined. Twenty-two percent of the respondents said their sales of mellorine were less in 1954 than in 1953. Sixty-six percent said their mellorine sales had increased, and 12 percent said sales had remained stable.

In the last year of this analysis, 1955, only slightly over half of the respondents answering the question (52 percent) stated that their mellorine sales had increased over 1954. Thirty-nine percent experienced decline in sales during the year, and the remaining 9 percent reported stability in sales from 1954 to 1955.

These sales data showing increases, decreases, or stability tend to substantiate previous statements about the product. They explain how the industry must have appeared so lucrative about 1951 and 1952 to those frozen dessert manufacturers not making the product and why there was an influx of new makers of mellorine. Moreover, the decline in the proportion showing an increase of sales in the following years might well be the result of the entrance of additional firms into the industry. Also, the reasons for beginning manufacture given by so many of the respondents--to meet competition and to increase their market--appear to be confirmed.

Some discussion of the data on ice cream, ice milk, or sherbet, presented in table 32 may be useful.

The percentages of respondents reporting increases in sales of ice cream fluctuated widely during these years, from a low of 33 percent in 1950 to 66 percent in 1955. There was a close relationship between these fluctuations and the national data on ice cream production. For instance, 1950 national output fell below 1949, and the percentage of manufacturers showing increases

was low. The opposite was true in 1955, when ice cream production showed a 5.5 percent increase from 1954.

In all of the years for which data were available from the respondents in meaningful quantities, the answers showed more than half of the plants with increased sales of ice milk over the previous year except, perhaps, for 1951. Data on ice milk, too, tend to conform to national production patterns. Not enough respondents answered the sherbet question to support valid conclusions.

Market Outlets

The primary market outlets for mellorine in the States where mellorine is sold are supermarkets and other grocery stores. Questionnaire returns indicated that in 1952 these outlets accounted for almost 77 percent of the sales of mellorine to consumers. In 1953, the percentage rose to over 81; in 1954, to 82 percent; and in 1955, to more than 83 percent (table 33, fig. 3).

Since these two types of outlets account for so much of the total mellorine movement, it is not difficult to see why most of the mellorine is packaged in half-gallon and smaller containers. Supermarkets and other grocery stores are seldom equipped to dispense mellorine in bulk. The output of mellorine through drug stores and confectioneries has declined through the years, and it is through these two types of outlets that one would expect most bulk mellorine to be moved. Thus, the trend has been away from bulk sales of mellorine, and toward more sales in family-size packages.

Movement of mellorine products through restaurants and hotels has remained fairly constant during the last few years. However, sale of mellorine by company-owned stores has increased from 1.4 percent of the total output in 1952 to 4.0 percent in 1955.

In the "all other outlet" group, which included retail delivery to homes, institutions, military establishments, vending machines, street carts, and the like, the proportion of sales has remained relatively constant at slightly over 2 percent of total sales.

Grocery stores other than supermarkets have been distributing a fairly constant proportion of the mellorine production within the 12 States. These stores accounted for 33 percent of the output in 1952, 35 percent in 1953, 32 percent in 1954, and 31 percent in 1955. Supermarkets, on the other hand, have increased their proportion of the total output from 44 percent in 1952 to 52 percent in 1955. Since the gain in supermarket operations has not been at the expense of the other grocery stores, it follows that some other type or types of outlets have declined in importance. The drugstore and confectionery groups have shown the declines that could account for the increase in supermarket sales.

An interesting pattern is revealed when the types of outlets for distributing mellorine are considered by plant size. The smallest plants (production

Table 33.--Percentage distribution of mellorine marketed by responding plants through various types of outlets, by size of plant, 1952-1955

Year and type of outlet	Size of plant 1/				All plants
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	
	Percent	Percent	Percent	Percent	Percent
1952:					
Supermarkets	17.7	48.1	47.5	51.0	44.0
Grocery stores (not supermarkets)	60.0	27.7	30.9	25.5	32.8
Drugstores	14.1	2.0	8.6	14.5	13.4
Restaurants, hotels	2.5	.2	---	1.8	1.7
Confectioneries	.4	.2	1.3	6.1	4.4
Company-owned stores	3.4	2.0	---	.9	1.4
Other 2/	1.9	19.8	12.2	.2	2.3
1953:					
Supermarkets	21.7	45.7	37.4	54.7	45.9
Grocery stores (not supermarkets)	62.5	32.7	52.5	24.1	35.2
Drugstores	8.6	8.5	6.3	9.8	9.0
Restaurants, hotels	3.1	1.0	---	1.0	1.2
Confectioneries	.2	.4	1.0	5.3	3.4
Company-owned stores	2.4	3.8	---	3.8	3.1
Other 2/	1.5	7.9	2.8	1.3	2.2
1954:					
Supermarkets	23.1	48.7	60.4	53.6	49.8
Grocery stores (not supermarkets)	56.5	34.8	33.1	24.6	32.3
Drugstores	10.2	5.1	4.3	9.0	7.8
Restaurants, hotels	3.2	.9	---	1.3	1.3
Confectioneries	.2	.5	1.0	3.5	2.2
Company-owned stores	5.3	3.7	---	5.4	4.1
Other 2/	1.4	6.3	1.2	2.6	2.4
1955:					
Supermarkets	27.3	49.0	60.2	56.2	52.1
Grocery stores (not supermarkets)	54.5	30.1	35.1	24.4	31.4
Drugstores	7.6	8.5	3.1	8.3	7.2
Restaurants, hotels	3.0	2.6	---	1.2	1.4
Confectioneries	.2	1.2	.9	2.1	1.5
Company-owned stores	5.6	2.6	---	5.4	4.0
Other 2/	1.8	6.0	.7	2.4	2.4

1/ Size based on 1955 production.

2/ Includes retail delivery to homes, institutions, military establishments, vending machines, street carts or trucks, etc.

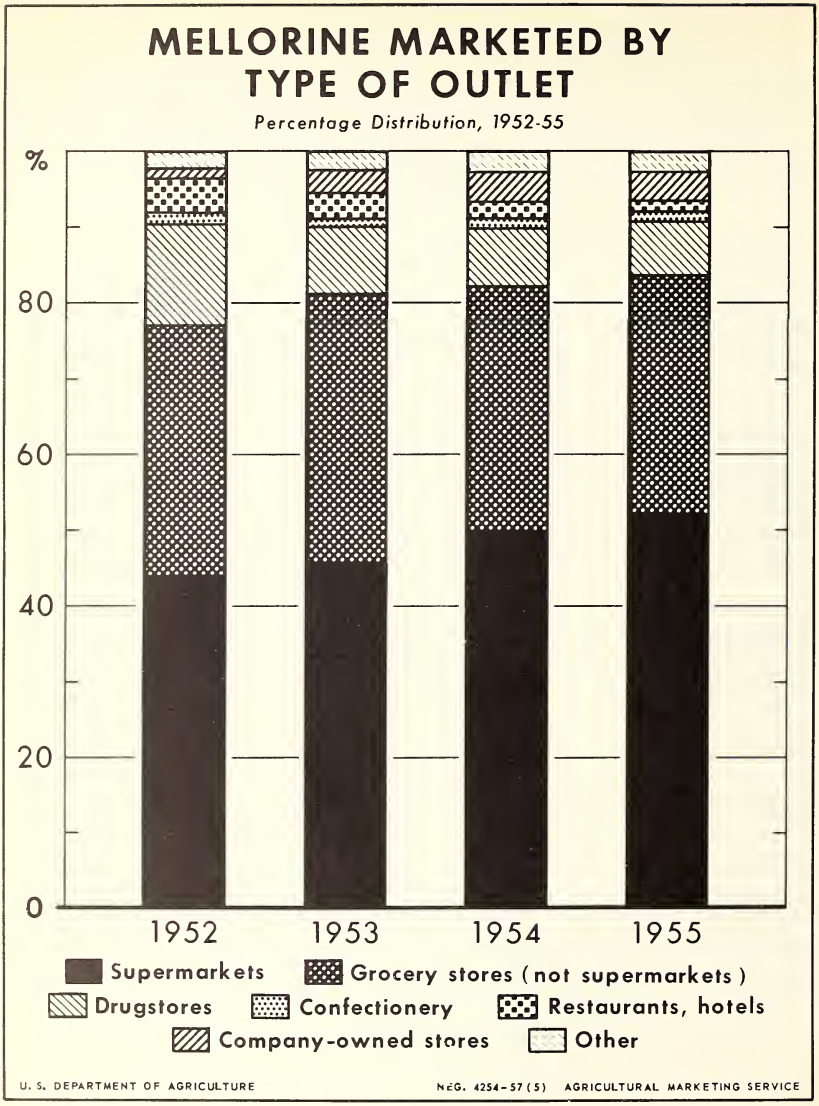
MELLORINE MARKETED BY TYPE OF OUTLET
Percentage Distribution, 1952-55
%
80
60
40
20
0
1952
1953
1954
1955
Supermarkets
Grocery stores (not supermarkets)
Drugstores
Confectionery
Restaurants, hotels
Company-owned stores
Other
U. S. DEPARTMENT OF AGRICULTURE
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Figure 3

of 250,000 gallons or less in 1955) showed a definite dependence on the grocery store outlet. In 1952, 60 percent of the production of these small plants was distributed through grocery stores other than supermarkets, while 18 percent was marketed through supermarkets. In 1953, in the same plant-size group, 62.5 percent was marketed through other grocery stores while 22 percent was sold through supermarkets. In 1954 the percentages were 57 marketed through other grocery stores and 23 through supermarkets, and in 1955 they were 54.5 through other grocery stores and 27 through supermarkets.

The smallest plants were the only ones indicating they sold most of their mellorine through grocery stores other than supermarkets. In all other size groups, supermarkets were the principal outlets.

This tendency of the smaller plants to sell through grocery stores other than supermarkets poses some questions to which no answers are now available. It is possible that the smaller plants are mostly in communities where supermarkets are not available. It is also possible that supermarkets prefer to get all their supply from one plant, and this volume of output might not be supplied by a small producer. The dependence of small producers on grocery stores other than supermarkets also raises some questions about marketing costs and the relation between producer and retailer margins.

A classification by States generally follows the overall pattern, showing a concentration of sales through the supermarkets (table 34). In Illinois in 1952, more mellorine was moved through other grocery stores than supermarkets. In the next three years, however, the pattern was reversed, and supermarkets handled a greater share of the output than other grocery stores. Drugstores showed a definite decline during the 4-year period, as did the confectionery stores. Restaurants and hotels and company-owned stores sold a relatively stable percentage of the output.

In Missouri, the percentage of output through other grocery stores exceeded the output through supermarkets in 1952 and 1953. The shift to marketing mellorine through supermarkets came in 1954 and continued through 1955. As in Illinois, Missouri sales through drugstores declined during the 4-year period, as did sales through confectioneries and company-owned stores.

Oklahoma respondents, like those in Missouri, favored grocery-store outlets over supermarkets in 1952 and 1953, and supermarkets over grocery stores in 1954 and 1955. Sales through drugstores declined each year during the 4-year period. Although sales through confectioneries were declining steadily in all other States, sales through this type of outlet in Oklahoma actually increased from 1952 through 1954, and there was only a slight decline in 1955. Sales through restaurants and hotels, company-owned stores, and retail delivery to homes declined over the 4-year period.

Texas did not follow the pattern of the other States where mellorine is sold. In 1952, almost 54 percent of the mellorine produced in the State was marketed through supermarkets. The volume distributed through supermarkets declined to 50 percent of the total in 1953, dipped to 48 percent in 1954, and

Table 34.--Percentage distribution of mellorine marketed by responding plants through various types of outlets, by States, 1952-1955

Year and type of outlet	Illinois	Missouri	Oklahoma	Texas	8 other States 1/
	Percent	Percent	Percent	Percent	Percent
1952:					
Supermarkets	40.7	34.4	24.1	53.7	---
Grocery stores (not supermarkets)	44.3	34.7	40.0	23.5	---
Drugstores	8.4	11.8	24.4	14.8	---
Restaurants, hotels	---	---	1.5	3.4	---
Confectioneries	6.4	15.3	1.4	---	---
Company-owned stores	.1	3.8	5.6	1.7	---
Other 2/	.1	---	3.0	2.9	---
1953:					
Supermarkets	51.9	34.6	34.7	50.0	21.9
Grocery stores (not supermarkets)	36.3	43.5	36.1	28.4	71.7
Drugstores	7.1	8.5	17.8	9.8	.3
Restaurants, hotels	.1	---	1.1	2.2	5.8
Confectioneries	4.5	11.3	1.9	.2	.3
Company-owned stores	.1	2.1	4.9	6.0	---
Other 2/	.0	---	3.5	3.4	---
1954:					
Supermarkets	53.8	44.0	40.3	48.0	65.7
Grocery stores (not supermarkets)	37.6	37.6	33.8	29.1	27.9
Drugstores	5.7	7.3	14.3	9.6	.1
Restaurants, hotels	.1	---	1.1	2.2	1.4
Confectioneries	2.6	9.4	2.9	.2	.1
Company-owned stores	.1	1.7	2.9	7.1	4.8
Other 2/	.1	---	4.7	2.0	---
1955:					
Supermarkets	55.8	55.6	45.3	49.4	58.2
Grocery stores (not supermarkets)	35.1	34.3	31.8	28.2	33.0
Drugstores	6.0	5.8	11.1	9.0	1.1
Restaurants, hotels	.1	---	1.3	2.4	1.7
Confectioneries	2.6	3.7	2.6	.1	.4
Company-owned stores	.2	.6	2.3	7.2	5.6
Other 2/	.2	---	5.6	3.7	---

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

2/ Includes retail delivery to homes, institutions, military establishments, vending machines, street carts or trucks, etc.

rose to 49 percent in 1955. Sales in other grocery stores, on the other hand, which had been either holding their own or declining in other States, increased from 1952 to 1954 in Texas, and then declined slightly in 1955. The proportion of sales through drugstore, restaurant, and hotel outlets declined. Sales through confectioneries maintained a relatively constant but small percentage of output while, in contrast, sales through company-owned stores increased during the 4-year period.

In the "all other States" group, grocery stores other than supermarkets accounted for almost 72 percent of the mellorine marketed in these States in 1953. Supermarkets accounted for 22 percent, and restaurants and hotels for over 5 percent. In 1954, supermarkets replaced other grocery stores as the largest outlet for mellorine, while all other types of outlets, except company-owned stores, declined in the proportion of total mellorine sold. In 1955, all types of outlets except supermarkets increased their proportion of total distribution in these States. Supermarkets dropped 7 percentage points from the previous year. However, they continued to have the greatest share of the market.

The greatest portion of unfrozen mellorine mix sold to other users for freezing has, without exception, gone to drive-in stands in each of the 4 years from 1952 through 1955 (table 35). In 1952, drive-in stands froze 86 percent of this mellorine mix. In 1953, the percentage rose to 88. The respondents who answered this question said they sold 87 percent to drive-in stands in 1954, and 84 percent in 1955.

Table 35.--Percentage distribution, by type of outlet, for mellorine mix manufactured by responding plants for sale to others for freezing, 1952-1955

Outlet	1952	1953	1954	1955
	Percent	Percent	Percent	Percent
Drive-in stands	86.1	87.0	86.6	84.1
Drugstores	.0	.0	.1	.1
Restaurants and hotels	.0	.2	.1	.0
Confectioneries	2.5	.8	.5	.5
Institutions	3.2	3.5	3.5	3.6
Military establishments	3.3	4.2	4.6	4.6
Other	4.9	3.4	4.6	7.1

Confectioneries provided an outlet for 2.5 percent of the mellorine mix in 1952, but this outlet declined in importance through the years, and in 1955, confectioneries consumed only 0.5 percent. Institutions have received in excess of 3 percent of the mix in each of the years.

Use of mellorine mix by military establishments in these States has grown slightly during the last few years, but still constitutes an outlet for less than 5 percent of the total.

Drugstores and restaurants received an extremely small amount of the mellorine mix for sale. In none of the years under consideration did these two outlets combined attain 0.5 percent of the total mix sold.

The questionnaires revealed one fact not evident from the tabulations. In organizations having several plants, there appears to be a tendency for one plant in the chain to make all the mix, and it is then distributed to the other plants for freezing. This supports the statement that specialization may be evolving in the industry. However, more evidence would be necessary to draw a positive conclusion.

Container Sizes

There are decided differences between mellorine and ice cream in the container sizes in which the two products are marketed. Figure 4 illustrates the volume of production packaged in the various sizes of containers in 1955 for both mellorine and ice cream.

Most of the mellorine production is packaged in half-gallons, with only a small portion sold in bulk quantities (larger than gallons). Ice cream production, on the other hand, is divided almost evenly between bulk and half-gallons and gallons, with smaller percentages of total production going into the various other package sizes and types.

The pattern of mellorine output by container sizes shows some interesting changes between 1951 and 1955 (table 36, fig. 5). In 1955, the half-gallon and gallon category made up 59.1 percent of total output. In 1951, however, this same category accounted for only 25.1 percent of the total. In 1951, the greatest proportion (38.5 percent) was in larger-than-gallon packages or bulk production. In 1955, the percentage sold in bulk had declined to 6.7.

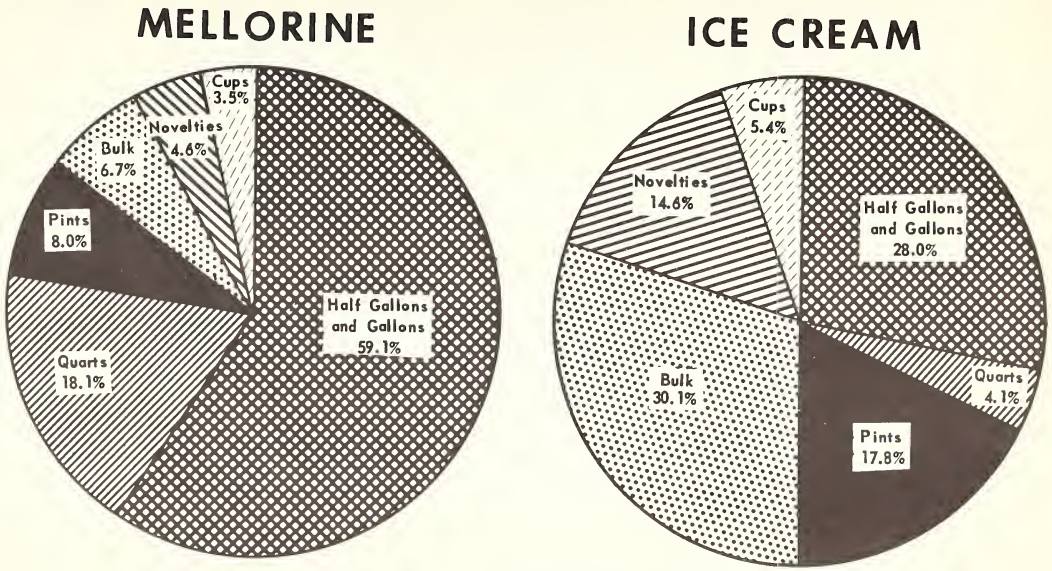
In the other container-size categories, pints increased from 7.6 percent of the total in 1951 to 8.0 percent in 1955. Quart packaging also increased during the period, from 15.4 percent of the total in 1951 to 18.1 percent in 1955. Novelties and cups fell from 13.4 percent in 1951 to 8.1 in 1955.

The trend away from the larger-than-gallon packaging to the half-gallon and smaller container sizes probably is largely due to the change in the type of outlet used in marketing mellorine.

Data by plant size do not indicate any appreciable deviation from this container-size pattern.

In considering container sizes by States, it should be recalled that several States have statutes that affect the packaging of mellorine. For

COMPARISON OF MELLORINE AND ICE CREAM CONTAINER SIZES, 1955



SOURCE: DATA FOR ICE CREAM FROM INTERNATIONAL ASSOCIATION OF ICE CREAM MANUFACTURERS, CONTAINER ANALYSIS 1955, P. 7.

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Figure 4

Table 36.--Percentage distribution of container sizes used to package mellorine manufactured by responding plants, by size of plant, 1951-55

Size of plant 1/ and year	Pints	Quarts	Half-gallons	Gallons	Larger than gallons	Novelties	Cups
	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.	Pct.
Less than 250,000 gallons:							
1951	16.6	2.7	26.9	0.2	32.9	18.1	2.6
1952	10.1	37.3	20.7	3.7	15.1	11.2	1.9
1953	4.6	27.9	38.9	1.7	15.8	7.9	3.2
1954	4.9	22.2	49.2	.7	12.3	7.8	2.9
1955	5.8	18.0	57.9	.3	8.6	7.0	2.4
250,000-500,000 gallons:							
1951	11.0	7.1	81.9	---	---	---	---
1952	12.3	2.4	49.7	---	2.5	14.4	18.7
1953	15.3	7.3	52.2	2.6	10.1	5.1	7.4
1954	9.4	15.4	59.2	1.7	7.8	.9	5.6
1955	8.2	6.9	69.7	1.4	8.0	.8	5.0
500,000-800,000 gallons:							
1951	3.5	86.7	6.3	---	3.2	---	.3
1952	18.4	49.6	27.7	---	2.9	.7	.7
1953	3.6	39.6	51.3	---	1.2	.9	3.4
1954	7.9	14.5	73.1	---	1.0	1.4	2.1
1955	4.6	14.0	77.0	---	.9	1.6	1.9
More than 800,000 gallons:							
1951	---	6.8	27.0	---	55.6	10.6	---
1952	30.5	19.2	19.6	---	19.4	10.8	.5
1953	20.8	19.3	36.1	---	11.2	9.2	3.4
1954	14.0	18.5	44.6	---	10.8	7.9	4.2
1955	9.5	21.7	51.5	---	7.8	5.5	4.0
All plants:							
1951	7.6	15.4	25.1	.0	38.5	12.3	1.1
1952	24.8	25.7	21.2	.9	16.1	9.8	1.5
1953	15.6	22.0	39.5	.5	10.9	7.8	3.7
1954	10.9	18.0	52.2	.3	8.9	6.0	3.7
1955	8.0	18.1	58.9	.2	6.7	4.6	3.5

1/ Size based on 1955 production.

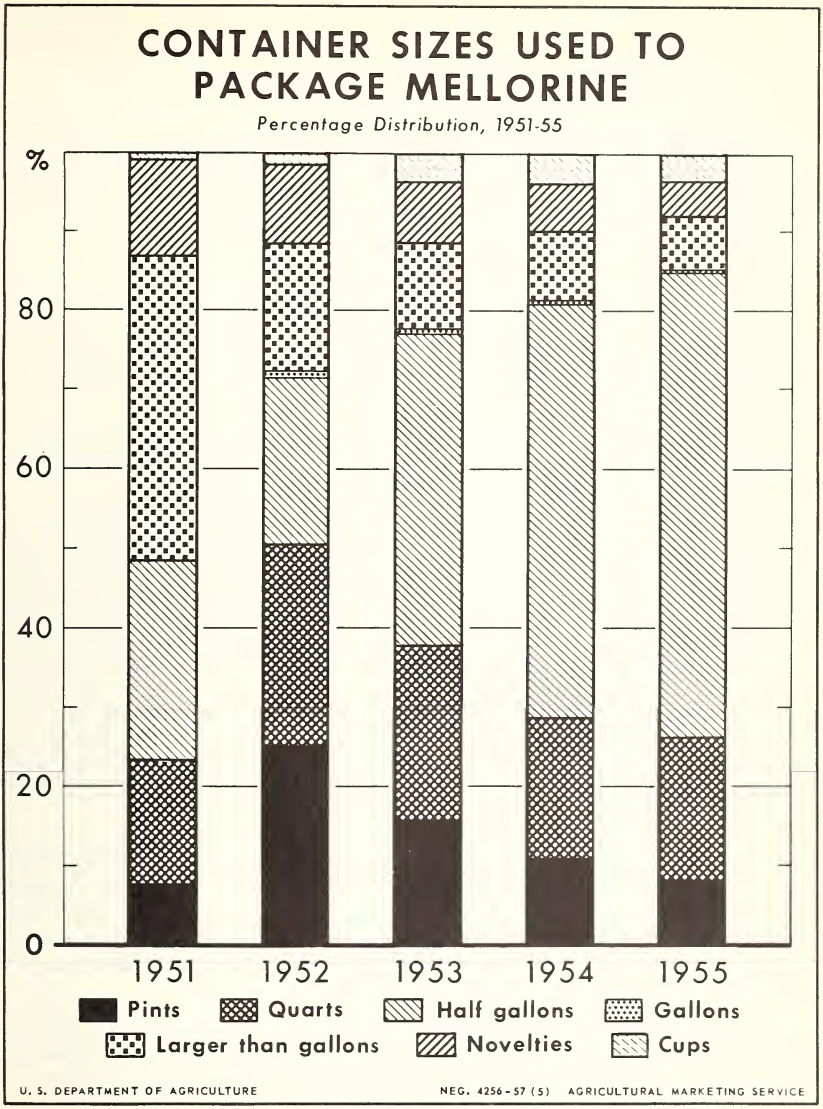
CONTAINER SIZES USED TO PACKAGE MELLORINE
Percentage Distribution, 1951-55
%
80
60
40
20
0
1951
1952
1953
1954
1955
Pints
Quarts
Half gallons
Gallons
Larger than gallons
Novelties
Cups
U. S. DEPARTMENT OF AGRICULTURE
NEG. 4256-57 (5) AGRICULTURAL MARKETING SERVICE

Figure 5

instance, both South Carolina and Alabama forbid the sale of mellorine in containers of any size except pints, quarts and half gallons. In California, there is a law prohibiting the sale of mellorine in bulk for resale.

The evolution of container sizes already shown for all plants and for plants by volume of production is evident in the figures for the States (table 37). The growth of popularity of the half gallon is particularly noticeable. There also appears to be a trend away from the pint carton. The State table also brings out that most of the bulk size containers are used in Oklahoma, in Texas, and in some of the States of the "other States" category.

Promotion and Advertising

The promotion of any new product, whether by advertising or other methods, is an important factor in the acceptance or rejection of the product by the consuming public.

About 42 percent of the mellorine manufacturers who responded to the questionnaire indicated that they had done some advertising and promotional work in the mellorine part of their business (table 38).

According to plant size, the largest producing group (production in excess of 800,000 gallons) was the group that advertised or promoted its product most frequently. Sixty-eight percent of the plants in this category indicated that they advertised or promoted mellorine. Half of the plants in the smallest producing group promoted their product, and in the 250,000-500,000-gallon category, 25 percent used advertising or promotional devices. Thirty-one percent of the plants in the 500,000-800,000-gallon class promoted their product.

On a State basis, Missouri reported that 54 percent of the mellorine manufacturers promoted or advertised their product (table 39). In Texas, 45 percent promoted mellorine, and in Illinois, 41 percent. Oklahoma manufacturers stated that 23 percent advertised, while in the "other States" grouping, the percentage was 45.

Of the promotional devices used by mellorine producers, demonstrations appear to be the most common (table 40). In 1953, 1954, and 1955, demonstrations were the favored promotional device. The promotional devices most used in 1955 were free samples, tie-in sales, premiums, special containers, and novelty stunts. Some plants listed special promotional devices such as streamers, coupons, and special weekend sales as alternate promotional activities.

The smallest and the largest plants did the most promotion in the industry. So far as the choice of promotional devices by plant size is concerned, there appeared no basic difference between the groups, or any great variation from the overall pattern.

Table 37.--Percentage distribution of container sizes used to package mellorine manufactured by responding plants, by States, 1951-1955

State of location and year	Pints	Quarts	Half-gallons	Gallons	Larger than gallons	Novelties	Cups
	Percent	Percent	Percent	Percent	Percent	Percent	Percent
Illinois:							
1951	41.7	16.6	---	---	---	41.7	---
1952	40.6	31.0	13.2	---	1.4	13.5	0.3
1953	30.1	32.1	18.0	---	1.3	13.6	4.9
1954	25.0	32.9	26.1	---	---	10.8	5.2
1955	16.6	31.6	37.2	---	---	9.4	5.2
Missouri:							
1951	---	100.0	---	---	---	---	---
1952	24.2	59.8	15.6	---	---	.3	---
1953	19.5	53.5	25.8	---	---	1.2	---
1954	15.6	44.6	36.4	---	---	3.1	.3
1955	7.2	35.2	56.9	---	.1	.2	.4
Oklahoma:							
1951	2.1	---	56.3	---	6.2	31.5	3.9
1952	26.2	8.1	24.3	10.7	4.7	23.1	2.9
1953	6.3	12.6	53.4	5.9	7.2	11.4	3.2
1954	2.5	7.8	70.6	2.7	5.3	8.8	2.3
1955	3.1	3.7	78.3	2.0	4.2	6.7	2.0
Texas:							
1951	2.1	---	56.3	---	6.2	31.5	3.9
1952	26.2	8.1	24.3	10.7	4.7	23.1	2.9
1953	6.3	12.6	53.3	5.9	7.2	11.4	3.3
1954	2.5	7.8	70.5	2.7	5.3	8.8	2.4
1955	3.1	3.7	78.3	2.0	4.2	6.7	2.0
Other States 1/:							
1953	11.4	5.7	73.0	---	9.8	---	---
1954	15.1	2.3	80.5	---	2.1	---	---
1955	20.9	1.9	74.9	---	2.3	---	---

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. No data on packaging in this group of States available prior to 1953. Also see footnote 1/, table 5.

Table 38.--Responding plants, by size, who have done advertising and promotional work on mellorine

Plant size 1/	Yes	No
Under 250,000 gallons	20	20
250,000-500,000 gallons	4	12
500,000-800,000 gallons	4	9
More than 800,000 gallons	13	6
Size unknown	3	13
Total	44	60

1/ Size based on 1955 production.

Table 39.--Number of responding plants that have done advertising and promotional work on mellorine, by States

State	Yes	No
Illinois	12	17
Missouri	6	5
Oklahoma	3	10
Texas	14	17
Other States 1/	9	11
Total	44	60

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

On a State basis, manufacturers in Illinois used demonstrations most frequently, with free samples next in importance (table 41). In Missouri, the stress has been placed on premiums; free samples, demonstrations, and tie-in sales were given equal weight.

Promotional devices were not used extensively in Oklahoma. The first choice of producers in this State appeared to be the distribution of free samples.

Texas promotion has been split fairly evenly between demonstrations and tie-in sales. Free samples and novelty stunts also have been utilized. In the "all other States" category, demonstrations were the most frequent form of promotion. Tie-in sales and free samples followed in importance. No wide divergencies from the overall mellorine promotion pattern were observed when the State data were analyzed separately.

Table 40.--Number of responding plants using specific devices for mellorine promotion, by size, 1952-1955

Promotional device	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	All plants
1952:						
Tie-in sales	2	---	2	3	1	8
Premiums	1	---	---	---	---	1
Demonstrations	2	---	2	5	---	9
Free samples	2	1	---	3	---	6
Plastic containers	---	---	---	---	1	1
Novelty stunts	---	---	---	1	---	1
Other	5	---	---	4	---	9
1953:						
Tie-in sales	2	---	3	3	---	8
Premiums	---	---	1	---	---	1
Demonstrations	3	---	3	5	---	11
Free samples	3	1	1	3	---	8
Plastic containers	---	---	---	---	---	---
Novelty stunts	---	---	---	1	---	1
Other	5	---	---	3	---	8
1954:						
Tie-in sales	2	---	1	2	---	5
Premiums	---	---	1	2	---	3
Demonstrations	3	1	2	6	---	12
Free samples	4	2	1	2	---	9
Plastic containers	---	---	---	---	---	---
Novelty stunts	---	---	---	1	---	1
Other	5	---	---	3	---	8
1955:						
Tie-in sales	2	1	1	2	1	7
Premiums	---	---	1	3	1	5
Demonstrations	3	2	2	7	---	14
Free samples	4	2	1	2	---	9
Plastic containers	---	---	---	---	1	1
Novelty stunts	---	---	---	1	---	1
Other	5	---	---	3	---	8

1/ Size based on 1955 production.

Table 41.--Number of responding plants using specific devices for mellorine promotion, by States, 1952-1955

Promotional device	Illinois	Missouri	Oklahoma	Texas	Other States 1/
1952:					
Tie-in sales	1	1	1	5	---
Premiums	1	---	---	---	---
Demonstrations	3	1	1	4	---
Free samples	3	1	---	2	---
Plastic containers	---	1	---	---	---
Novelty stunts	---	---	---	1	---
Other	4	2	---	3	---
1953:					
Tie-in sales	---	1	1	6	---
Premiums	---	1	---	---	---
Demonstrations	3	2	1	3	2
Free samples	3	2	---	2	1
Plastic containers	---	---	---	---	---
Novelty stunts	---	---	---	1	---
Other	3	2	---	3	---
1954:					
Tie-in sales	---	1	0	4	---
Premiums	1	2	---	---	---
Demonstrations	3	2	---	3	4
Free samples	4	2	---	2	1
Plastic containers	---	---	---	---	---
Novelty stunts	---	---	---	1	---
Other	3	2	---	3	---
1955:					
Tie-in sales	---	1	---	5	1
Premiums	1	3	---	---	1
Demonstrations	4	2	---	4	4
Free samples	3	2	1	2	1
Plastic containers	---	---	---	---	---
Novelty stunts	---	---	---	1	---
Other	3	2	---	3	---

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

Point-of-sale advertising used the greatest part of budget expenditures for mellorine advertising (table 42). In each of the 4 years for which reports were received (1952-1955), point-of-sale advertising was used most frequently, although producers are apparently shifting their emphasis in favor of newspaper, radio, and other media.

Table 42.--Number of responding plants showing various percentages of mellorine advertising and promotional budget allocated to various classes of media, 1952-1955

Percent	Newspaper	Radio	Point of sale 1/	Other 2/
1952:				
0 to 25 percent	5	3	6	5
25 to 50 percent	3	2	3	1
50 to 75 percent	2	---	---	---
75 to 100 percent	3	---	8	---
0 to 100 percent	13	5	17	6
1953:				
0 to 25 percent	3	5	7	7
25 to 50 percent	6	3	3	1
50 to 75 percent	3	---	2	1
75 to 100 percent	4	---	7	---
0 to 100 percent	16	8	19	9
1954:				
0 to 25 percent	3	5	8	7
25 to 50 percent	6	3	1	2
50 to 75 percent	2	---	2	2
75 to 100 percent	5	---	8	---
0 to 100 percent	16	8	19	11
1955:				
0 to 25 percent	6	8	10	9
25 to 50 percent	6	4	1	4
50 to 75 percent	2	---	---	---
75 to 100 percent	5	---	9	2
0 to 100 percent	19	12	20	15

1/ Includes window displays, placards, signs, etc.
2/ Includes television, handbills, billboards, promotional devices, and other advertising media.

In 1952, point-of-sale advertising was used by 17 plants, while 13 used newspaper advertising and 5 used radio. The remaining 6 plants used "other" media which included television, handbills, billboards, and other advertising and promotional devices.

The year 1953 showed slight relative declines in the use of point-of-sale advertising and newspaper advertising. Slight gains were made in the use of radio advertising and the "other" class of promotion and advertising.

The "other" class increased again in 1954, but the numbers of plants reporting use of each of the other media were unchanged.

Use of point-of-sale advertising in promoting mellorine in 1955 increased less than did use of other media advertising to a point where it was used by only 30 percent of the total who advertised. Radio advertising and the "other" category increased most.

Table 42 shows the percentages of the promotional budget devoted to the various types of advertising by responding plants. Plants which used a single medium to the extent of 75 percent or more of their promotional expenditures, used either newspapers or point-of-sale methods. Radio and "other," when used, were mostly limited to less than $\frac{1}{2}$ of the promotional expenditures. Point-of-sale expenditures up to 25 percent of the promotional budget were also common.

State and plant size data add little to the information on advertising and promotion. They do, however, bear out the assertion that promotion is greatest in the largest and smallest plants.

Of the features emphasized in advertising and promoting mellorine, the respondents to the questionnaire indicated that price was the one most frequently stressed (table 43). In 1952, 43 percent of the respondents who advertised stated that they promoted their product on a price basis. In 1953, the proportion stressing price in their advertising and promotion rose to 54 percent of the total respondents, and remained fairly constant through 1955.

Table 43.--Number of responding plants reporting specific features emphasized in mellorine advertising, 1952-1955

Feature	1952	1953	1954	1955
Price	19	24	26	27
Quality	14	19	22	21
Special flavors	11	12	15	19
Taste appeal	12	13	13	13
Other 1/	6	7	5	5

1/ Includes nutritive value, comparisons to ice cream, etc.

The feature second in rank was the quality of the product. In 1952, 32 percent of the respondents stressed quality. In 1953, the percentage rose to 43, hit a high of 50 in 1954, and returned to 48 in 1955.

Taste appeal accounted for 27 percent of the responses in 1952. In the following three years, it stabilized at 30 percent. Special flavors stood at 25 percent in 1952 and rose in use in each of the succeeding years. In 1955 it was used by 43 percent of the advertisers.

The individual features stressed during these years indicate some change in trends. Price remained almost constant from 1953 through 1955, but, in the other features, some of the shifts may be significant. The common practice of introducing a product with samples--that is, with taste appeal--has declined slightly in importance from the peak year of 1952 when many new firms entered the industry. On the other hand, special flavors and quality have increased in importance. This seems to indicate that mellorine is becoming a familiar product in most of the areas where it is sold, and that more stress, therefore, is being placed on the standard frozen dessert features of quality and special flavors. Examination of the data by States and by plant size showed no significant deviations from the overall pattern.

A study of the gross receipts spent on mellorine advertising and promotion indicates that the responding plants did little promotion before 1952. In that year, 36 percent of the respondents said they spent less than 2 percent of their gross receipts from mellorine on promotion of the product (table 44). Forty-three percent spent between 2 and 4 percent, and 21 percent of them spent between 4 and 6 percent.

Table 44.--Number of responding plants reporting various percentages of gross receipts from mellorine expended on advertising and promoting the product, 1952-1955

Expenditure percent	1952	1953	1954	1955
Under 2 percent	5	6	9	9
2-4 percent	6	8	7	7
4-6 percent	3	2	2	4
6-8 percent	---	---	---	---
More than 8 percent	---	1	2	---

Thirty-five percent of the respondents said they spent less than 2 percent of their gross receipts on mellorine promotion in 1953. An additional 47 percent spent between 2 and 4 percent of their gross receipts, and 12 percent spent between 4 and 6 percent. Six percent of the plants that answered the question reported they spent more than 8 percent of their gross mellorine receipts on promotion of the product.

In 1954, 45 percent of the respondents spent less than 2 percent of their gross mellorine receipts for promotion and advertising. Thirty-five percent

expended between 2 and 4 percent, 10 percent between 4 and 6 percent, and another 10 percent spent over 8 percent.

The 1955 data indicate the breakdown was the same as for 1954, with these exceptions: 20 percent of the respondents who answered said they spent between 4 and 6 percent of their gross receipts from mellorine on mellorine promotion, and no respondents spent over 8 percent.

There appears to be no trend or pattern developing in the amount of gross receipts spent for promotion of mellorine.

Gross Margins

The questionnaire did not ask respondents to report their prices for mellorine. It was felt that differences in the quality of the product, fat content, and differences in local markets would prohibit either addition for summary purposes or distribution for comparison by plant size or by States. However, respondents were asked to compare their own gross margins on mellorine with their margins on ice cream and also to report the comparison for their retailers.

Of those responding to the question, 48 percent said margins on mellorine and ice cream were the same. Forty-one percent said they realized less margin on mellorine, while the rest, 11 percent, reported a larger margin on mellorine (table 45, fig. 6).

These answers seem to be consistent with the reported reasons for entering the industry. Two-thirds of the respondents said they began making mellorine to meet competition, while 24 percent said they entered the industry to extend their market. Since labor, overhead, and the cost of materials other than fat are approximately the same for mellorine and ice cream, one would expect relative margins to be the same or lower to reach the stated objectives. Some producers make mellorine probably to utilize plant capacity and increase their total sales. They would likely accept a lower margin on mellorine. Others would produce mellorine because their competitors do. They would see the sale of mellorine maintaining their total volume of sales and, accordingly, set a margin equal to or nearly equal to that earned on ice cream

Retailers of mellorine evidently have margins, in relation to ice cream, similar to those of manufacturers. Fifty-one percent of the respondents said the margin of their retailers was the same on ice cream and mellorine; 47 percent said the margin on mellorine was the lower of the two. Only 2 percent reported a higher margin for mellorine. The differences between producers and retailers in this respect do not appear significant.

Some differences appear among producers when the data are arranged by plant size. Fifty-six percent of the respondents in class I reported the margin on mellorine and ice cream to be the same; 31 percent said the margin on mellorine was lower, while 13 percent said it was higher.

Table 45.--Gross margin policy for mellorine compared to ice cream in responding plants, by size of plant

Gross margin	Size of plant 1/					
	Under 250,000 gallons	250,000-500,000 gallons	500,000-800,000 gallons	More than 800,000 gallons	Size unknown	Total
Charged by responding plants:						
Less than that for ice cream	12	9	6	9	3	39
Equal to that for ice cream	22	5	6	7	6	46
More than that for ice cream	5	1	1	1	2	10
No answer	1	1	---	2	4	9
Total	40	16	13	19	16	104
Charged by retailers of responding plants:						
Less than that for ice cream	15	10	5	10	4	44
Equal to that for ice cream	20	6	8	7	6	47
More than that for ice cream	2	---	---	---	---	2
No answer	3	---	---	2	6	11
Total	40	16	13	19	16	104

1/ Size based on 1955 production.

Plants in the larger size groups were more inclined to have a lower margin on mellorine. In general, half or more of the plants in each group had lower margins on mellorine. The number of plants in each of the larger size groups was small, therefore the differences among them are not significant.

The distribution by States follows the pattern to be expected from the distribution by size of plant. The States with the largest volume of production, such as Texas and Oklahoma, show the lowest margins in relation to ice cream. Illinois is an exception (table 46). One questionnaire suggested an explanation for this condition. The respondent stated that a price war in the Chicago area had reduced the price of ice cream. This perhaps produced a larger than normal percentage of producers reporting the margin on the two products to be the same.

Retailers for 51 percent of responding producers were reported as pricing mellorine to earn a gross margin equal to that of ice cream. Forty-seven percent showed a lower margin on mellorine, while only 2 percent had a higher margin on the new product.

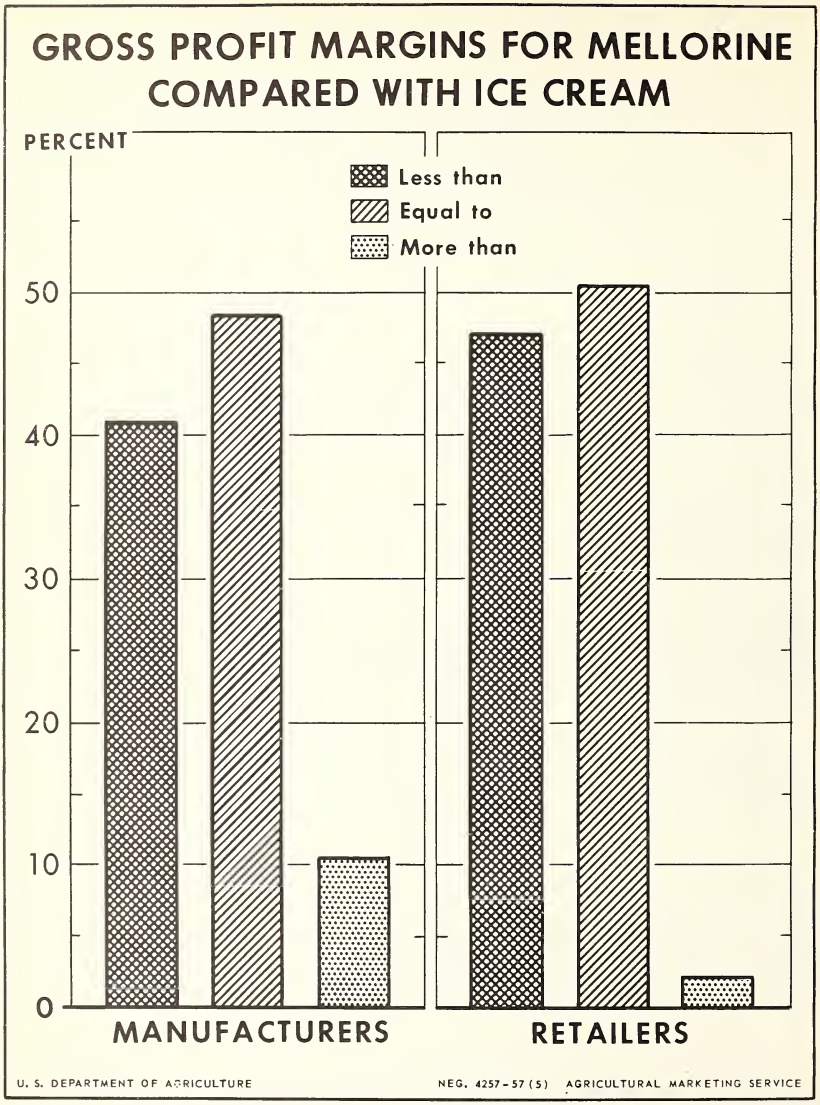
GROSS PROFIT MARGINS FOR MELLORINE COMPARED WITH ICE CREAM
PERCENT
Less than
Equal to
More than
50
40
30
20
10
0
MANUFACTURERS
RETAILERS
U. S. DEPARTMENT OF AGRICULTURE
NEG. 4257-57 (5) AGRICULTURAL MARKETING SERVICE

Figure 6

Table 46.--Gross margin policy for mellorine, compared to ice cream, in responding plants, by States

Gross margin	Illinois	Missouri	Oklahoma	Texas	Other States 1/	Total
Charged by responding plants:						
Less than that for ice cream	6	2	8	15	8	39
Equal to that for ice cream	16	5	5	11	9	46
More than that for ice cream	5	2	---	1	2	10
No answer	2	2	---	4	1	9
Total	29	11	13	31	20	104
Charged by retailers of responding plants:						
Less than that for ice cream	7	1	12	17	7	44
Equal to that for ice cream	21	8	---	8	10	47
More than that for ice cream	---	---	---	1	1	2
No answer	1	2	1	5	2	11
Total	29	11	13	31	20	104

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

The State data show that in Illinois no retailer of responding plants priced the product to show a gross margin for mellorine greater than the margin on ice cream. Seventy-five percent of the plants had retailers receiving equal margins on the two products, and 25 percent receiving a lower margin on mellorine than on ice cream.

In Missouri, 90 percent of the responding plants reported retailers operated on the same margin for mellorine and ice cream, while 10 percent said their retailers received a lower margin on mellorine than on ice cream. There were no instances cited where ice cream margins were less than mellorine margins.

Returns from Oklahoma indicated that all of the retailers received a lower margin for mellorine than for ice cream.

In Texas, retailers for 65 percent of the plants priced their mellorine to show less margin than their ice cream. Thirty-one percent showed retailers making the same margin, and 4 percent priced mellorine to show a larger margin than ice cream.

In the "other States" category, most of the retailers (56 percent of plants) realized the same margin on mellorine and ice cream. Thirty-nine percent made less margin on their mellorine, and 5 percent made more on mellorine than on ice cream.

In three of the five State categories, Illinois, Missouri, and "all other," more retailers apparently priced mellorine to make the margin the same as the margin on ice cream (table 47). Texas and Oklahoma were exceptions. No information helping to explain this condition was obtained from the questionnaire. Local market conditions, such as a price war in mellorine or between mellorine and ice cream, possibly had effects on the pattern.

Table 47.--Mellorine and ice cream gross margins for producers and retailers compared by States

State	Percent of producers		Percent of retailers	
	Margins the same as for ice cream	Margins lower than for ice cream	Margins the same as for ice cream	Margins lower than for ice cream
Illinois	59	22	75	25
Missouri	56	22	90	10
Oklahoma	38	62	0	100
Texas	40	56	31	65
All other States 1/	47	42	56	39

1/ Includes Alabama, Arkansas, California, Montana, Oregon, and South Carolina. See footnote 1/, table 5.

Implications

Several times in this report--in the discussion of production based on both data from the questionnaire and data from the United States Department of Agriculture--the inference has been drawn that mellorine production in the States where this product is sold has increased through the years but at a decreasing rate. The data on marketing substantiate this inference.

The meaning of this change in the rate of increase in production and sale of mellorine is not entirely clear from the information available.

The trend in the relation between sales of ice cream and sales of other frozen desserts in these 12 States is not clearly evident from responses to the questionnaire. In most years for which responses were received, more of the producers of mellorine reported an annual increase in their sales of mellorine, ice milk, and sherbet than reported increased sales of ice cream. Nevertheless, ice cream remained the principal choice of consumers in the States where mellorine was sold during the years 1952-1954 (table 48). However, there is some evidence, particularly in Texas, Oklahoma, and Illinois, that the per

Table 48.--Per capita production in quarts for ice cream and related products in States where mellorine is made, 1952-1954

State	1952			1953			1954		
	Ice cream and related	Ice cream	Difference	Ice cream and related	Ice cream	Difference	Ice cream and related	Ice cream	Difference
Alabama	12.63	9.57	3.06	13.79	9.63	4.16	14.87	10.64	4.23
Arkansas	7.56	4.42	3.14	8.58	4.81	3.77	10.02	4.56	4.28
California	21.50	15.51	5.99	22.30	15.09	7.21	22.23	13.81	8.42
Illinois	19.90	14.56	5.34	19.74	13.19	6.55	18.94	12.74	6.20
Missouri	24.09	16.37	7.72	24.36	15.61	8.75	22.89	15.49	7.40
Montana	20.91	21.13	.78	21.00	17.61	3.39	20.30	16.02	4.28
Nevada	23.32	16.37	6.95	25.35	18.22	7.13	20.61	13.73	6.88
Oklahoma	15.63	11.14	4.49	17.58	9.50	8.08	19.65	9.48	10.17
Oregon	22.09	16.29	5.80	20.74	14.96	5.78	19.62	13.63	5.99
South Carolina	5.71	4.42	1.29	6.65	4.81	1.84	6.47	4.56	1.91
Texas	16.65	10.79	5.86	18.67	9.88	8.79	20.04	9.14	10.90

Source: International Association of Ice Cream Manufacturers, Sales Index, 1955, pp. 48 and 63.

capita consumption of ice cream is diminishing while the per capita consumption of other frozen desserts is increasing.

The validity of this evidence is strengthened when the rate of production of ice cream is compared to the rate of production for all frozen desserts for the country as a whole (fig. 7). In the 1920's and early 1930's, ice cream was almost the only frozen dessert. Then, in 1932, new products began to appear. From that depression year, production of frozen desserts other than ice cream began to increase. This increase was rapid during World War II, when butterfat for ice cream was short in supply and when the effective demand for frozen desserts increased. The gap between production of ice cream and of all frozen desserts was narrowed in 1945 and 1946, when rationing and price control were removed. It has been increasing since 1947, particularly after 1950 when mellorine gained legalization in more States.

A number of explanations for these trends suggest themselves. The per capita consumption of all frozen desserts has been increasing, indicating a strong effective demand for such products. There has been a more rapid increase in sales of low-fat products; mellorine producers reporting annual increases in their sales of sherbet and ice milk. Finally, the current controversy over the health significance of fat in the diet may be influencing consumer preferences 9/.

The fact that ice cream began to lose some of its prominence in the field during the depression years indicates that producers were attempting to extend their markets by offering consumers a low-priced product. That this factor is now at work in the markets where mellorine is sold is indicated by the fact that 24 percent of the respondents said they entered the mellorine industry specifically for this purpose and that 66 percent said they entered the industry to meet competition, which is, in another sense, an attempt to extend markets. The evidence that price is a factor in the growth of production and sale of mellorine is strengthened by the fact that producers stressed the relatively low cost of their product in their advertising.

CONCLUSIONS

Resources for the production of mellorine have been available to producers for years in the form of vegetable oils and animal fats. Capital also has been available, without additional investment in most cases, because the product can be made with the same equipment used for making ice cream. Knowledge of how to use fats other than milk fats in frozen desserts existed during the late 1940's, borrowed from the past and from abroad. Some stimulus was needed to impel producers to organize this knowledge and extend it to the point where a new product, mellorine, might emerge to be sold widely in the United States.

9/ Grant, H. B., "An Editorial," Ice Cream Field, Vol. 59, No. 6, June 1952, p. 21.

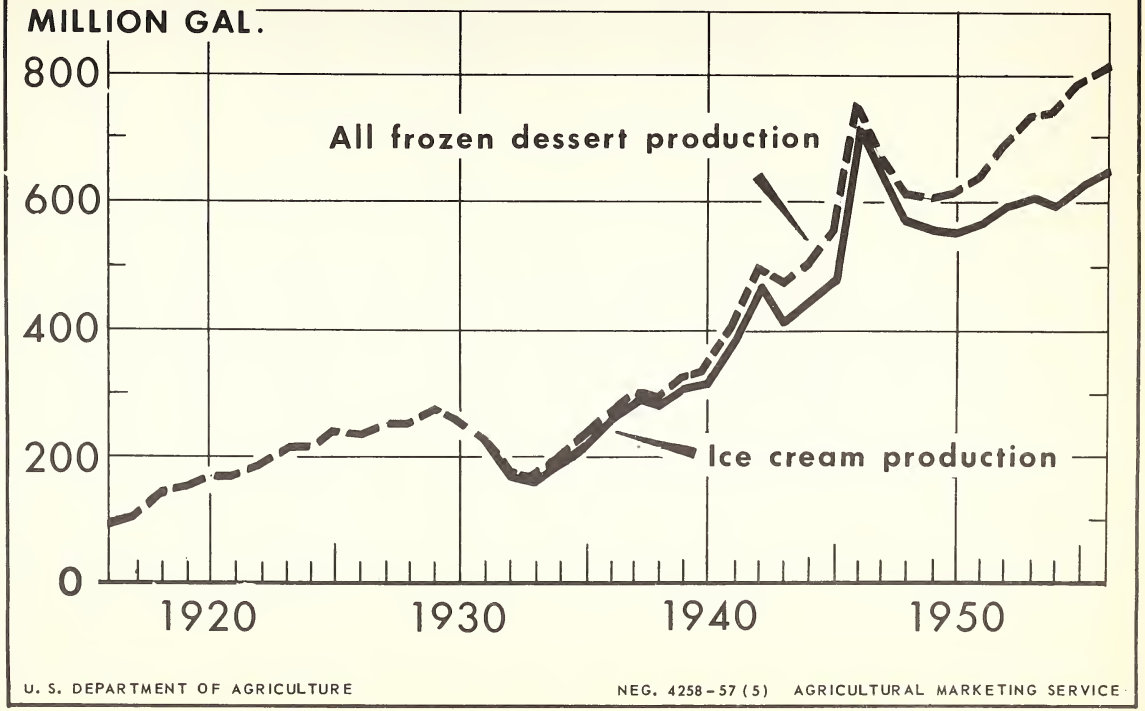
FROZEN DESSERT PRODUCTION
United States, 1916-56
MILLION GAL.
800
600
400
200
0
All frozen dessert production
Ice cream production
1920
1930
1940
1950
U. S. DEPARTMENT OF AGRICULTURE
NEG. 4258-57 (5) AGRICULTURAL MARKETING SERVICE

Figure 7

The stimulus came in the 1940's when, apparently, the effective demand for ice cream was rising rapidly, milk fat supplies were low relative to demand, and a shift occurred toward acceptance of substitute products. Producers did not immediately offer the fully developed product, mellorine. Rather, evidence shows they mixed vegetable oils with butterfat, probably in attempts to reduce their supply prices, to augment low supplies of butterfat, to experiment with consumers' tastes and preferences, and to confirm their new knowledge about the use of new resources with existing technical equipment.

This "mixing" stage soon disappeared and a new product, mellorine, emerged when tentative knowledge was confirmed and it was learned that consumers would accept the product.

A pattern by which producers, particularly in Texas, Oklahoma, Illinois, and Missouri, entered the new industry soon emerged:

1. The small plants (classes I and II) entered the industry generally before the larger plants (classes III and IV).

2. Most of the plants in the States with the greatest volume in 1955 delayed entry until there was some evidence that the product could be made successfully and that there was an effective demand.

Entry of the innovators and early imitators created a new condition in the local markets for ice cream and other frozen desserts. Most producers of frozen desserts were interested in conserving the market for ice cream and its institutional arrangements--that is, the kinds of firms in it, and the laws and regulations affecting it. Those who introduced mellorine were concerned with changing those institutional arrangements, if necessary, so they could sell their product. State governments and administrative agencies accepted their responsibility for protecting consumers and producers by establishing standards of identity and by reconciling differences between conflicting interests.

The third phase in the development of mellorine, when laws and regulations were established and changed, broadened greatly in 1953, when six States followed the lead of Texas and California. Two observations can be made in connection with this development:

3. The vast majority of producers in the primary producing States did not wait for specific enabling legislation before entering the industry.

4. The legislation in 1953 apparently did not result in any great increase in the number of producers. It was accompanied by the entry of a few producers in a larger number of States.

Two main reasons for entering the industry were ascertained from the questionnaire. These answers indicate that producers felt that there was an

effective demand for mellorine, which threatened to reduce the volume of their ice cream and other frozen dessert products unless they entered the industry. The answers show:

5. The principal reasons for entry into the industry were: (1) To meet competition of other producers and (2) to extend the volume of a producer's sales.

The existence of this demand was apparently associated with two important market changes:

6. While ice cream remains the principal frozen dessert, an increasing number of consumers in these 12 States are accepting a frozen dessert made from vegetable oils, animal fats, or both.

7. The lower price of mellorine in relation to ice cream was increasingly attractive to consumers in these States. This situation was apparently recognized by producers who, after an introduction period when they attempted to induce consumers to taste their product, stressed the price of mellorine in their advertising more than any other single feature.

Relatively few plants have discontinued the production of mellorine. No single difficulty or insolvable problem seems to account for discontinuances. A study of the reasons reported on the questionnaire provides only one generalization:

8. Few, if any, producers encountered production problems unique to mellorine. Those that discontinued production of the product were generally small plants that were probably encountering production problems associated generally with the frozen dessert industry.

Some time could be expected to elapse, after the introduction of a new product and its acceptance by consumers, before a pattern of production would emerge. This was the case with mellorine. Although definitive conclusions cannot be drawn from data for such a short period of time, there is evidence of a production pattern taking shape:

9. The small plants (classes I and II) in recent years apparently have been producing a smaller percentage of the total mellorine production than formerly. These data suggest, although they do not prove, the possibility of concentration in the industry.

10. An increasing number of plants in all size categories are producing mellorine mix for sale to others. There is some evidence of a growing specialization in this aspect of the industry, particularly in Texas, Illinois, and Oklahoma.

Producers would be expected to encounter production problems associated with a new product. This was the case with mellorine. Except in a few instances, and those generally in the small plants, these problems were not of sufficient difficulty to induce producers to discontinue operations. Some of these problems, such as shrinkage and obtaining the desired overrun, are common to all frozen desserts. Another, fat globules adhering to the walls of the mixing vats, has proved difficult to overcome. The literature indicates, however, that some progress is being made. Small plants (class I) seem to have some difficulty in obtaining a satisfactory flavor. However, this did not seem to be an important problem in larger plants. Generalization about production problems is difficult. However, the following, only tentative, seems to be the case:

11. The small plants (class I) were the only group to report a major production problem. This was difficulty with flavoring.

12. Approximately two-thirds of the small plants reporting said they had a production problem, such as difficulty with flavoring, shrinkage, difficulty in stabilizing and emulsifying, and nonuniformity of the fat.

13. More than three-fourths of the large plants (class IV) reported production problems of some kind. However, no single problem was of special prominence as was the case with the small producers.

14. A smaller percentage of the class II and class III plants reported production problems. As in the case of class IV plants, no single problem was of major importance in these two categories.

A review of the State laws would lead one to expect a large proportion of producers to report that their product was fortified with vitamins. The survey did not reveal this to be the case. What is more, this observation did not change when the data were distributed by plant size or by States. No explanation for this situation is available.

An analysis of marketing practices reported by producers of mellorine reveals some interesting results, some expected and some unique within the industry. A substantial percentage of respondents reported annual increases in their sales for the years 1949 to 1955. Of particular significance was the fact that these reports suggest:

15. The future of mellorine production in the 12 States where the product is made, as reflected by the percentage of producers reporting an annual increase in sales, appeared most promising in the years 1951 and 1952, when the largest number of producers entered the industry.

16. Local variations in the production of ice cream, ice milk, and sherbet by producers of mellorine apparently follow closely the national trends in production of these products.

Apparently a pattern has been established in these States for distributing mellorine, and apparently the pattern does not vary significantly among the States with the larger volumes of sales. Bulk sales through confectioneries and drugstores have declined to a minor part of total sales. Most of the sales by producers are to supermarkets and other grocery stores. The type of outlet, or choice between the two, evidently depends a great deal on plant size.

17. The small plants (class I) are tending to distribute more and more through grocery stores other than supermarkets while the larger plants (classes II, III, and IV) are tending to distribute most of their product through supermarkets.

18. Most of the unfrozen mellorine mix sold, approximately 85 percent, is distributed through drive-in stands.

The pattern of distribution has had some effect upon package size. In the States where sold, mellorine increasingly is becoming a product for home consumption and for consumption at drive-in stands.

19. Most of the mellorine sold by producers in recent years (almost 60 percent in 1955) is sold in half-gallon packages. This pattern of distribution applies to all the States where the product is sold in significant volume. Only in Illinois, where quart packages approached the volume of half-gallon size (31 percent as compared to 37 percent), was there any significant deviation from the pattern.

Respondents did not report extensive or vigorous advertising of mellorine generally. More than half said they did no promotion or advertising; no significant differences appeared when these responses were distributed by plant size or by States. Only in Missouri, where the number (11) of respondents was relatively small, did advertising and promotion seem significant to producers generally. The answers from this State were almost evenly divided between those who did and those who did not advertise. There is some evidence that a few independent, very profitable producers specializing in the distribution of mellorine and a few large companies producing the product successfully have had vigorous advertising and promotional campaigns 10/. Then, too, the questionnaire was not designed to reveal the part played, if any, by institutional advertising or by the advertising of a brand name. These conclusions may be reached:

10/ Ice Cream Field, Vol. 59, No. 6, June 1952, pp. 20, 28.

20. Demonstrations at the point of sale have become increasingly important as a means of promoting mellorine when promotion is used.

21. Newspapers have been and are an important medium for advertising the product.

22. Price, quality, and special flavors are the principal features emphasized in advertising mellorine.

23. When advertising is used, the amount expended is usually less than 4 percent of the company's gross receipts from mellorine.

Most producers entered the industry to meet competition or to extend the volume of their sales. It might be expected, therefore, that the profit margins on mellorine would be the same or less than the profit margins on ice cream and other frozen desserts. That was the case generally. However, the data raise some questions: Are those reporting higher margins for mellorine what might be called marginal operators trying to recover some of the profit not forthcoming from ice cream? To what extent are those with lower margins specializing in the production of mellorine? 11/ These and other important questions need answering before the full significance of the data associated with profit margins can be uncovered. The following conclusion may be reached:

24. Profit margins for producers and for those retailing the product of the responding producers tended to be the same or lower than profit margins on ice cream. Distribution by plant size or location produced no significant differences in these findings.

Ice cream remains the principal frozen dessert for the country as a whole and in those States where mellorine is produced. There is some evidence, however, that the per capita production of ice cream is diminishing in these latter States and that the per capita production of frozen desserts other than ice cream is increasing. This evidence can be extended to the country as a whole when the annual rate of production for ice cream is compared to the annual rate of production for all frozen desserts.

25. The effective demand for frozen desserts as a whole has remained strong in recent years.

26. There have been relatively large increases in the low-fat frozen products as compared with ice cream.

11/ Myrick, N., "Vegetable Fat Challenges Ice Cream." American Milk Review, Vol. 14, No. 12, December 1952, p. 14.

27. There is also some evidence that producers have maintained or extended their markets for frozen desserts by offering increasing amounts of low-priced products, particularly mellorine.

28. The production of mellorine has been increasing at a decreasing rate. This suggests that the markets where mellorine is produced and sold are approaching a limit.

As an industry, the production and distribution of mellorine remains localized, largely limited to Texas, Oklahoma, Missouri, and Illinois and to local areas in the other States where the product is legal. The evidence indicates that markets for the product in these States have been growing, but recently at a decreasing rate.

Apparently some of this expansion in market has been in competition with ice cream. The evidence is, however, that much of the demand is not for a substitute for ice cream. The low price of mellorine in relation to ice cream offers a frozen dessert to some consumers in these 12 States who, because their income is low, would not be in the market for ice cream at the present level of prices. The fact that ice cream production in these 12 States has not kept pace with the growth in the frozen dessert industry as a whole in these States is partly a matter of changing consumer tastes and preferences. Even a lower price for a food might not attract persons consciously restricting their intake of that food as a means of reducing their calorie and fat consumption.

Since the production and distribution of mellorine is localized, further understanding of the industry's structure and operations must await more detailed study of particular markets. Only when these studies have been made will it be possible to describe more concretely and precisely the character and prospects of the industry. Only when local markets have been studied in more detail will it be possible to draw further inferences about the impact of mellorine on the related agricultural industries.

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