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Judging Quality in Dairy Products

P. A. Downs

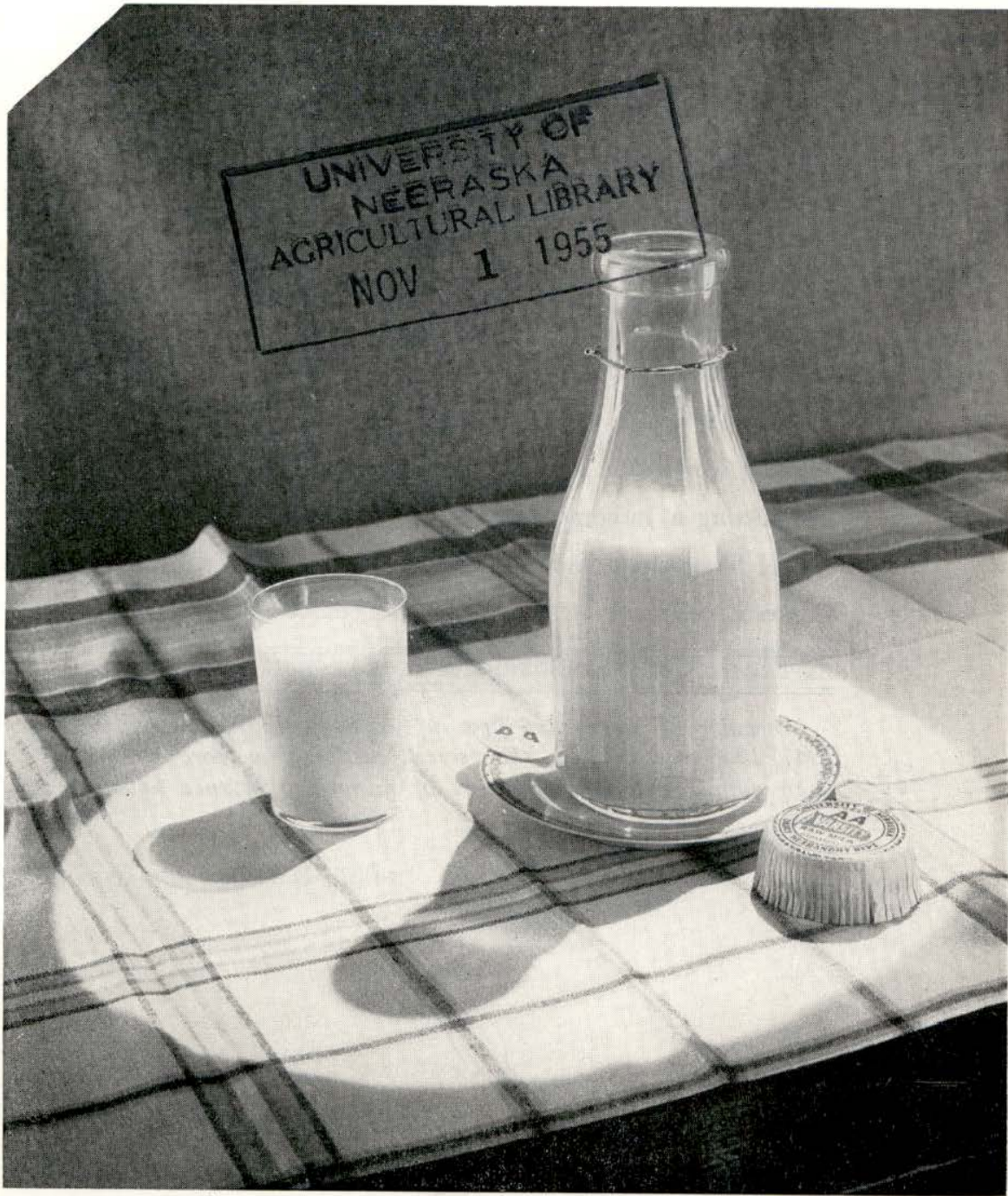
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JUDGING QUALITY IN DAIRY PRODUCTS



The Agricultural Experiment Station
of the University of Nebraska College of Agriculture
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Circular 54 was issued first in February, 1937, and revised in 1941, 1948 and 1955. In the present edition new score cards have been added and other changes of minor importance have been made.

(2-37-6M) (9-41-6M) (7-48-3M) (9-55-3M)

Judging Quality in Dairy Products

P. A. DOWNS

Department of Dairy Husbandry

IN THE DAIRY INDUSTRY increasing attention is being paid to the question of quality of products. The well established system of buying and selling butter and cheese on the basis of quality by score or grade is practiced in the principal markets of the world. The other dairy products, while not marketed by score, are receiving more and more attention in this respect. As more information becomes available and the judging becomes better standardized, other dairy products will doubtless be sold by grade.

PERSONAL QUALIFICATIONS FOR JUDGING DAIRY PRODUCTS

Tasting really includes both taste and smell. Strictly speaking, taste includes sweetness, bitterness, sourness, and saltiness, or a combination of these. They are sensed only by the minute organs called "taste buds" on the base of the tongue, and no other tastes are known. All material must be soluble in order to have a taste.

Most of what is ordinarily considered as taste is really derived from the sense of smell. Odors are detected by the olfactory nerve located in the nose. When food is chewed, it is not only broken up but also warmed in the mouth so that the volatile odors or aromas are liberated. With the mouth closed, these odors find their way through the nose, where they are detected by this nerve. If it is desired to distinguish the fine odors of a product, it should *not* be examined in a cold room, and cold material should be warmed to a temperature approaching 98° F. Ice cream should be held on the tongue until it is warmed to body temperature. The presence of perfume, strong-smelling soap, tobacco, or any other material of like nature will interfere with the detection of flavors and odors of dairy products.

That people differ in the ability to taste—that is, to detect the presence of sour, sweet, bitter, and salt—has been demonstrated by Blakeslee and Fox.¹ By the use of a test paper they have shown that the inability to taste is apparently transmitted as a Mendelian character. On the average, three out of ten persons failed to get a definitely bitter taste from the paper. While the inability to taste this material may not indicate inability to taste other materials that are bitter, it does show that not all persons have the same tasting ability. Some people may have a keener sense of smell than others and can detect odors more easily. Proper education and training in the art of tasting and classifying flavors and odors may, however, improve this ability.

SCORE CARDS FOR DAIRY PRODUCTS

In the judging of dairy products it has been necessary to develop score cards suitable for both commercial and school use. While these score cards are basically alike, more detailed descriptions are found on the student cards. On the other hand, as in the case of the student cards for milk, cream, and

¹ A. F. Blakeslee and A. L. Fox, Tasters and Non-Tasters, Jour. Heredity, Vol. 28, No. 3, March, 1932.

MILK SCORE CARD

Contestant No. _____

Place scores opposite the rating for perfect score. Check criticism in space opposite the defect noted in proper sample column. Write in other criticisms if necessary. Do NOT write in space indicating grade. Total the score of each sample. Use black pencil.

Perfect score	Criticisms	Sample No.										Summary of contestant grades	
		1	2	3	4	5	6	7	8	9	10		
FLAVOR 45	Contestant score												
	Grade on score												
	criticism												
	Barny												
	Bitter												
	Cooked												
	Cow												
	Feed												
	Flat												
	Foreign												
	Garlic or onion												
	High acid												
	Malty												
	Metallic												
	Musty												
	Oxidized												
	Rancid												
	Salty												
	Unclean												
	Weedy												
SEDIMENT 10	Contestant score												
	Grade on score												
CONTAINER AND CLOSURE 5	Contestant score												
	Grade on score												
	criticism												
	Closure—												
	Cover torn												
	Not sealed												
	Poorly seated, or leaky												
	Container—												
	Dented												
	Leaky												
	Not clean inside												
	Not full												
	Pouring Lip—												
	Chipped												
	Cover not waterproof												
	Not protected												
	Partly protected												
BACTERIA 35	Allowed perfect in contest	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
TEMPERATURE 5	Allowed perfect in contest	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
TOTAL 100	Total score of each sample												
	Total grade per sample												

FINAL GRADE

RANK

FLAVOR: No criticism: 40 to 45; normal range: 30 to 40
SEDIMENT: (Not criticized); normal range: 8 to 10
CONTAINER AND CLOSURE: No criticism: 5; normal range: 3 to 5
BACTERIA: (Allowed perfect in contest)
TEMPERATURE: (Allowed perfect in contest)

TEAM RANK

Code	Grade
1	
2	
3	
Total	
Rank	

INDIVIDUAL RANK—ALL PRODUCTS

PRODUCT	GRADE	RANK
MILK		
BUTTER		
CHEESE		
ICE CREAM		
TOTAL		

RANK

NOTE: This score card is also used for scoring cream.

ice cream, certain factors such as bacteria count and street temperature are not used in the actual process of judging, because these qualities can be determined accurately only by laboratory methods.

In the development of judging work, especially in connection with educational phases, the American Dairy Science Association through its committee on judging of dairy products recommends certain changes in score cards from time to time. Usually the changes are confined to details of special interest to the educator rather than the commercial judge. Basic changes in the scoring of these products usually originate in such organizations as the Agricultural Research Service and the Bureau of Dairy Industry, or some other organization interested in the commercial grading of these products.

The methods of scoring milk and grading butter and cheese, while well established, are not considered perfect. In the case of butter a radical departure from the present system of judging has been adopted by the Agricultural Marketing Service, U. S. Department of Agriculture, but has not been adopted in contest judging. The material set forth in this publication is in general that utilized by the dairy industry and approved by the American Dairy Science Association. Certain modifications have been recommended for instructional purposes.

JUDGING MILK

The judging of milk is carried on under various conditions and often made use of by producers in an effort to improve the quality of the milk delivered. Educational scoring contests are used to advantage in milk-improvement programs and as a part of the regular inspection system of city health departments. In commercial milk organizations the practice of judging samples of their own product in comparison with their competitors' encourages the marketing of higher-quality milk. The judging of milk in colleges, high schools, and in connection with 4-H club work throughout the United States has been very successful. The information obtained in this way should awaken an interest in better milk with the producer as well as the consumer.

Milk Score Cards and Their Use

The card developed by the federal Bureau of Dairy Industry is used where laboratory facilities permit and includes the factors of bacteria count and street temperature or acidity. Directions for scoring are given on the back of the card, and details can be found in Circular 384, "How to Conduct Milk and Cream Contests," by C. J. Babcock and C. S. Leete, U. S. Department of Agriculture, 1929. Score cards may be obtained in separate form. The bacteria count is determined by the plate method and acidity by titration.

A score card used for instructional purposes and for judging milk where laboratory facilities are not available is shown (page 4). It agrees in all essentials with the card of the U. S. Department of Agriculture. Certain factors (bacteria count and temperature or acidity) are not scored and are considered as perfect on the card. Definitions of terms describing faults are furnished with other materials to the student.

Judging Procedure

The order of judging will depend upon the situation. In all cases samples should be kept at a temperature below 50° F. until examined for flavor. The scoring for bottle and cap must be carried out before the bottle is opened. If only one sample is available and bacteria count, acidity, or street tempera-

ture are desired, they should be determined as soon as possible in the order named. These should be followed by the determination of flavor and sediment.

Flavor and odor.—Before milk is scored for flavor and odor, the bottles of milk should be brought to a temperature of 60° F. Faint odors are more easily detected at this temperature than when milk is cold. Scoring should be done in a room free from odors. The sample should be well mixed before being opened, and part of the contents should be poured into a clean cup or glass. Smell at once the open container of milk and note any odor that may be present. Flavors are determined by tasting the milk. It is well to sip the milk slowly and allow it to remain in contact with the tongue for a short time. During this time the mouth should be closed and the breath slowly passed out through the nose. Odors that may have been overlooked by the first smelling are usually detected by this method. The cups or glasses should be rinsed with water before new samples are poured in, and the judge may rinse his mouth with water or chew a piece of apple.

Description of Flavor ^{2 3}	Score
Pleasant, full flavor, free from defects (no criticism)	40.0 to 41.0
Lacking full flavor, flat, slight feed, slightly cooked	37.5 to 39.5
Cooked flavor, feed, slightly salty, slightly cowy, slight metallic, slightly bitter, slightly weedy, slightly malty, slightly oxidized or slightly barny	34.0 to 37.0
Pronounced feed, weedy, slight garlic, bitter, unclean, musty, cowy, barny, slightly acidy, slightly rancid, oxidized, or salty	25.0 to 33.5
Rancid, pronounced cowy, acidy, or pronounced bitter or garlic	0.0 to 24.5

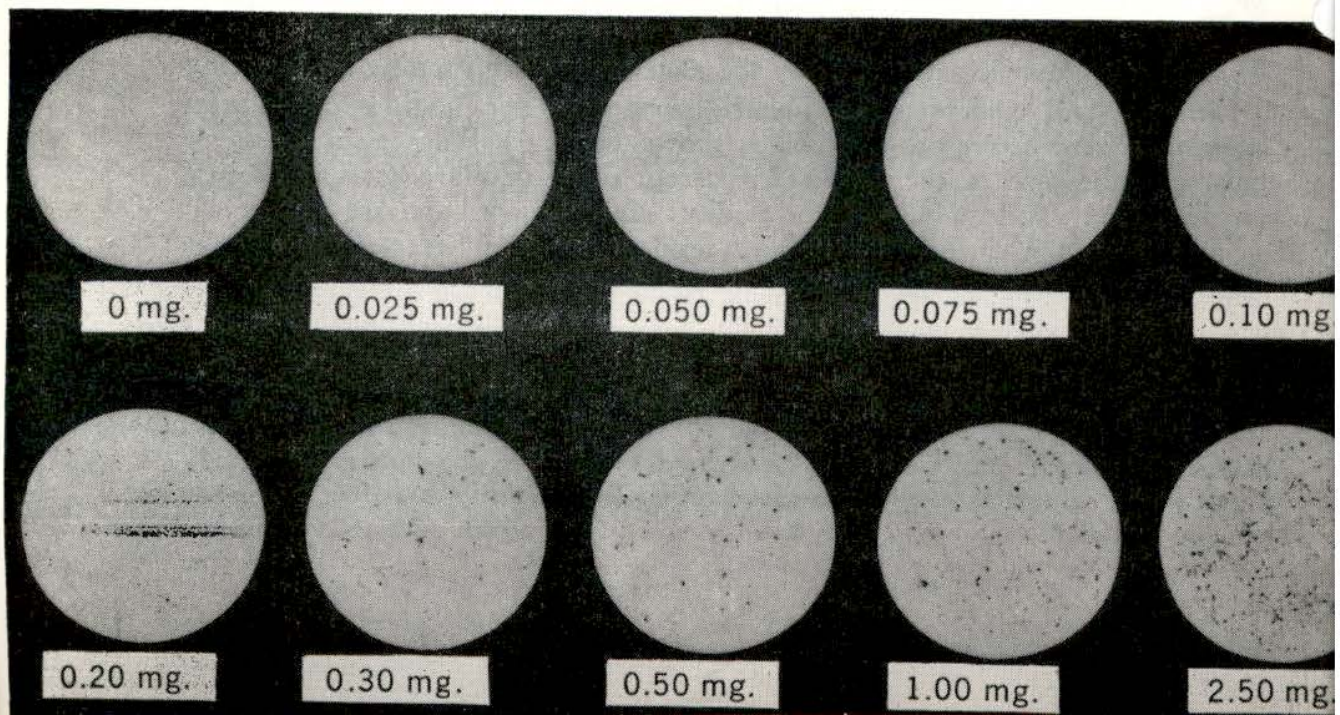
Samples that are sour or have disinfectant or other off flavors so pronounced as to make the milk unsalable must score 0 in flavor and odor. Deductions of less than half points are not used except in case of a tie, when quarter points are used.

² Detailed guide on page 38.

³ Explanation of terms with respect to flavor:

- (1) Slight: Detected only upon critical examination.
- (2) Definite: Not intense but readily detectable.
- (3) Pronounced: Intense.

FIGURE 1.—United States Department of Agriculture sediment standards for milk and milk products.



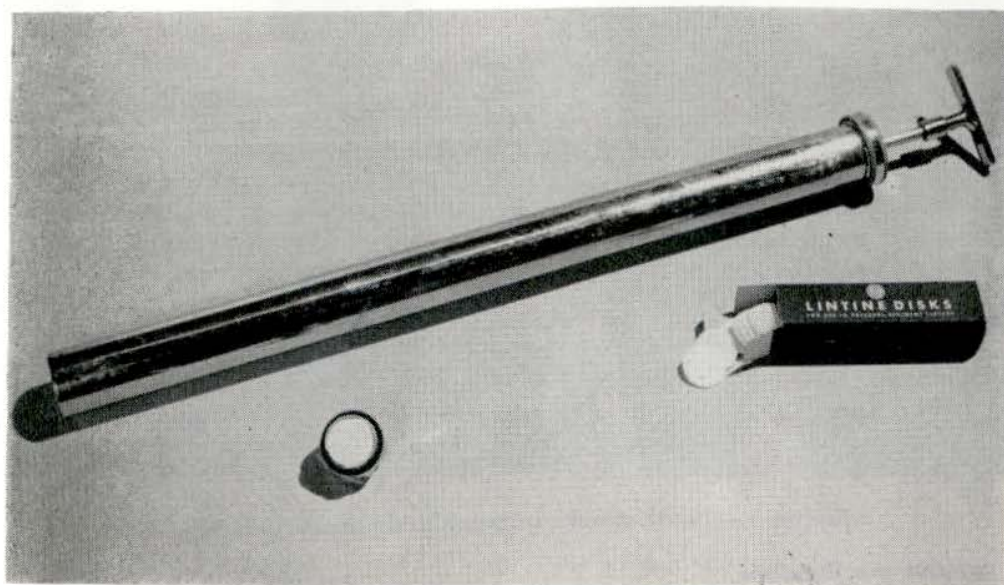
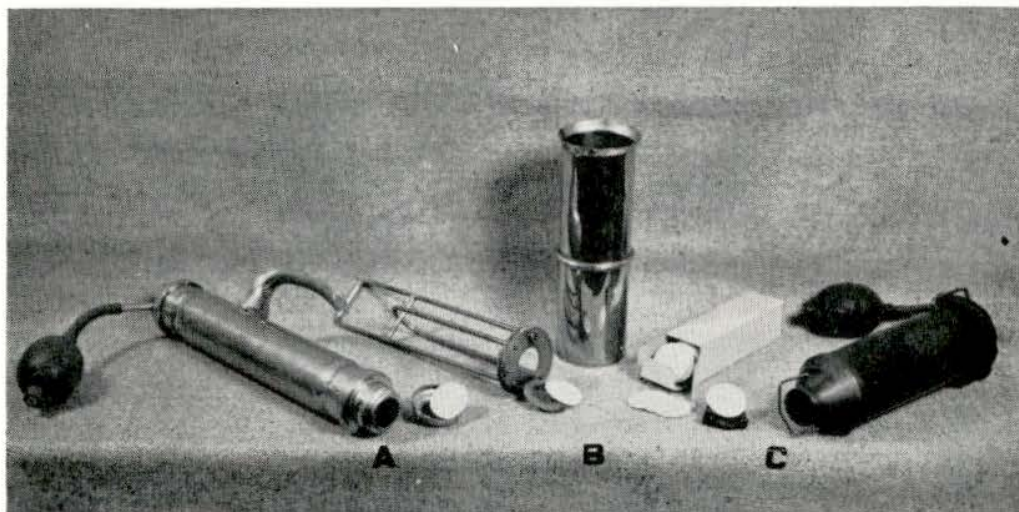


FIGURE 2.—*Top*: Different types of sediment testers, with cotton disks. *Bottom*: Off the bottom of can sediment tester.

Sediment.—Sediment may be scored either by direct observation of the bottom of the bottle or by the use of the sediment tester disk (Fig. 1). The latter method is preferable where the equipment (Fig. 2) is available. When sediment is scored in the bottle, the samples should stand undisturbed for at least an hour before being scored. Each bottle is then examined in a good light by lifting carefully without tipping until the bottom can be seen. To score "perfect," not so much as a single movable speck is allowable in the bottom of the bottle. When sediment is present, points must be deducted according to the quality. The following scores are suggested if a pint of milk is being scored.

Number of Tiny Particles	Score	Number of Tiny Particles	Score
No perceptible trace.....	10.0	Four to six	9.7
One or two	9.9	Six to eight	9.6
Two to four.....	9.8	Eight to ten	9.5

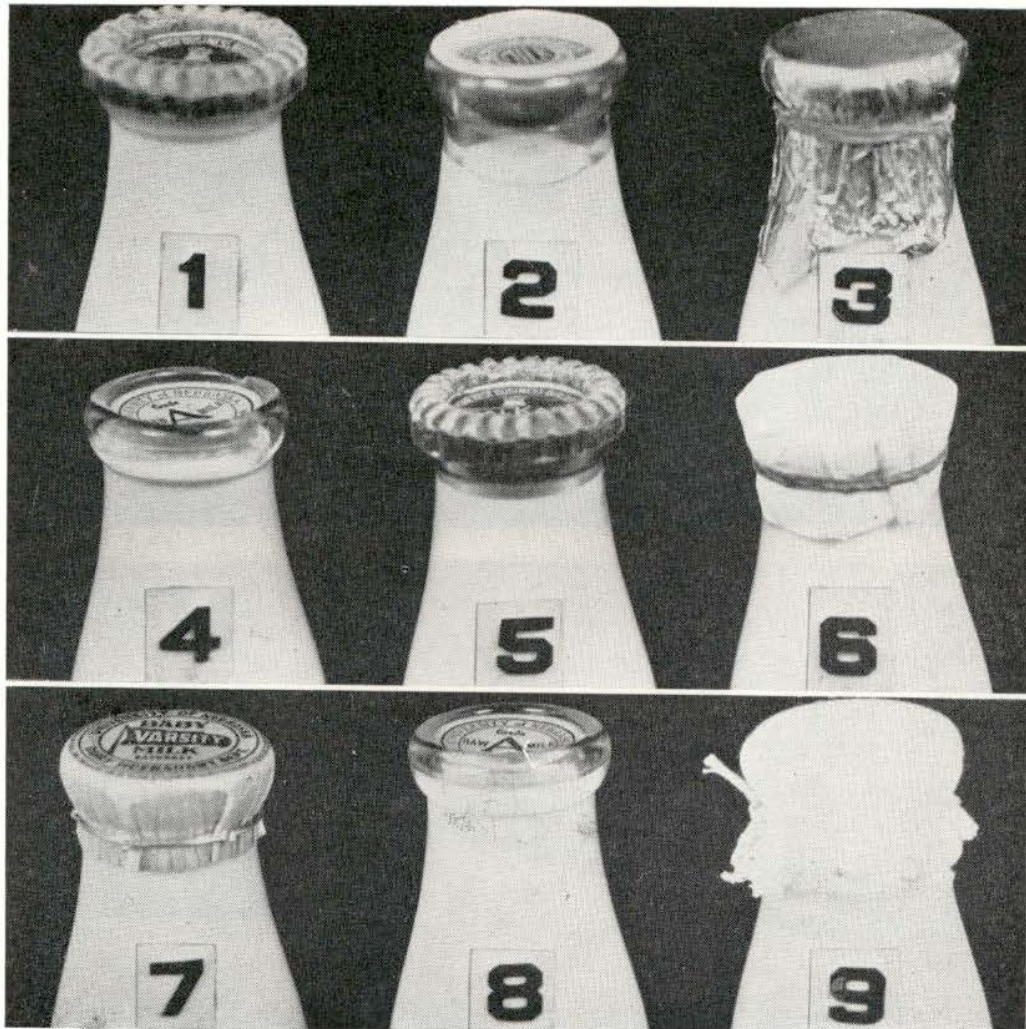


FIGURE 3.—Bottle samples prepared to show certain faults.

Criticisms and Deductions	Score
1. Bottle closure unsealed (0.25).....	4.75
2. Lip partly protected (0.50); bottle not full (0.50); bottle closure unsealed (0.25).....	3.75
3. Bottle closure unsealed (0.25).....	4.75
4. Lip unprotected (1.0); chipped lip (0.25); bottle closure unsealed (0.25).....	3.50
5. Bottle not full (0.50); bottle closure unsealed (0.25).....	4.25
6. Lip cover non-waterproof (0.50); bottle closure unsealed (0.25).....	4.25
7. None (perfect score).....	5.00
8. Lip unprotected (1.0); bottle closure unsealed (0.25).....	3.75
9. Lip cover non-waterproof (0.50); bottle closure unsealed (0.25).....	4.25

Further deductions are based on quality and character of sediment. For instance, a hair would cause a 0.5 point cut.

When a sediment tester is available the sediment may be scored by grading the sediment disk from one pint of milk. If the milk is warmed slightly before it is run through the tester, it will pass through the cotton disk much more quickly. A perfectly clean disk will score 10 with deductions for increasing amounts of sediment. The following tabulation will give an idea of the numerical ratings given to the disks. While only point deductions are shown, finer gradings are often made. Usually whole points are used between 0 and 9, and half points between 9 and 9.5, and one-tenth points between 9.5 and 10. (See suggested scores in paragraph above for this last group.)

Sediment in cans of milk can be determined by the use of an off bottom of the can sediment test (figure 2 Bottom) which filters one pint of milk through the disk.

The U. S. Department of Agriculture Sediment Standards for milk and milk products show the disks when they contain different amounts of sediment in a pint of milk. (These standard charts may be obtained from the U. S. Department of Agriculture, Agr. Marketing Service, Dairy Division, Washington 25, D.C.)

When the sediment from a pint of milk corresponds to a disk shown in Figure 1 the following numerical rating can be applied. For off bottom samples before stirring, score whole points only.

Milligrams of Sediment per Pint	Numerical Rating or Score
0.000	10
0.025	9.9
0.050	9.7
0.075	9.5
0.10	9
0.20	8
0.30	7
0.40	6
0.50	5
1.00	4
1.50	3
2.00	2
2.50	1
over 2.50	0

Container and Closure.—All samples should be in milk bottles or paper containers. Deductions in score are made for dirty or chipped bottles, bottles not full, and for caps which do not cover the lips of the bottles, or that do not fit properly in the cap seats (Figs. 3 and 4). The top of the bottle may be covered with parchment paper, metal foil, or some other covering impervious to water and dust. To obtain a perfect score, the covering must be sealed so securely that it cannot be removed without breaking the seal. If



FIGURE 4.—Paper container samples prepared to show certain faults.

Criticisms and Deductions	Score
1. None (perfect score).....	5.00
2. Lip partly protected, unsealed (0.50).....	4.25
3. None (perfect score).....	5.00
4. Bottle closure unsealed (0.25).....	4.75

the bottle is closed with the usual cardboard milk cap, the pouring lip is unprotected and the closure is unsealed.

Type of Defect	Deduction
Bottle closure unsealed	0.25
Bottle not full (milk line below lip roll)	0.5
Bottle dirty on the inside	1.0
Cap poorly seated or leaky (if uncovered)	1.0
Lip chipped	0.25
Lip unprotected	1.0
Lip partly protected	0.5
Lip cover non-waterproof	0.5
Torn bottle cap non-waterproof	0.5

When paper containers or dummies are used, they shall be considered as being full of milk.

Can and Cover.—When milk is scored in the Future Farmers of America National Contest⁴ the can and cover are scored in place of container and closure as for bottled milk.

The following cuts are given in their rules and regulations:

Type of Defect	Deduction
Can or cover dirty on inside	0.5
Can or cover open seams	0.5
Can milk stone on inner surface	0.5
Can or cover—rusty on inside	0.5
Can wet or moist on inside	0.5
Can leaky	0.5
Can dented badly to hinder cleaning	0.5
Cover non-waterproof (lid with hole in it)	0.5
Cover plug type (umbrella type gets full credit)	0.5
Cover poorly seated	0.5

A combination of undesirable factors may score the can and cover zero.

Terms Used in Judging Milk

Flavor Criticisms

ACIDY—As bacteria grow in milk they change the lactose to lactic acid. The first appearance of such action is referred to as “acidic.” A pronounced acidic flavor is called “sour.”

BITTER—A bitter taste may be caused by stripper cows, bacterial action, or certain feeds.

COOKED—A custard caramel flavor caused by pasteurization or heating milk to too high temperature.

COWY—A flavor or odor which resembles the smell of cows. This flavor usually indicates a lack of cleanliness in the barn, where the milk absorbs the cowy odor while being handled.

DISINFECTANT—Any flavor which might be due to the use of chemical disinfectants around the cows. Very objectionable and easily avoided.

FEED or FEEDY—Usually more common in the winter and early spring and caused by strong-flavored feeds such as certain roots or silage. All strong-flavored feeds should be fed after milking.

FLAT—When milk lacks a full, pleasing flavor, it is spoken of as being flat or tasteless. Due either to the condition of the cow or to the lack of high-flavored feed.

⁴ Future Farmers of America, National Contests 1954, '55, '56. Bul. No. 4 Revised Jan. 1, 1954, Office of Education. Dept. of Health, Education and Welfare, Washington 25, D. C.

F.F.A. NATIONAL CONTEST

MILK AND CREAM SCORE CARD

Class Name _____ Class No. _____

Contestant Name _____ Contestant No. _____

Write scores only opposite the rating for contestant's score. Check criticism in space opposite the defect noted and in proper sample column. Do NOT write in space indicating official score, grade difference and grade on defects.

PERFECT SCORE	CRITICISMS	SAMPLE NUMBER																												
		1	2	3	4	5	6	7																						
FLAVOR AND ODOR—45 (No criticism 40-45) (Normal range 25 through 39)	Contestant's score								SUMMARY OF CONTESTANT GRADES BY TABULATORS	<table border="1" style="margin: auto;"> <tr> <th style="width: 50px;">Sample No.</th> <th style="width: 50px;">Grade</th> </tr> <tr><td>1</td><td></td></tr> <tr><td>2</td><td></td></tr> <tr><td>3</td><td></td></tr> <tr><td>4</td><td></td></tr> <tr><td>5</td><td></td></tr> <tr><td>6</td><td></td></tr> <tr><td>7</td><td></td></tr> <tr><td colspan="2" style="text-align: center;">Total Score</td></tr> <tr><td colspan="2" style="text-align: center;">(perfect score is zero)</td></tr> </table>	Sample No.	Grade	1		2		3		4		5		6		7		Total Score		(perfect score is zero)	
	Sample No.	Grade																												
	1																													
	2																													
	3																													
	4																													
	5																													
	6																													
	7																													
	Total Score																													
	(perfect score is zero)																													
	Official score																													
	Grade difference																													
	Grade on defects																													
	Bitter																													
	Cooked																													
	Cowy																													
Disinfectant																														
Feed																														
Flat—watery																														
Garlic or onion																														
High acid																														
Malty																														
Metallic																														
Musty																														
Oxidized—cardboard																														
Rancid																														
Salty																														
Unclean																														
Weedy																														
SEDIMENT—10 (Normal range 5 through 9)	Contestant's score								1																					
	Official score																													
	Grade difference																													
CAN AND COVER—5 (No criticism 5) (Normal range 3 through 4)	Contestant's score								3																					
	Official score																													
	Grade difference																													
	Grade on defects																													
	Can or cover—dirty inside																													
	Can or cover—open seam																													
	Can—milkstone on inside																													
	Can or cover—rusty inside																													
	Can—wet inside																													
	Can—leaky																													
	Can—badly dented																													
Cover—non-waterproof																														
Cover—plug type																														
Cover—poorly seated																														

Criticisms—A maximum value of one point each.

Sediment— Score sediment discs according to U. S. Department of Agriculture sediment standards for milk and milk products.

GARLIC or ONION—A flavor found in milk from cows which have been eating wild garlic or onion. Very objectionable and can seldom be removed from the milk. Cows should be removed from infested pastures three or four hours before milking.

MALTY—A flavor resembling that of malt. Often due to the development of certain bacteria, it usually indicates unclean conditions.

METALLIC—This flavor gives the impression of holding a piece of metal in the mouth between the teeth. It is often caused by the presence of metallic salts in the milk due to handling milk in rusty cans or pails.

MUSTY—A flavor suggesting a musty or moldy condition. It may be due to feeding musty feed or storing milk in a musty cellar or milk house.

OXIDIZED—A flavor which resembles the odor and taste of wet cardboard sometimes called "cappy." It is caused by action of metallic salts, especially copper salts.

RANCID—A flavor characteristic of spoiled butter or resembling the flavor of butyric acid. It is due to the decomposition of the butterfat. In milk it may be due to the condition of the cow or to feeding rancid feeds.

SALTY—Salty flavor is often due to high sodium chloride content and is often found in milk from cows affected with mastitis or garget.

UNCLEAN—Flavor and odor which one would find in unclean utensils, especially those improperly washed. Very objectionable and can easily be prevented.

WEEDY—A feed flavor characteristic of certain weeds eaten by the cow. Often found in milk during the dry season when good feed is scarce in pastures. Frequently resembles a wood flavor, due to the dry condition of weeds.

Container and Closure Criticisms:

CHIPPED MOUTH—The mouth of the bottle either at the cap seat or on the pouring lip should be free from chipped places. Such places are difficult to clean and are considered a defect.

DIRTY BOTTLE—Refers to the condition of the inside of the bottle. Any condition which indicates an unclean bottle where it comes in contact with the milk is objectionable.

LEAKY CAP—One that leaks or drips milk when the bottle is inverted. The expansion of milk in bottles often forces milk out around the cap, but if the cap is properly seated it will not leak or drip when inverted.

LIP COVER NON-WATERPROOF—A term used to indicate that the cap protector or hood is absorbent and not waterproof.

LIP NOT PROTECTED—The pouring lip should be completely covered.

LIP PARTLY PROTECTED—Certain kinds of milk caps partly cover the pouring lip but not completely. Such conditions are designated by the above term.

NOT FULL—A bottle of milk should be full to the line below the lip roll.

UNSEALED BOTTLE CLOSURE—All hood cap covers or protectors should be securely fastened so that they cannot be removed without detection. When this is not the case, this term is used as an unfavorable criticism.

JUDGING CREAM

Cream can be judged wherever samples are available. The only equipment necessary is something to be used as a tasting rod, a place to wash the rod after each sample is tasted, paper towels for wiping the tasting rod, and a waste jar.

Cream may be classified as bottled cream for household use or commercial cream in cans. It is used in both the sweet and the sour condition. Sweet cream, having a greater variety of uses, demands a higher price, but the fact that cream is sour does not make it unsalable, provided it is of suitable quality. The quality of butter to a large extent depends upon the flavors present in the cream, rather than the acidity, provided the cream is not too sour. Smoothness and body are important factors in good cream. A thin cream is



FIGURE 5.—Cream is used in households in large quantities and should be of the highest quality.

expensive to handle in butter making, and often develops objectionable curd lumps when it sours. Cream which contains sediments, extraneous matter or excessive mold growth is not acceptable for food purposes by the Food and Drug Administration of the United States Department of Agriculture.

Cream Score Cards and Their Use

A card developed by the U. S. Department of Agriculture, Bureau of Dairy Industry, is used for scoring sweet cream in bottles intended for household use. This type of cream approaches the requirement for fluid milk and is judged on the same basis.⁵

The card used for scoring milk and cream presented on page 4, takes into consideration the requirements for this type of product. If laboratory facilities are available, the complete score card may be used, including bacteria count of the cream. If laboratory facilities are not available and when judging is done for instructional purposes, bacteria count can be considered perfect.

⁵ Score card for milk also used for cream in vocational high school contests.

Judging Procedure

The bacteria count should be determined first, before the sample is subjected to any contamination. The sample can then be warmed and scored for the other points in any order desired.

Flavor and odor.—The determination of flavor and odor in cream is carried out in the same manner as with milk. The samples should be at a temperature of 60° F. when examined. A wooden ice cream spoon or a glass or composition rod about the size of a lead pencil is dipped into the cream, and a small amount is transferred to the mouth. The cream is tasted and the flavor and odor determined. The following material will serve as a guide in determining the score for certain flavor defects.

Description of Flavor	Score
Pleasant full flavor, free from defects (no criticism).....	40.0 to 41.0
Lacking flavor (flat), slight feed, slightly cooked or watery.....	37.5 to 39.5
Cooked flavor, feed, salty, slightly cowy, slightly metallic, slightly oxidized or slightly weedy.....	34.0 to 37.0
Pronounced feed, weedy, slight garlic or onion, unclean, musty, cowy, slightly acidic, rancid or yeasty.....	25.0 to 33.5
Pronounced rancid, greasy, metallic, pronounced acidity, garlic, or onion, pronounced bitter, pronounced yeasty.....	0.0 to 24.5

Samples showing disinfectant or coal oil, or defects pronounced enough to produce butter scoring 88 or below, score 0.

Sediment.—Sediment should be scored by the examination of a sediment disk prepared by filtering four ounces of cream through the regulation cotton sediment disk used for milk. A perfectly clean disk will score 10, with deductions for increasing amounts of sediment. The same system of grading should be used as in the case of milk.

All water and containers must be clean. Water can be cleaned by filtering it through disks similar to those used to filter cream.

Method of Determining Sediment in Commercial Cream

1. Use 4 ounces of cream.
2. Pour the cream into the filtering bottle (if such a filter is used) or into a mixing vessel.
3. Add $\frac{3}{4}$ teaspoon of baking soda, commercial soda ash, or sesquicarbonate of soda and stir or shake until the neutralizer has been mixed with the cream.
4. Rinse out the sample jar which held the cream with at least 180° F. water (distilled or cleaned), pour this rinse into the cream, and thoroughly mix again.
5. Add enough water at 180° F. or above to dilute this mixture to about 1 pint.
6. Then filter through a Rapid-Flo filter disk (Johnson and Johnson). The mixture should be at least 160° F. before filtering; higher temperatures are desirable for some cream. (Do not heat the mixture.)

Sediment in one pint sample off bottom of unstirred can of cream is scored the same as in milk.

Terms Used in Judging Cream

Flavor Criticisms

HIGH ACID—As bacteria grow in cream they change the lactose to lactic acid. The first appearance of such action is referred to as "acidic." A pronounced acidic flavor is called "sour."

BITTER—A bitter taste which may be caused by feed or by the separation of milk from stripper cows.

COOKED—This flavor, also referred to as “heated,” resembles that of cream which has been overheated. May be caused by overpasteurizing or allowing the can of cream to stand in the hot sun until the cream has become heated.

COWY—A flavor or odor which resembles the smell of a cow. Caused by the absorption of the cowy odor in the barn while the milk or cream is being handled.

DISINFECTANT—Any flavor which might be due to the use of chemical disinfectants around the cream. Very objectionable and easily prevented.

FEED—Indicates the flavor resembling that of feed. Usually found in the spring and fall when the feeding of roots and silage is in progress or the cows are on wheat or rye pasture. All such feed should be fed after milking.

GARLIC—A common flavor due to wild garlic in pastures. This can be corrected by removing cows from the pasture three or four hours before milking.

METALLIC—This flavor resembles that which is noticed when metal is held in the mouth. It is caused by handling the milk or cream in rusted pails, cans, or separators.

MUSTY—An odor or flavor often associated with a moldy or damp cellar. Cream which has mold growing in it will often show a musty flavor.

ONION—A flavor like that of onion caused by cows eating wild onion. It can be eliminated in the same manner as garlic flavor.

SALTY—A salty flavor may be due to salt being added or may be found in cream from cows which have mastitis.

UNCLEAN UTENSILS—A flavor due to an unclean condition, especially of the utensils. It borders somewhat on a musty flavor.

WATERY—Used to describe a condition caused by adding water to the cream or by rinsing the separator or cans excessively.

WEEDY—A flavor resembling that of drying weeds, which is caused by the cows eating weeds. This defect can be reduced by removing the cows from the source of feed three to four hours before they are milked.

MALTY—A flavor resembling that of malt. Often due to the development of certain bacteria, it usually indicates unclean conditions.

JUDGING BUTTER

Judging butter is a well-established practice and has been used as a means of grading that product in the major markets of the United States for many years. Official government standards for quality of creamery butter have been used by the U. S. Department of Agriculture⁶ butter graders since April 1, 1939. By this means the federal and private judges grade large amounts of the butter sold on the market on a graded basis. In the industry the practice of scoring butter by individuals interested in the purchase or sale of butter is common. Factory shipments are often scored and sold on the basis of grade. National contests among the manufacturers of butter are held from time to time. The place of butter judging in the dairy industry makes such judging of great interest and importance.

Butter Score Cards and Their Use

While the types of butter range from high-quality creamery butter, both salted and unsalted, to dairy butter, the same score card is used for all. The highest-quality product scores 93 to 94, and the lowest scores as low as 86. Butter scoring 92 or over is often referred to commercially as “extras,” while butter scoring 90 is designated as “Chicago standard.” The student score card used for grading purposes consists of a card with space for information describing the lot of butter. The score is based upon the factors of flavor, which are allowed 45 points; body, 25 points; color, 15 points; salt, 10 points; and package, 5 points, making a total of 100 points.

⁶ Latest Standards USDA, Agricultural Marketing Service, April 1954. (19 F.R. 1693).

BUTTER SCORE CARD

Contestant No. _____

Place scores opposite the rating for perfect score. Check criticism in space opposite the defect noted in proper sample column. Write in other criticisms if necessary. Do NOT write in space indicating grade. Total the score of each sample. Use black pencil.

Perfect score	Criticisms	Sample No.										Summary of contestant grades	
		1	2	3	4	5	6	7	8	9	10		
FLAVOR 45	Contestant score												
	Grade on	score											
		criticism											
	Acid												
	Bitter												
	Briny												
	Cheesy												
	Coarse												
	Cooked												
	Feed												
	Fishy												
	Flat												
	Garlic												
	Malty												
	Metallic												
	Musty												
	Neutralizer												
	Oily												
	Old cream												
	Oxidized												
	Rancid												
Storage													
Tallowy													
Unclean													
Weedy													
Woody													
Yeasty													
BODY AND TEXTURE 25	Contestant score												
	Grade on	score											
		criticism											
	Crumbly												
	Greasy												
	Gummy												
	Leaky												
	Mealy												
	Salvy												
	Sticky												
	Weak												
COLOR 15	Contestant score												
	Grade on	score											
		criticism											
	Mottles												
	Specks												
Uneven													
Wavy													
SALT 10	Contestant score												
	Grade on	score											
		criticism											
	Gritty												
PACKAGE 5	Allowed perfect in contest	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0		
TOTAL 100	Total score of each sample												
	Total grade per sample												

* **FLAVOR:** No criticism: 38 to 45; normal range: 31 to 39
BODY AND TEXTURE: No criticism: 25; normal range: 23 to 25
COLOR: No criticism: 15; normal range: 13 to 15
SALT: No criticism: 10; normal range: 9 to 10
PACKAGE: (Allowed perfect in contest)

TEAM RANK	
Code	Grade
1	
2	
3	
Total	
Rank	

FINAL GRADE
RANK



FIGURE 6.—A fine, clean flavor is essential in high-quality butter.

For instructional work the score card (page 16) is used, based upon the same number of points, but with additional details and terms. In the judging of butter many different types of butter packages are encountered as shown in Figure 7. It is important regardless of type of package that a representative sample be obtained by the use of a trier.

Judging Procedure

Butter can best be judged by the use of a long butter trier which will reach well into the butter, thus getting away from the exposed surface of the package. The trier should be inserted as far as desired, turned one revolution, and pulled out of the butter. It should be passed under the nose immediately so that the aroma can be detected. It should then be examined for color defects by a good light. The body should be determined by the presence of free water on the plug as well as by the resistance to the finger or spatula when passed against it. A small amount of butter should then be placed in the mouth for judging flavor. The condition of the package should be observed before finishing the work with the sample.

Flavor and odor.—The small amount of butter that is placed in the mouth should be allowed to melt on the tongue. The mouth should be kept closed so that the volatile products will pass out through the nose where they can be better detected. The odor should be determined by smelling the freshly drawn plug of butter as soon as possible after it is removed from the package.

The temperature of the room where the judging is carried on should be such that the butter will remain firm but not too cold, as excessive cold prevents the detection of flavors to the best advantage. The atmosphere must be free from odors of all kinds which might interfere with the judge's sense of

smell. The trier should be free from exposed steel and must be wiped clean after each sample.

While definite ratings will vary with the intensity of the flavor and odor defects, the following guide may be used.

Description of Flavor	Score
Fresh, fine, sweet, and clean if fresh make; or fine, sweet, and clean if storage butter. Slight feed and cooked. (No criticism)	38.0 to 39.0
Fresh, sweet, and clean if fresh make; or sweet and clean if storage; also slight coarse or flat	37.0 to 37.5
Burnt, oily, heated, neutralizer, yeasty, feedy, briny, storage, cowy, acidy, cheesy, weedy, cooked, old cream, or tallowy to a slight degree	35.0 to 36.5
Pronounced burnt, oily, heated, storage, neutralizer, cowy, yeasty, cheesy, weedy, or feedy. Slightly metallic, woody, bitter, or unclean. Definitely old cream	33.5 to 34.5
Stale, old cream, unclean, or musty. Slight oily, lime, fishy, or metallic.	32.0 to 33.0
Garlic, gasoline, rancid, pronounced or stale old cream, pronounced oily, metallic, or cheesy	30.0 to 31.5

Body.—The body should be determined by the examination of the trier and plug of butter for excessive amount of free moisture (drops of water). The clearness of such moisture should also be observed. The thumb should be pressed into the plug of butter to determine the firmness and its ability to hold the incorporated moisture. Inability to hold this moisture is spoken of as leakiness. The ideal body should have a firm, waxy texture and perfect grain, as indicated by a jagged or irregular toothed edge, when butter is broken apart. It should be free from salviness or excess free moisture and should not show a milky brine.

	Score
Firm, waxy, and good grain	25.0
Crumbly, greasy, leaky, mealy, salvy, sticky, weak, gummy, or cloudy brine to a pronounced degree	24.0 to 24.5
Any of the above to a very pronounced degree	23.0 to 23.5



FIGURE 7.—Types of butter packages (left to right): 3-pound paper tub, 5-pound tin can, 1-pound print, 2-pound roll, 1/4-pound prints, 64-pound wooden tub.

Color.—The plug of butter should be observed in bright daylight and any unevenness of color noted. The presence of specks or extreme orange or yellow color is objectionable.

	Score
Uniform color throughout—may be light, medium, or full golden yellow	15.0
Color specks (reddish orange), mottled, uneven, wavy, or white specks.	13.0 to 14.5

Salt.—The amount of salt in butter may vary from none to a rather high salt content. This variation is not objectionable provided the salt present is completely dissolved.

	Score
Uniform and all dissolved—may be light, medium, or heavy	10.0
Undissolved or gritty	9.0 to 9.5

Package.—The butter must be neatly and properly packed in a sound package which is clean and free from mold.

	Score
Neatly packed in clean, sound packages	5.0
Dirty tubs or containers or poor finish	4.0 to 4.5

Terms Used in Judging Butter

Flavor Criticisms

ACIDY—Applied to butter which has an acid flavor. It is due to the churning of high-acid cream and is common during hot weather and in highly flavored butter.

BITTER—A bitter taste which may be caused by cream from stripper cows or cream which has developed a bitter taste from bacterial action.

BRINY—A condition due to unincorporated brine due to improper working. Such butter will have a much more salty taste than the butter with the moisture properly incorporated and having the same amount of salt.

BURNT or **SCORCHED**—Very similar to a cooked flavor, but more pronounced and more disagreeable. More commonly found in butter made from neutralized sour cream, pasteurized at a high temperature.

CHEESY or **CURDY**—These terms are used whenever butter has a flavor which resembles that found in fresh cheese or curd. Usually caused by churning thin, sour cream in which the curd has coagulated, by using a starter which is too sour, or by leaving too much buttermilk in the butter.

COARSE—This refers only to the flavor and indicates that the butter is lacking in the fine, sweet-cream flavor that is required for fine butter scoring 93 or better. The term is used in describing 92-score butter and is usually the result of not grading the cream closely enough. A can or two of cream of questionable flavor or quality added to a vat of fine cream may be the cause of a "coarse" flavor in sweet-cream butter.

COOKED—A custard or caramel flavor caused by improper pasteurization or heating the cream to too high a temperature. Usually appears in butter made from cream of high quality.

COWY or **BARNY**—A flavor or odor which resembles the smell of a cow. Usually indicates lack of clean methods of milking and the milk and cream absorbing cowy or barny odors which later show up in the finished butter.

FEED or **FEEDY**—Usually more common in the winter and early spring and caused by strong-flavored feeds such as certain roots or silage. All strong-flavored feeds should be fed only after milking.

FISHY—Suggests an odor or taste resembling that of dried fish. It is characteristic of butter of poor keeping quality and is a very serious defect. It may be caused by absorp-

tion from being stored near fish, from feed condition, or bacterial action. The development of the defect is intensified by the presence of metallic salts in the butter.

FLAT—Used when butter lacks the pronounced delicate flavor and aroma characteristic of superior-quality butter. Due to churning sweet cream without starter, cream from stripper cows, excessive washing of butter, and excessive dilution of cream with water.

GARLIC—Caused by cows eating wild garlic. Objectionable and can seldom be removed from milk or cream. Butter made from cream produced on pasture containing this plant often has the characteristic flavor.

GASOLINE—Caused by exposing the milk, cream, or butter to the fumes of gasoline. This happens by permitting gasoline engines to operate too close to the milk or cream or by contaminating the cream cans with gasoline. Cans should never be used for cream after they have had gasoline in them. Cream or butter having this flavor is practically useless as food.

HEATED—This term does not have reference to overheating of the cream in the process of pasteurization, but is a flavor characteristic of butter made during extremely hot weather where either the cream has been subjected to the hot sun while in the cream cans, or the butter has been exposed at some time to the direct heat of the sun and becomes very soft. Either condition will result in a flat, greasy-tasting butter which is commonly described as "heated."

METALLIC—Suggests the taste of metal or the odor that may be noticed when the cover is removed from a rusty cream can.

MUSTY—Suggests a moldy vegetable cellar.

NEUTRALIZER—An alkaline flavor, resulting from the improper use of alkali as a neutralizer or from overneutralized cream.

OILY—Butter-oil taste in butter, which may be due to various causes, such as exposing cream to the hot sun, which causes the butterfat to form a film of butter-oil around the inside walls of the can.

OLD CREAM—Suggests the use of stale cream in the manufacture of the butter. May be caused by unclean separator, mixing sweet and sour cream, or not cooling the cream on the farm.

RANCID—A rancid or strong flavor characteristic of old butter of poor keeping quality. It is due to the decomposition of the butterfat and is common as a decomposition product of practically all animal fats and oils. It may be caused by molds and bacteria as well as by enzyme and chemical action. When present to a pronounced extent, butter is no longer suitable for table use.

STORAGE—This flavor develops in butter held for any considerable time in cold storage. The butter gradually loses some of its delicate flavor and aroma, developing this peculiar flavor. It develops more quickly in inferior butter than in the better types. The exact cause has not been demonstrated but is believed to be due to chemical changes.

TALLOWY—Refers to butter that shows a distinct taste and odor of tallow. Very often bleaching of the color can be noticed in tallowy butter. The defect is caused by exposure to air, light, and heat, by metallic salts in the cream or an excess of neutralizer. This defect, like rancidity makes the butter unfit for market use.

UNCLEAN—This term is used whenever the butter has a flavor or odor objectionable and foreign to butter that suggests unclean conditions. Flavors of this kind usually originate in dirty conditions somewhere in the handling of milk and cream on the farm. Improperly cleaned cream separators or milking machines or careless methods of milking are the most common causes of flavors described as "unclean."

WEEDY—The taste of certain weeds that cows have eaten.

WOODY—A flavor not very common but occurring at times. Resembles the odor of new wood and is usually due to new churns, paddles, or other wooden equipment which has not been properly treated before being used. Some bacteria and mold, as well as wash water and wooden packages, may be responsible for the flavor in butter.

YEASTY—A flavor and odor resembling those resulting from alcoholic fermentations produced by yeasts. In the advanced stages of fermentation a bitter taste often develops in the cream as well as much foaming. Butter made of low-quality cream usually shows indications of this flavor.

Body and Texture Criticisms

CLOUDY BRINE—The incorporated water in salted butter is referred to as brine. When drawing a plug of butter with the trier, droplets of brine will appear on the surface. If this is cloudy (not clear) to a marked degree, it is spoken of as cloudy brine. It is caused by improper washing and working of the butter and is often associated with leaky butter.

CRUMBLY—This characteristic, sometimes described by the term "brittle," refers to butter which does not stick together. It fails to draw a satisfactory plug and does not cut or spread readily. Usually found in fall, winter, and early spring and is due to the hard condition of the fat globules.

GREASY—With this type of body the butter is not waxy in appearance but has the appearance of soft grease. Usually is due to overworking, especially when the butter is too warm.

LEAKY—The moisture has not been properly incorporated and the butter shows considerable free moisture, which drips off of the trier.

MEALY—Butter showing a granular or mealy condition. May be due to pasteurizing, to an "oiling off" of the butter-oil when butter is added to the cream for repasteurization, or to improper neutralization of sour cream.

SALVY—This term is used to describe butter in which the grain has been destroyed to the extent that the texture resembles that of lard. It may be due to overworking very firm butter, especially that which lacks moisture.

WEAK—Butter that lacks the desired firmness and "standing up" properties. Usually caused by churning cream too soon after pasteurization or by not cooling to a low enough temperature to obtain proper firmness of the butterfat before churning.

Color Criticisms

COLOR SPECKS—Reddish yellow specks throughout the butter that are due to sediment in the butter color used.

MOTTLES—An unevenness of color in the body of butter is shown in the form of spots (mottles) of lighter and deeper shades of yellow. This is caused by the uneven distribution of the salt and is a very serious defect on the market.

UNEVEN—When different lots of butter of different shades of yellow are packed together, the package will show an uneven color.

WAVY—When the unevenness of color in the butter is shown in the form of streaks or waves, it is referred to as "wavy." Caused by uneven working and by working remnants of other churnings into the butter.

WHITE SPECKS—Many small white specks (curd specks) throughout the butter due to the incorporation of small particles of coagulated casein. Also caused by starter or cream being allowed to enter the churn without proper straining.

Salt Criticisms

GRITTY—When butter is gritty between the teeth, it usually contains some salt undissolved because of insufficient working of the butter. Gritty butter is very often wavy or mottled in color.

Package Criticisms

DIRTY TUB—The butter tub should be clean in order to be pleasing to the eyes of the purchaser. Tubs of butter which are objectionably soiled or dirty are criticized unless the judge is otherwise directed.

POOR FINISH—The surface of the butter in the package as well as the paper used to cover the butter should be smooth and have a pleasing appearance. When this is not the case, it is spoken of as "poor finish."

JUDGING AMERICAN CHEDDAR CHEESE

Judging of American cheddar cheese in the United States markets is a well established practice. Standards and grades are accepted and are used to guide the producer, dealer, and consumer in buying and selling cheese. The U. S. Department of Agriculture carries on cheese scoring and grading work in the principal markets of this country. A fundamental knowledge of the practice of judging cheese is important to those interested in the production as well as the consumption of cheese.

American cheddar cheese is made and marketed in several styles or shapes known commercially as cheddars, flats (single or twin), daisies (single, double, or triple), young Americas, squares (5 and 10 pounds), and Long Horns. The shape of the cheese does not affect the scoring of cheese made from whole milk. Skimmed, part skimmed, and process cheeses are not included in this class and should be scored by different standards.

Cheese Score Cards and Their Use

On the question of the best score card for American cheddar cheese some difference of opinion seems to exist. For that reason there are two score cards in use. The one used by the inspection service of the U. S. Department of Agriculture, and set forth in USDA Circular 157(is based on the following scoring system: Flavor, 30; body and texture, 40; finish and appearance, 20; and color, 10.

It will be noted that the number of points allowed for body and texture is greater than that for flavor. No doubt this is due to the fact that commercially the body of the cheese determines its value more than the flavor does.

The score card used throughout this country in educational work and approved by the American Dairy Science Association is shown on page 23.



FIGURE 8.—High-quality cheddar cheese in a convenient-sized package.

CHEESE SCORE CARD

Contestant No. _____

Place scores opposite the rating for perfect score. Check criticism* in space opposite the defect noted in proper sample column. Write in other criticisms if necessary. Do NOT write in space indicating grade. Total the score of each sample. Use black pencil.

Perfect score	Criticisms	Sample No.										Summary of contestant grades	
		1	2	3	4	5	6	7	8	9	10		
FLAVOR 45	Contestant score <input type="text"/>												
	Grade on score												
	criticism												
	Acid												
	Bitter												
	Feed												
	Fermented												
	Flat												
	Fruity												
	Heated												
	Moldy												
	Rancid												
	Unclean												
	Weedy												
	Whey taint												
	Yeasty												
BODY AND TEXTURE 30	Contestant score <input type="text"/>												
	Grade on score												
	criticism												
	Corky												
	Crumbly												
	Curdy												
	Gassy												
	Mealy												
	Open												
	Pasty												
	Short												
	Spongy												
	Sweet curd holes												
	Weak												
	Yeast slits												
FINISH 15	Allowed perfect in contest	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	
COLOR 10	Contestant score <input type="text"/>												
	Grade on score												
	criticism												
	Acid cut												
	Mottled												
	Seamy												
	Wavy												
TOTAL 100	Total score of each sample <input type="text"/>												
	Total grade per sample												

* **FLAVOR:** No criticism: 40 to 45; normal range: 35 to 42
BODY AND TEXTURE: No criticism: 29.5 to 30; normal range: 26 to 29.5
FINISH: (Allowed perfect in contest)
COLOR: No criticism: 10; normal range: 9 to 10

TEAM RANK	
Code	Grade
1	
2	
3	
Total	
Rank	

FINAL GRADE
RANK

This card allots 45 points for flavor, 30 points for body, and only 15 points for finish. In addition there is certain descriptive matter useful for instructional purposes.

Judging Procedure

The samples of cheese properly labeled should be allowed to stand at room temperatures for a few hours before they are scored. This allows the cheese to become warm after being removed from storage and gives a more characteristic appearance and body. Cheddar cheese should be judged by the use of a clean trier so that a representative sample will be obtained. The trier is inserted well into the top of the cheese in a slanting position, if

possible, turned around once, and then withdrawn. In this way, a long, round, cylindrical sample, commonly called a plug, is obtained. After the plug has been drawn, it is passed under the nose and the flavor is determined. This can be done best by smelling the plug and by crushing and warming some of the cheese between the thumb and fingers and then smelling. As little actual tasting as possible is advisable in judging cheese. The continued tasting of strong cheese soon deadens the sense of taste. Much depends upon smell. The plug is removed from the trier and rolled between the fingers to test its texture, which is judged by its pliability and compactness. An ideal texture is one that shows a solid, compact, continuous curd free from breaks and holes. When the plug is rolled, it should bend readily and when broken it should show a flinty appearance resembling the surface of broken flint.

After the plug is broken, a small portion is pressed and rubbed between the thumb and fingers for the determination of body. An ideal body feels soft, firm, and smooth in consistency. When drawn from a cheese of ideal body, the plug is smooth and waxy in appearance. After the examination, the remainder of the plug should be replaced in the trier hole and the surface sealed with a small amount of cheese. The make-up or appearance of the cheese as a whole should be noted and the color determined by observation during the examination of the plug.

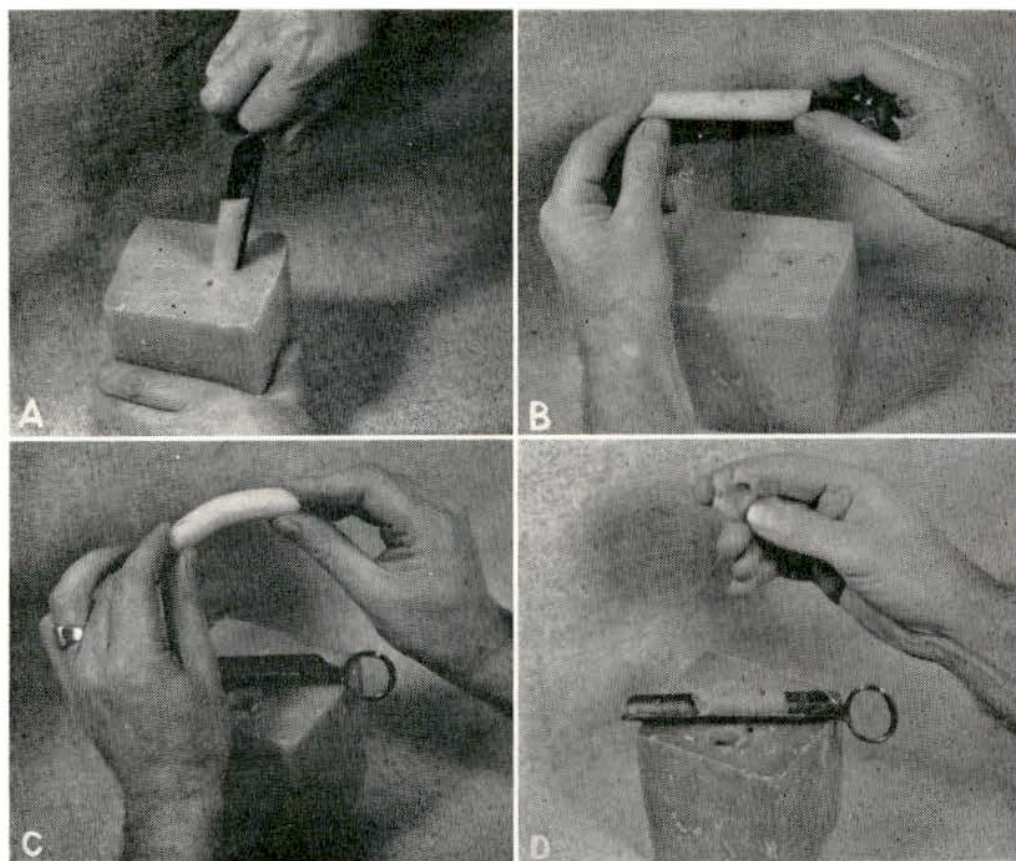


FIGURE 9.—Steps in examining cheese.

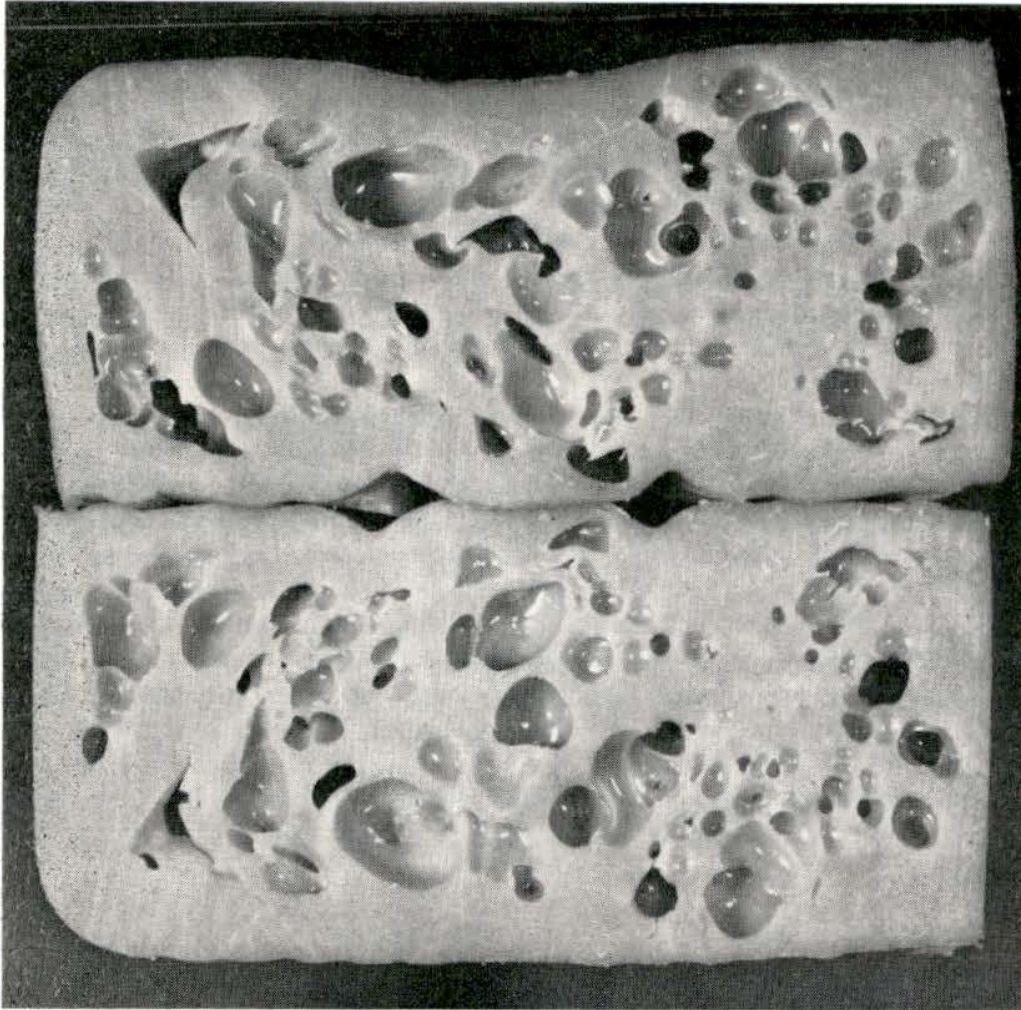


FIGURE 10.—A marked case of sweet-curd holes in a sample of canned cheddar cheese.

Characteristics and Ratings Used in Scoring American Cheddar Cheese⁷

Flavor.—In scoring cheese, flavor must be considered from the standpoint of degree and quality. A newly made cheese does not have a well developed flavor and aroma. Usually it has a raw-curd taste and is classed as a “fresh” cheese. A cheese that has been held in the curing room for some time and has a moderately developed “nutty” flavor is classed as “mild,” and cheese which has considerable age and has ripened more fully and developed a rather sharp taste is classed as “aged” cheese.

The demand of cheese consumers varies greatly, some desiring a fresh, very mild-flavored cheese, while others desire an aged cheese with a distinctly sharp taste.

Cheese that has developed a characteristic cheese flavor and does not possess a raw-curd taste, receives the same rating for flavor whether it is “fresh,” “mild,” or “aged,” provided it is clean and pleasing.

⁷ C. W. Fryhofer and Roy C. Potts, Handbook for Use in the Inspection of Whole Milk Cheese under Food Products Inspection Law, USDA Circ. 157.

The quality of the flavor may be classified from the standpoint of palatability under five general groups as "highly pleasing," "desirable," "slightly objectionable," "objectionable," and "poor." The scores of cheese and their relation to flavor characteristics are as follows:

A highly pleasing flavor is a fine, clean flavor with a fully developed aroma especially pleasing to the taste and smell. It is characteristic of highest-quality cheese, scoring 95 points or more in total score and 40 points or above on flavor, and it requires no flavor criticism on the score card.

Slightly objectionable flavors are flavors such as "cowy," "feed," "weedy," or "heated," and when only slightly developed are permitted in cheese scoring 89 to 94. Slight defects may appear in body and texture as well as in color in cheese of this score.

Objectionable flavors are those flavors objectionable to the taste but not developed to the extent that they are distinctly disagreeable. Such flavors as "cowy," "weedy," and "feed," when distinctly developed, are common in cheese of this quality and also such flavors as "fruity," "acidic," and "bitter" when only slightly developed. These flavors are permitted in cheese scoring 86 to 88 points, which may also show defects in body, texture, and color.

Poor or "off" flavors include all objectionable flavors which have developed to the extent that they are distinctly disagreeable to the taste. They are common to cheese of low quality and include such flavors as "unclean," "yeasty," "fermented," "pronounced acid," "strong bitter," "strong fruity," "moldy," and "rancid." They are permitted in cheese scoring 85 or less, which may also be accompanied by marked defects in body, texture, and color. Cheese scoring below 83, usually spoken of as "culls," is not suitable for general consumption.

Description of Flavor	Score
Characteristic cheese flavor, well developed, clean, and highly pleasing..	41.0 to 43.0
Clean and desirable, but lacking characteristic cheese flavor.....	40.0 to 40.5
Flavors (cowy, feedy, weedy, bitter) present to slight or moderate degree, very slightly acidic or unclean.....	37.0 to 39.5
Flavors above present to pronounced degree or flavor such as acidic, bitter, fruity, unclean, fermented, moldy, rancid, yeasty, present to slight degree.....	35.0 to 36.5
Flavors such as acidic, bitter, fruity, unclean, fermented, moldy, rancid, and yeasty present to pronounced degree.....	30.0 to 34.5

Body and texture.—The term "body" as applied to cheese refers to the degree of firmness of the cheese as a whole and its general consistency; the term "texture" refers to the character of its structure. The general appearance of the plug will show the nature of the texture; that is, whether it is "close" or "open," and also the presence or absence of "gas holes," or "pin holes," "sweet curd holes," or "yeast holes." A portion of the cheese rubbed between the thumb and fingers will show the nature of the body of the cheese and will indicate readily such characteristics as "corky," "mealy," "crumbly," "weak," "pasty," or "spongy."

To receive the maximum rating of 30 points for body and texture, cheese must be smooth and silky, slightly translucent, meaty and waxy, free from gas holes or any tendency to mealiness or pastiness, and must not be sticky, rubbery, or corky. Such cheese is not criticized on the score card for body and texture, because it is seldom found.

	Score
Firm, waxy, smooth, and no more than three small mechanical openings on a trier plug.....	29.5 to 30.0
Four to six mechanical openings or sweet curd holes on a trier plug; very slightly weak, flaky, pasty or mealy.....	28.5 to 29.0
Slightly corky, crumbly, curdy, mealy, pasty, lumpy, weak; a few pin holes; seven to twelve mechanical openings or sweet curd holes on a trier plug.....	27.0 to 28.0
Many pin holes or ragged mechanical openings; distinctly corky, crumbly, mealy, pasty, weak.....	25.5 to 26.5
Spongy structure, yeast holes.....	23.0 to 25.0

Finish and appearance.—A neat, uniform, smooth finish gives a cheese an attractive appearance and increases its market value. To be given the full rating of 15 points for finish and appearance, cheese must be uniform in size and shape, covered with a clean, closed, smooth fitting bandage, free from "mold," and have square edges, sound rind, and dry, clean and even surfaces. Cuts are given when "wrinkled bandage," or "cracked rind," "uneven surface," "scaly paraffin," "rot spots," "mold," and "huffed" conditions are found on a cheese.

	Score
Clean, neat, and smooth, rind sound and uniform in color.....	15.0
Huffed, light spots, moldy, scaly paraffin, soiled, uneven surfaces, wrinkled bandage.....	14.0 to 14.5
Cracked rind, rot spots.....	13.0 to 13.5

Color.—The color of the cheese varies greatly, depending upon the market, from uncolored (white) to a dark yellow color. The degree of color does not affect the score except in extremely high- or reddish-colored cheese, which is limited to a score of 9.0 points. Cuts in color score are made when "white specks," "wavy," "mottled," "acid cut," or "seamy" conditions exist.

	Score
Even and slightly translucent.....	10.0
Acid cut, seamy, wavy, mottled, faded.....	9.0 to 9.5

Terms Used in Judging Cheese

Flavor Criticisms

ACIDY—A sharp acid taste or a sour odor in cheese is denoted by this term. It is caused by over-ripened milk and insufficient cooking of the curd.

BITTER—A term used to indicate a bitter taste which is due to feed conditions, condition of the cow, or bacterial action.

COWY—A flavor and odor that resembles the smell of a cow. It indicates that unclean milk or milk which has been allowed to stand in the barn and absorb the odor was used in the manufacture of the cheese.

FEED—A term to describe flavors that resemble feeds, especially strong ones such as silage and roots. Such feeds should always be fed after milking.

FERMENTED—A term used to describe a flavor which resembles fermented whey or milk and has a somewhat sickening taste. It is caused by unclean milk or unclean conditions in the factory.

FLAT—Cheese that lacks flavor and aroma because of too sweet milk, improper cooking of curd, or too much washing of the curd.

FRUITY—This flavor is sometimes referred to as "sweet" and is suggestive of artificial pineapple odor.

GREEN—A flavor characteristic of a fresh (green) cheese in which there has been no development of the true cheese flavor.

HEATED—A term used to describe a flavor that resembles that of heated fat and is due to using milk which has been exposed to too much heat.

MOLDY—A flavor or odor that resembles mold. It is often spoken of as **musty** and is caused by mold growth in the cheese.

RANCID—A flavor due to the decomposition of butterfat that is common in old dairy products of poor keeping quality. When it is present to a pronounced degree, the product is unsuitable for table use.

UNCLEAN—This term is used to describe a flavor or odor which suggests unclean conditions. It is often due to the condition of the milk which is carried through into the cheese.

WEEDY—A flavor due to the use of milk which has a weedy flavor. It is often accompanied by a bitter flavor.

YEASTY—A flavor and odor resembling those resulting from the fermentations produced by yeasts. Very often large gas holes are found in cheese that shows a yeasty flavor.

Body and Texture Criticisms

CORKY—A term used to describe a hard, tough, over-firm cheese which does not crush down readily when pressed between the thumb and finger.

CRUMBLY—A crumbly body is one that breaks down in a crumbly condition when pressed and rubbed between the fingers. It is closely associated with mealiness and is commonly found in "acidy" cheese.

FLAKY—This term is used to denote a condition that seems to indicate that the curd has not knitted together properly. It is characterized by the plug's breaking with an even and glistening surface.

GASSY—When cheese ferments, it often shows many small gas holes often spoken of as pin holes. A cheese in this condition is called "gassy." Sometimes the gas holes are caused by yeast, in which case they are usually much larger in size than the pin holes.

MEALY—A cheese that breaks down into fine crumbs when pressed between the fingers is called mealy. The feeling between the fingers resembles that of corn meal. The condition is often associated with a sour flavor and an "acidy" cheese and may be bleached or "acid cut" in color.

OPEN—This term indicates that the cheese is not compact but has openings throughout. These are usually caused by the mechanical failure in pressing the curd which tends to produce a somewhat imperfect union of the curd pieces.

PASTY—A condition that is sometimes called "salvy." Such a cheese when pressed and rubbed between the fingers appears to be very soft, usually from excessive moisture. It also smears on the fingers and is sticky.

SPONGY—The ideal body feels solid, firm, and smooth. A spongy body is one that lacks firmness and springs excessively when pressed. Very often such a condition is associated with "gassy" holes.

SWEET CURD HOLES—In certain types of cheese made with low acidity, small round gas holes sometimes appear. They are often found in very good cheese and are usually very glossy in appearance. Such holes are spoken of as "sweet curd holes" or "sweet gas holes." When they develop to a larger size they are sometimes referred to as "swiss-eyes."

WEAK—A weak-bodied cheese is one that is soft and lacks firmness but is not necessarily sticky like a pasty cheese. This condition is often caused by excessive moisture.

YEAST HOLES—During the fermentation process by yeast, gas is formed rather rapidly. Such holes, spoken of as "yeast holes," are often elliptical in shape and vary greatly in size. They are often spoken of as "fish eyes."

Finish and Appearance Criticisms

CRACKED RIND—The rind of a cheese should be smooth and free from cracks. Any cheese that shows cracks should be criticized.

HUFFED—Cheeses in which considerable gas has been produced often show a bulging of the sides and top.

MOLDY—This term is used to describe the presence of mold on the cheese, especially when it is under the paraffin.

ROT SPOTS—When cheese has excessive moisture, spots of decomposed cheese frequently appear on the surface. They are often dirty in color and soft to the touch.

SCALY PARAFFIN—The paraffin on a cheese should adhere tightly to the cheese. If it is loose and scales off, this criticism should be used.

UNEVEN SURFACE—The surface of a cheese should be smooth and even. The presence of a high rim or ridge around the outside of the cheese or an unevenness of the surface can be criticized by this term.

WRINKLED BANDAGE—The bandage that covers the side of the cheese should fit tightly and smoothly under the paraffin. If it does not, it can be criticized by this term.

Color Criticism

ACID CUT—The color of cheese should be uniform and even throughout the whole mass. When the color is bleached and shows light areas throughout, it is spoken of as being "acid cut." It is caused by the presence of too much acid in the curd.

LIGHT SPOTS—Sometimes spoken of as white specks may appear in cheese, especially that which has been aged at low temperature.

MOTTLED—This term is used to describe a variation in the color of cheese. It consists of irregular lighter color spots of rather large size that give it a mottled appearance.

SEAMY—A seamy appearance refers to a pale ring surrounding each piece of curd and showing an outline of the pieces as they were before being pressed.

SOILED—A term used to describe a cheese which is unclean or has been soiled on the surface.

WAVY—A cheese that shows streaks of lighter color appearing in the form of waves is spoken of as being "wavy" in color.

JUDGING ICE CREAM

While ice cream is one of our leading dairy products, it has been only within the last few years that any great effort has been made to standardize this product by means of judging. During the development and standardization of ice-cream judging, many score cards have been proposed. While all do not agree as to which is the best score card for the purpose, the larger group of those interested have settled upon the card presented on page 30.

Ice Cream Score Card and How to Use It

The score card used where laboratory facilities are available includes bacteria count. The maximum ratings for the separate divisions are:

Flavor	45
Body and texture.....	30
Melting quality	5
Package and color.....	5
Bacteria	15
	<hr/>
Total	100

The bacteria count is considered perfect when by the standard plate method it is found to be less than 50,000 per gram. A deduction of one point is made for each 25,000 over 50,000. When it is desired to judge ice cream where laboratory facilities are not available and for instruction purposes, the factor of bacteria is considered perfect on the score card and other descriptive material is added which aids in its use.

ICE CREAM SCORE CARD

Contestant No. _____

Place scores opposite the rating for perfect score. Check criticism in space opposite the defect noted in proper sample column. Write in other criticisms if necessary. Do NOT write in space indicating grade. Total the score of each sample. Use black pencil.

Perfect score	Criticisms	Sample No.										Summary of contestant grades	
		1	2	3	4	5	6	7	8	9	10		
FLAVOR 45	Contestant score												
	Grade on	score											
		criticism											
	Cooked												
	Egg												
	Flavoring—												
	Lacks												
	Too high												
	Unnatural												
	High acid												
	Lacks fine flavor												
	Lacks freshness												
	Metallic												
	Neutralizer												
	Old ingredient												
	Oxidized												
	Rancid												
	Salty												
	Storage												
	Sweetener—												
Lacks													
Too high													
Unnatural													
Unclean													
BODY AND TEXTURE 30	Contestant score												
	Grade on	score											
		criticism											
	Coarse												
	Crumbly												
	Fluffy												
	Gummy												
	Icy												
	Sandy												
	Soggy												
Weak													
MELTING QUALITY 5	Contestant score												
	Grade on	score											
		criticism											
	Curdy												
	Does not melt												
COLOR AND PACKAGE 5	Contestant score												
	Grade on	score											
		criticism											
	Color uneven												
	Color unnatural												
BACTERIA 15	Allowed perfect in contest	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0		
TOTAL 100	Total score of each sample												
	Total grade per sample												

FLAVOR: No criticism: 40 to 45; normal range: 31 to 40
BODY AND TEXTURE: No criticism: 29.5 to 30; normal range: 25 to 29.5
MELTING QUALITY: No criticism: 5; normal range: 4 to 5
COLOR AND PACKAGE: No criticism: 5; normal range: 3 to 5
BACTERIA: (Allowed perfect in contest)

TEAM RANK	
Code	Grade
1	
2	
3	
Total	
Rank	

FINAL GRADE
RANK _____

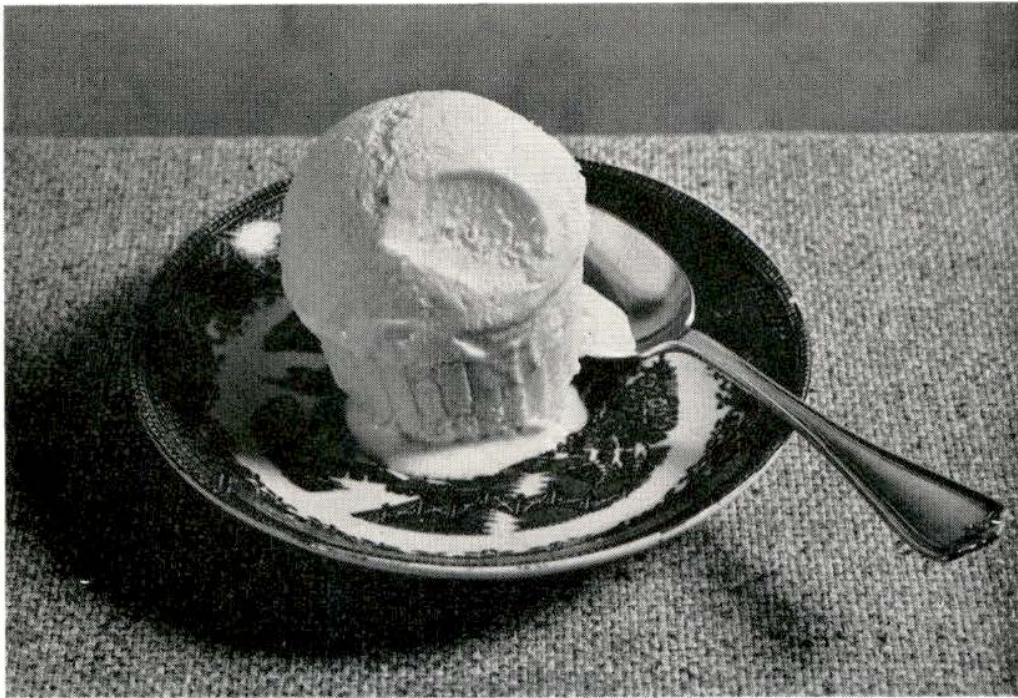


FIGURE 11.—High-quality ice cream is a refreshing dessert.

Judging Procedure

In judging ice cream care should be taken that proper refrigeration is provided to keep the samples in good condition. The ice cream should be so tempered that it can be dipped readily but is not soft. Ice cream that is too hard or soft is difficult to score, specially for body and texture. To show melting quality, a scoopful of each sample should be placed on a plate as the judge starts and allowed to stand throughout the judging so that the progressive melting may be observed. The body and texture should be determined first, while the ice cream is firm. By the use of the spoon and the eye such conditions as "fluffy," "crumbly," and "soggy" can be determined. A small amount placed in the mouth will reveal such defects as "buttery," "gelatin lumps," and "weak." If it is chewed slowly, "sandiness" or the presence of an "icy" condition may be noticed. The small amount of ice cream that has been placed in the mouth should then be held on the tongue for a minute or two until it is warm and the volatile flavors can rise into the nose. The mouth should remain closed during this time and the flavors gradually forced out through the nose. Practice is usually needed because of the coldness and the sugar, which are not found in other dairy products.

Flavor.—As in all other dairy products the flavor should indicate that it has been made from materials of high quality. The flavor should be clean, fine, and sweet. The extract or flavoring should be present in such amounts that it will impart a characteristic flavor. Variable judgment should be used when one is scoring on the question of intensity of flavor, as some localities demand higher flavors than others. The character of the flavoring material should be considered. It should be pleasing and well blended.

Description of Flavor	Score
Highly pleasing and desirable. Fresh, creamy, clean flavor, flavoring well blended (no criticism).....	40.0 to 45.0
Desirable but not too well blended. Too sweet, lacks sweetness, too high flavor, lacks flavoring, lacks fine flavor, egg, slight cooked, lacks freshness	37.0 to 39.5
Objectionable flavor. High acid, cooked, metallic, unnatural flavoring, old ingredients, storage, feed, oxidized, salty.....	33.0 to 36.5
Foreign (off) flavor, pronounced salty, feed, high acid, neutralizer, old ingredients, oxidized, storage, unclean, rancid.....	31.0 to 32.5
Unsalable product is scored zero.	

Body and texture.—The ideal body and texture for ice cream is one that is smooth to the tongue, free from large ice crystals, fine grained, and compact. It melts down freely on the plate and resembles the body of high-quality sweet cream.

	Score
Very desirable. Firm, smooth, velvety.....	29.5 to 30.0
Fairly desirable. Fluffy, crumbly, coarse, or icy, weak or soggy.....	27.0 to 29.0
Undesirable. Sandy, or any of the following to a pronounced degree: crumbly, coarse or icy, buttery, weak.....	25.0 to 26.0

Melting quality.—A small amount of ice cream should be allowed to melt at room temperature and the following conditions observed:

Desirable: Melts freely, free from curd, and does not whey off. No cut on melting quality.

Undesirable: Curdy or does not melt. Make deduction in score for melting quality, but not to exceed one point.

Color.—If the color is uniform and natural, there should be no deduction. Undesirable, unnatural, or uneven color should have a maximum deduction of one point.

Package.—A clean, bright package with parchment if in a can should have no deduction. Undesirable package may be an unclean can, rusty can, or one without parchment, in which case the maximum deduction is one point.

Terms Used in Judging Ice Cream

Flavor Criticisms

COOKED—A flavor resembling boiled or overheated milk or milk products. Sometimes called scorched. May be due to the flavor in the materials used or to a too high pasteurization temperature on the ice cream mix.

EGG—The use of egg yolk powder sometimes causes a noticeable flavor in ice cream. The most objectionable flavor is that of poorly flavored or stale egg powder.

GARLIC—A flavor resembling the odor of garlic is found in ice cream made from milk drawn from cows that have eaten wild garlic.

LACKS FRESHNESS—Loss of flavor.

OXIDIZED—A flavor resembling the taste and odor of wet cardboard.

TOO SWEET—Sweeter to the taste than desirable.

UNNATURAL SWEETENER—A flavor resembling corn syrup.

HIGH ACID—When milk or milk products have a slightly sour flavor and odor, they are called "high acid." A pronounced condition of this kind is called "sour."

LACKS FINE FLAVOR—Sometimes an ice cream does not have the fine, full flavor that one desires. In such cases this term is used to describe the defect. It may be caused by poor quality flavoring.

LACKS FLAVORING—An ice cream should be flavored pleasingly and strongly enough to show its characteristics. If this is not the case, the above term is used to designate the defect, often caused by not using enough flavoring extract.

LACKS SWEETNESS—When a product is not sweet because too little sugar has been included, the above term is used.

METALLIC—This flavor gives one the impression of holding a piece of metal in the mouth between the teeth. It is often caused by the presence of metallic salts in the milk products from which the ice cream was made or from handling in rusty cans.

NEUTRALIZER—When dairy products of high acid content are used in the ice cream mix and alkalies are added to reduce the acidity, a "neutralizer" or "soda" flavor is produced.

OLD INGREDIENTS—At times there are flavors that cannot be defined exactly but which resemble old, off-flavored products. Such flavors are referred to as "old ingredient" flavors.

RANCID—A flavor characteristic of spoiled butterfat and resembling the flavor of butyric acid. It is due to the decomposition of the butterfat and may be found in any product that contains rancid fat.

SALTY—A salty flavor in the product usually results from contamination by salt. Although some makers add a small amount of salt to the mix, a noticeable salty flavor should be criticized.

STORAGE—This flavor develops in ice cream when held for a considerable length of time in storage. It gradually loses some of its flavor and develops a "storage" flavor.

TOO HIGH FLAVORING—Too much flavoring extract of good quality may result in a flavor that would be referred to as "too high a flavor."

UNNATURAL FLAVORING—This term refers to the type of flavor and usually refers to a synthetic flavor resembling vanilla. It may also result from the use of small amounts of flavoring extracts other than vanilla, such as lemon or maple.

UNCLEAN—A term used to designate a flavor and odor which one would associate with unclean utensils or cans. Milk products made from milk which has this flavor will often impart it to the ice cream. It is very undesirable.

Body and Texture Criticisms

BUTTERY—When the ice cream contains butter granules large enough to be detected on the tongue or roof of the mouth, it is called "buttery." It is often present in improperly homogenized ice cream.

COARSE—The texture of an ice cream should be smooth and fine; when this is not the case, it is criticized as being "coarse." It may be caused by incorrect composition or improper freezing.

CRUMBLY—When ice cream does not hold together but breaks or crumbles, this term is used. It is due to incorrect composition and sometimes to too high an overrun.

FLUFFY—The incorporation of excessive amounts of air in ice cream produces a "fluffy" or light body.

GELATIN LUMPS—Undissolved gelatin is sometimes found in ice cream. Such a condition is defined as "gelatin lumps."

GUMMY—The use of too large an amount of stabilizer often gives a body and texture that will not melt readily. It has a firmness not characteristic of ice cream of good body and texture.

ICY—This term is used to denote the presence of ice crystals in the ice cream when they are large enough to be noticeable between the teeth. Large crystals may be due to too slow freezing, or thawing and then freezing. Such samples should not be scored.

SANDY—A term used to denote the presence of lactose crystals which are large enough to be noticed on the tongue. They can usually be felt between the fingers and feel like very fine sand.

SOGGY—Heavy, compact ice cream is often referred to as “soggy.” It may be due to excessive solids in the mix or to a very low overrun which results in the incorporation of only a small amount of air.

WEAK—When ice cream is held on the tongue one expects it to melt down and feel somewhat like rich cream. When it melts down and feels thin, more like milk than cream, it is referred to as being “weak.”

Melting Quality Criticisms

CURDY—Ice cream should melt into a smooth, creamy mass. When the mass appears curdled, this term is used as a criticism.

DOES NOT MELT—When ice cream fails to melt down into a creamy mass, this term is used as a criticism.

Package and Color Criticism

NO PARCHMENT—Every can of ice cream should be covered with parchment under the lid. When this is not the case, the package should be criticized.

RUSTY—When the interior of the container shows rust spots, the package should be criticized by using this term.

UNCLEAN PACKAGE—All packages containing food products should be clean. When they are not, they are criticized by this term.

UNNATURAL COLOR—The natural color of cream is the color desired. The degree of intensity should not be criticized. The occurrence of shades of red, green, and orange should be considered as unnatural in vanilla ice cream.

UNEVEN COLOR—When two or more lots of ice cream are mixed together after freezing, an uneven color may result.

CONDUCTING A JUDGING CONTEST

Dairy products can be judged wherever suitable samples and equipment are available. The nature of the work makes it possible to carry on such work in the classroom if desired. High school contests in judging milk, cream, and butter have been conducted for several years in Nebraska. Collegiate contests in judging milk, butter, cheese, and vanilla ice cream have been conducted each year in connection with the dairy industries exposition under the direction of the American Dairy Science Association.

Observation indicates that there has been great variation in the training of the individuals taking part in these contests. A coach can impart to the pupil only the knowledge that he has obtained from experience or from available literature. In an effort to standardize the information much research has been carried on throughout the United States on methods of judging and factors affecting the quality of dairy products. Through the cooperation of the United States Department of Agriculture and committees of the American Dairy Science Association much progress has been made in standardizing procedures. It is hoped that this information with other material as presented here may be of value to the teacher or coach in presenting judging work to the student.

Milk Samples

One quart of milk to represent each of the seven or ten samples to be scored, as well as the three key samples, should be on hand for each 12 to 15 persons in the contest. It is preferable that it be divided into portions so that each group will have a freshly warmed sample when they examine it for flavor. Samples not used for flavor determination should be kept cold until used.

Materials such as parchment paper, tin foil, cloth, and string for preparing the bottle and cap exhibit should be available. A sediment tester and disks are necessary for preparing sediment disks. Petri dishes for holding the disks are preferred but are not absolutely necessary. Paper cups for tasting the milk are usually used, although individual glass containers will answer if provision is made for rinsing them between samples. The milk to be scored should show as wide a variation of flavors as possible but should represent marketable milk. The bottles to be scored for bottle and cap should be prepared to show typical variations. Sediment disks should show a considerable range. Each sample for scoring should be well marked by a number on the judging table. Often three key samples are prepared for the contestants to examine, with the judge's scores and criticisms attached. These should represent high, low, and medium quality in flavor, sediment, and bottle and cap. The contest ordinarily consists of judging seven or ten samples, which should cover a wide range of scores for each factor.

Flavor samples.—Usually a sufficient variety of flavor samples can be obtained by examining the milk of several producers. Samples of milk from individual cows will often furnish excellent variety. If specific flavors are needed, the following procedures may assist in producing the desired flavors:

BITTER—The addition of a very small amount of quinine or powdered gall will give this flavor. The amount used will depend upon the intensity desired.

CARDBOARD—A bottle of fresh, warm milk is placed in cold water (ice water is best) and stirred with a piece of clean copper until cooled to 45° F. Leave the copper stirrer in the milk and hold for several days at about 45° F. The flavor develops and will be more pronounced after being held. The milk must be kept cool and sweet.

COOKED—Place bottle of milk in hot water bath, heat to 150° F., hold for 40 minutes, and cool.

COWY—Allow a container of fresh, warm milk to cool while exposed to a cloth which has been treated as follows: The cowy odor is the most pronounced at points on the cow's body where there is the greatest amount of oily secretion. If a cloth is rubbed back of the ear or back of the front legs it will absorb this oily secretion and odor. The desired results can be obtained by hanging the cloth over the container of cooling milk.

DISINFECTANT—Adding a minute quantity of disinfectant material or exposing the milk to a cloth upon which disinfectant has been placed should give the desired results. Hypochlorite disinfectants do not affect the flavor of milk, but most other disinfectants do.

FEED—This flavor can be obtained from the particular feed or group of feeds by exposing the warm milk, if the feeds have considerable odor, or by submerging them in the milk in a clean cloth, if they have a mild flavor, while the milk is cooling.

FLAT—The milk of individual cows should be examined when looking for this flavor. Withholding all feed from a cow for four or five hours before milking will help to eliminate the flavors in the milk, tending to make it have less flavor and to be slightly flat.

GARLIC or ONION—Drop a few pieces of cut garlic or onion into the milk.

HIGH ACID—A sample of milk held at 70° F. for 10 to 12 hours will usually develop this flavor.

METALLIC—This flavor is difficult to produce satisfactorily. If warm, fresh milk is placed in a container that is slightly rusty and allowed to cool slowly for 10 to 12 hours the flavor may develop.

MUSTY—Exposing cooling milk to musty vegetables such as beets, turnips, or potatoes will give this flavor.

RANCID—This flavor can be produced by adding a very minute quantity of butyric acid or exposing the milk while cooling to a cloth on which have been placed a few drops of butyric acid or a small amount of rancid butter. Mixing raw and homogenized milk and left standing for some time will also produce this flavor.

SALTY—A salty sample of milk can very often be found by sampling the milk of individual cows. It can be produced by adding a small amount of common salt.

UNCLEAN—This flavor is difficult to produce artificially, but can be obtained by sampling the milk of the producers as it is delivered to a milk plant. It is not usually hard to find in warm weather.

WEEDY—This flavor is usually obtained without much difficulty in the fall, especially during the dry season. Exposing the milk while cooling to some half-dried rag weed or allowing the cow to inhale the odor of weeds just before milking should give a characteristic flavor.

It is generally better to develop a stronger flavor than desired, as it can be adjusted by diluting with unflavored milk. With a little practice very good sets of samples can be prepared.

Sediment disks.—Sediment disks for judging can best be obtained by filtering pint samples of warm milk through the sediment tester. Usually the sample of milk as produced is much more satisfactory than are prepared samples. If several quarts of rather dirty milk can be obtained, disks showing different amounts of sediment can be prepared by filtering different amounts of milk. For a clean disk a sample can be run through the second time.

Container and Closure.—A set of container and closure samples for judging can be prepared at the time of the contest. In instructional work it is often desirable to prepare a set that can be used more than once. In this case approximately a teaspoonful of formalin should be added to each quart of milk used. Skim milk may be used in place of whole milk. While pint bottles are preferable, other sizes may be used if desired.

The following suggestions will be helpful in the preparation of these samples. The bottles are filled with milk in the usual manner and capped with regular caps (Fig. 3).

LIP COVER NON-WATERPROOF—A piece of non-waterproof paper or cloth is placed over the top of bottle and fastened in place with wire, string, or a rubber band.

CHIPPED LIP—A bottle with a chipped mouth or pouring lip will have to be selected to show this defect.

DIRTY BOTTLE—Select a bottle before filling that has a small amount of dirt dried on the inside walls.

LEAKY CAP—Notch or dent the edge of cap before capping the bottle. This will cause it to leak when inverted.

LIP UNPROTECTED—A bottle capped with an ordinary cap will be satisfactory.

LIP PARTLY PROTECTED—This will have to be shown by the use of special caps which only partly cover the pouring lip.

A perfect bottle and cap can be prepared by securely fastening some waterproof material over the top of a full bottle of milk with a sealed fastener. Such material as parchment paper, tin foil, or regular hood caps can be used for this purpose. Most paper containers are scored perfect.

Cream Samples

Very little difficulty should be experienced in finding suitable samples. Cream as delivered to the cream station or creamery will usually furnish enough variety. The samples may be held in any container that is handy, although it should be so constructed that the tasting rod can be dipped into the cream with ease. If a sufficient variety of flavors is not available, similar procedures as suggested in the case of milk may be followed. The incubation of cream samples at a temperature of about 100° F. for two or three days will usually develop a flavor. Often holding the cream at a temperature of 75° F. for three or four days will cause an old cream flavor.

Butter Samples

While it is desirable to have butter in tubs or other large containers so that a full trier can be drawn, it is not practical under ordinary conditions. In contests of national character this type of package is used, but for smaller contests smaller packages can be used with much less expense. Butter in any type of package that is available can be used for judging work. The one-pound print is a very satisfactory package, or even the quarter pound print may be used. When such packages are used, the factor of body is usually considered perfect because of the inability of the judge to draw a plug. A spoon can be used in place of a trier in this case.

Cheese Samples

As the style or shape of the package of cheddar cheese does not affect the score, a variety of shapes or styles of packages may be used in the same class. Often it is difficult to obtain the desired quantity of cheese all in the same style of package. For that reason one should pay no attention to the style of package. A section or slice of a larger package, provided the judge can draw a trier full of cheese, will be satisfactory. White and yellow cheese may be used together in the same group of samples. All cheese samples should be tempered at room temperature for several hours before they are judged, as cold cheese is difficult to judge.

Ice Cream Samples

Vanilla ice cream is usually used in a judging contest. Suitable samples can be obtained in most towns. The type of ice cream container is of little importance, provided a sufficient supply is available. In the classroom or small contest, pint samples are sufficient, but enough pints of each sample should be available so that a fresh sample can be had for each group of students or, if the sample is depleted, before the students are through judging.

In large contests usually 2½ gallon containers are kept in a ten-hole mechanically refrigerated cabinet adjusted to the proper temperature for dipping ice cream. In this case each student dips his own sample as he uses it. In a smaller contest, samples can be kept under proper refrigeration and brought to the place of judging as needed. In this case the properly tempered samples are numbered and submitted for judging. The sample should have a spoon in it with which the judge places a small amount of ice cream upon his own spoon, which is placed in his mouth. This procedure eliminates the dipping of the spoon that has been in the judge's mouth back into the ice cream sample.

USE OF SCORE CARDS AND GUIDES

Probably one of the greatest difficulties that the inexperienced judge encounters is the proper use of the score card. Figures placed in the wrong place, mistakes in adding, and general carelessness are common troubles. The student should score each item and make a check mark opposite the criticism that describes the defect. If the defect is not listed, write it in the blank space. Detailed scoring guides for the different products designated for instructional use are valuable,⁸ as copies can be made and furnished each student for study.

⁸ P. A. Downs, E. O. Anderson, C. J. Babcock, F. N. Herzer, and G. M. Trout, Evaluation of Collegiate Students Dairy Products Judging, Since World War II. *Jour. Dairy Science*. Aug. 1954 Vol. XXXVII, 1021-1026.

Detailed Milk Scoring Guide*

		Intensity of Defect		
		Slight	Definite	Pronounced
Flavor 45 (Normal 25-40)	No criticisms	40-41		
	Flat	39.0	38.0	37.0
	Cooked	39.0	38.0	37.0
	Feed	39.0	37.0	35.0
	Salty	38.0	36.0	34.0
	Metallic	36.0	34.0	32.0
	Malty	36.0	33.0	30.0
	Cowy	36.0	33.0	30.0
	Bitter	36.0	32.0	...
	Oxidized	36.0	33.0	30.0
	Weedy	35.0	33.0	30.0
	Musty	35.0	33.0	30.0
	Unclean	35.0	30.0	...
	Disinfectant (foreign)	35.0	33.0	30.0
	High Acid	33.0	30.0	...
	Rancid	33.0	30.0	...
	Garlic and Onion	35.0	33.0	30.0
Barny	35.0	30.0	...	
<hr/>				
Sediment 10	Normal Range 5-10			
<hr/>				
Container and Closure 5 (Normal 3-5)	No criticisms	5		
	Unsealed, cut	.25	Chipped lip, cut	.25
	Not full, cut	.5	Lip unprotected, cut	1.0
	Dirty, cut	1.0	Lip partly protected, cut	.5
	Closure leaky, cut	.5	Torn closure cover, cut	.5
			Non-waterproof cover, cut	.5
<hr/>				
Bacteria 35	Allowed perfect score in student contest			
<hr/>				
Temperature 5	Allowed perfect score in student contest			
<hr/>				
Total 100				
Range of Score for Each Class of Milk Flavor				
	Excellent	40-45		
	Good	37-39.5		
	Fair	34-36.5		
	Poor	30-33.5		

* Use same for cream.

Detailed Butter Scoring Guide

Suggested Values to be Used in Scoring				
		Intensity of Defect		
Criticisms		Slight	Definite	Pronounced
Flavor	No criticisms	38-45		
45	Acid	36.0	35.0	34.0
(Normal 31-39)	Bitter	36.0	35.0	33.0
	Briny	37.0	36.0	35.0
	Cheesy	34.0	33.0	32.0
	Coarse	37.0	36.0	35.0
	Cooked	38.0	37.0	36.0
	Feed	38.0	37.0	36.0
	Fishy	33.0	32.0	31.0
	Flat	37.0	36.0	35.0
	Garlic (onion)	34.0	33.0	32.0
	Malty	36.0	35.0	34.0
	Metallic	34.0	33.0	32.0
	Musty	34.0	33.0	32.0
	Neutralizer	35.0	34.0	33.0
	Oily	34.0	33.0	32.0
	Old cream	35.0	34.0	33.0
	Rancid	33.0	32.0	31.0
	Storage	37.0	36.0	35.0
	Tallowy (oxidized)	34.0	33.0	32.0
	Unclean (utensil)	35.0	34.0	32.0
	Weedy	35.0	34.0	32.0
	Woody	36.0	35.0	34.0
	Yeasty	34.0	33.0	32.0
Body	No criticisms	25		
25	Cloudy brine	24.5	24.0	23.5
(Normal 23-25)	Crumbly	24.5	24.0	23.5
	Gummy	24.5	24.0	23.5
	Greasy	24.5	24.0	23.5
	Leaky	24.5	24.0	23.5
	Mealy	24.5	24.0	23.5
	Salvy	24.5	24.0	23.5
	Sticky	24.5	24.0	23.5
	Weak	24.5	24.0	23.5
Color	No criticisms	15		
15	Color specks	14.5	14.0	13.5
(Normal 13-15)	Mottles	14.0	13.0	12.0
	Uneven	14.0	13.0	12.0
	Wavy	14.5	14.0	13.5
Salt	No criticisms	10		
10	Gritty	9.0		
(Normal 9-10)				
Package	No criticisms	5		
5	Dirty tub	4.0		
(Normal 4-5)	Poor finish	4.0		

Range of Score for Each Class of Flavor of Butter

Excellent	38 (No criticism)
Good	36 -37.5
Fair	34.5-35.5
Poor	31 -34

Detailed Cheese Scoring Guide

Suggested Values to be Used in Scoring			
Criticism	Intensity of Defect		
	Slight	Definite	Pronounced
Flavor 45 (Normal 35-42)	No criticisms	40-42	
	Acid	38.5	35.5
	Bitter	38.5	35.5
	Whey taint	37.0	35.0
	Feed	38.5	36.5
	Fermented	37.0	35.0
	Flat	39.5	38.5
	Fruity	38.0	36.0
	Heated	39.0	37.0
	Moldy	37.0	35.0
	Rancid	37.0	35.0
	Unclean	38.0	36.0
	Weedy	38.0	36.0
	Yeasty	37.0	35.0
Body and Texture 30 (Normal 26-29.5)	No criticisms	29.5-30	
	Corky	29.0	28.0
	Crumbly	29.0	28.0
	Curdy	29.0	28.0
	Flaky or short	29.0	28.0
	Gassy pinhole	(few) 28.5	(many) 26.5
	Mealy	29.0	28.0
	Open mechanical	(4 to 6) 29.0	(7-12) 28.5 (over 12) 28.0
	Pasty	28.5	26.5
	Spongy	28.5	26.5
	Sw. curd holes	(4 to 6) 29.0	(7-12) 28.5 (over 12) 28.0
	Weak	28.5	26.5
	Yeast holes	28.5	26.5
Color 10 (Normal 9-10)	No criticisms	10	
	Acid cut	9.5	9.0
	Mottled	9.5	9.0
	Seamy	9.5	9.0
	Wavy	9.5	9.0
Allowed perfect score in student contest			
Finish 15 (Normal 14-15)	No criticisms	15	
	Cracked rind	14.5	14.0
	Huffed	14.5	14.0
	Light spots	14.5	14.0
	Moldy	14.5	14.0
	Rot spots	14.5	14.0
	Scaly paraffin	14.5	14.0
	Soiled	14.5	14.0
	Uneven surfaces	14.5	14.0
	Wrinkled bandage	14.5	14.0
Range of Score for Each Class of Flavor of Cheese			
	Excellent	40-41 (No criticisms)	
	Good	38-39	
	Fair	36-37	
	Poor	35	

Detailed Ice Cream Scoring Guide

Suggested Values to be Used in Scoring				
		Intensity of Defect		
		Slight	Definite	Pronounced
Criticisms				
Flavor 45 (Normal 31-40)	No criticisms	40-41		
	Lacks fine flavor	39.0	38.0	37.0
	Lacks flavoring	39.0	38.0	37.0
	Lacks freshness	38.0	37.0	36.0
	Lacks sweetness	39.0	38.0	37.0
	Egg	39.0	38.0	37.0
	Cooked	39.5	38.0	36.0
	Storage	37.0	36.0	35.0
	Too sweet	39.0	38.0	37.0
	Salty	38.0	37.0	36.0
	Unnatural flavoring	36.0	34.0	33.0
	Old ingredient	37.0	35.0	33.0
	Oxidized	36.0	34.0	32.0
	Metallic	36.0	34.0	32.0
	High acid (slightly sour)	35.0	32.0	30.0
	Neutralizer	35.0	33.0	31.0
	Unclean	35.0	33.0	31.0
	Rancid	35.0	32.0	30.0
	Unnatural sweetener	38.0	37.0	35.0
Body and Texture 30 (Normal 25-29.5)	No criticisms	29.5-30		
	Weak	29.0	28.0	27.0
	Coarse	29.0	28.5	28.0
	Crumbly	28.0	27.0	26.0
	Fluffy	28.0	27.0	26.0
	Soggy	28.0	27.0	26.0
	Buttery	28.0	27.0	26.0
	Sandy	28.0	27.0	26.0
	Icy	28.0	27.0	26.0
Melting Quality 5 (Normal 4-5)	No criticisms	5		
	Curdy		4.5	4.0
	Does not melt		4.5	4.0
Color and Package 5	No criticisms	5		
	Color uneven	4.5	4.0	3.5
	Color unnatural	4.5	4.0	3.5
	No parchment	4.5	4.0	3.5
	Rusty can	4.5	4.0	3.5
	Unclean can	4.5	4.0	3.5
Bacteria 15	Allowed perfect score in student contest			
Total 100				

Range of Score for Each Class of Flavor of Ice Cream

Excellent	40 -41	(No criticism)
Good	37.5-39.5	
Fair	34.5-37	
Poor	30 -34	

CONTESTS

Only persons who have had training and some experience in the process of judging should be entered in a contest. They should be in good health, dressed in clean clothes, and free from body odors. This is especially true of hands. The use of strong-smelling soap, tobacco, or other materials will often hinder the work not only of that person but also of others within smelling distance. As the contest lasts for several hours, a good night's rest, followed by a normal or slightly lighter than normal meal, should be taken previous to the contest. No strong-flavored foods or those likely to upset the stomach should be eaten. During the contest some coaches prefer to furnish fruit such as apples to enable the individual to clear his mouth. Water, no doubt, is as satisfactory as anything and eliminates the possibility of fruit flavors and odors.

The natural attitude of the contestants is very important. They should enter the contest with the purpose of learning rather than with that of winning. Too often the latter idea has made the contestant nervous, and he has failed to use good judgment during the contest. A feeling of self-confidence and the resolve to score the products accurately regardless of the outcome of the contest is the proper attitude. It is an educational contest and not all can win, but all will profit from the experience.

The judge needs a good pencil and 6-inch butter trier. In general the room should be light, of normal temperature, free from odors, and large enough to accommodate the students. A large table should be available for holding samples of each product. A supply of fresh warm and cold water is necessary, as well as containers for waste materials. A sink is very desirable. Score cards for different products to be scored should be available and ready for distribution as the contestant is ready for them.

Rules Governing Judging Contests

1. A team shall consist of three persons.
2. No mark of identification of the contestant or school shall be in evidence during the contest.
3. No notebooks or paper shall be taken into the contest. Score cards will be furnished.
4. While the contest is in progress there shall be no communication between contestants.
5. All persons except the contestants and those in charge shall be excluded from the place of scoring during the contest.
6. Each contestant on entering the place of contest will be assigned a number and will be given score cards on which to record his scores and criticisms. The contestant shall place the number assigned him on each card.
7. The contestants will be divided into groups containing one individual from each team. Each group will score samples of products as directed.
8. The person in charge may set out three key samples of each product, showing good, medium and poor quality, with the judge's score and criticisms attached. The contestants shall have access to these samples during the 10 minutes previous to their scoring of that product in the contest, and then only. In National Collegiate contests no key samples are used and ten samples are scored instead of seven.

9. Each contestant shall score seven or ten samples of each product, 45 minutes being allowed for each product.

10. Each contestant should look his cards over carefully to see that they are marked properly and turn them in to the person in charge of the group.

Grading Cards

The work of the contestants shall be graded in the following manner: The scores and criticisms shall be graded separately, but the grades shall be added to form the total for the product. The lowest score wins.

Score.—The contestant's score on each item on the score card will be given a grade expressed by the difference between his score and the official score. For example, if a student scores "flavor" 37 and the judge's score is 35, the student receives a grade of 2 points. The grades shall be recorded in red pencil.

Criticism.—The grading of criticisms, which is independent of the grading of scores, is based on the contestant's proficiency in recognizing the same quality merits and defects of the various samples as noted by the official judge. The contestant's grade on criticisms for a single item shall be:

- (1) perfect, 0, when the contestant
 - (a) checks precisely the same defect (s) as the official and checks *only* those made by the official, or
 - (b) recognizes with the official that the item is above criticism, under which condition a check is not necessary.
- (2) the maximum, 1.0 point, when the contestant
 - (a) fails to check any of the defect(s) noted by the official judge,
 - (b) checks a defect(s) when the sample was judged by the official as being above criticism, or
 - (c) fails to check a criticism(s) when the official judge scores the sample within the criticizable range (although the contestant may have scored the sample above criticism), or
 - (d) fails to check a criticism(s) when his score indicated he should have (although the official scored the sample above criticism).
- (3) less than one, 0.25, 0.33, 0.50, 0.67, or 0.75, etc., of a point according to the percentage of the criticisms checked correctly.

Example:

- (a) the official checks 3 criticisms and the contestant checks only one, which is identical with one of the official criticisms. The grade shall be 0.67.
- (b) the official checks one criticism and the contestant checks three, one of which coincides with that of official. The grade shall be 0.67.
- (c) the official checks 3 criticisms and the contestant checks 3, one of which is identical with one of the official criticisms. The grade shall be 0.80. (A total of 5 different criticisms has been involved by official and contestant. They agree on one of these. Thus the contestant was 4/5 incorrect, meriting a grade of 0.80.)

Grades and standings.—A contestant's grade on a sample shall be the sum of his grades on "score" and "criticisms" of that sample. His grade on a pro-

duct shall be the sum of his grades on the 10 samples of that product. His grade on all products shall be the sum of his ranks on all four products.

A team grade for each product shall be the sum of the grades of its members.

As "grade" in this contest means "points lost," the contestant with the lowest "grade" shall be the winner and the team with the lowest "grade" shall be the winning team for that product.

The standing of each contestant shall be obtained by arranging the grades of all contestants in order from the lowest to the highest. Team standings in each product shall be obtained the same way.

Team standings in all products shall be determined by arranging the sum of the team standings in all four products in order from the lowest to the highest.

Breaking ties.—When two or more contestants or teams (except teams in all products) tie for a place for which a prize is awarded, the tie shall be broken in favor of the contestant or team having the lowest "grade" on flavor; if there is still a tie it shall be broken in favor of the one having the lowest grade on other items in the order in which they appear on the various score cards. If no prize is involved the placing shall remain a tie.

Team ties in all products, involving a prize, shall be broken in favor of the team having the least sum of the individual standings in the judging of the separate products. If no prize is involved the placing shall remain a tie.

Methods of Tabulating

After the cards for each product have been graded and checked, they can be tabulated either by the use of the large record sheet or by the card system. The larger score sheet provides a place for the contestant's name and number as well as for the team identification. For each product judged several columns are provided, one for each of the samples, one for the total score for the individual, and another for the total score of the team. In addition a column for individual placing and one for the team placing should be provided. For the tabulation of all products, four columns are necessary, one for the total score for the individual, one for team score, one for individual placing, and one for team placing. Care should be taken that errors are not made in tabulation and addition. Additions can be checked by adding totals for individual scores in each product and comparing them with the sums of the team scores for all products. After additions have been checked, the placings can be made.

Another method of tabulation is the card system, which is used by the American Dairy Science Association and by members of the U. S. Department of Agriculture at the National Collegiate Contest each year. This consists of recording the scores of each student for the particular product on the card. The total score is determined by adding, and the cards are placed in order with the lowest score first. In this way the individual ranking for the product is obtained. This is carried out for each product. On another card the scores of all products are tabulated for the contestants. These are added, and the cards are placed in order to determine the ranking of the contestant. In the same manner, a card is made out for each team, using the totals from the cards on each product. In this way the team totals for each product and for all products are determined and ranked by sorting the cards. Either method of tabulation can be used with satisfactory results.