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## Judging Quality in Dairy Products

P. A. Downs

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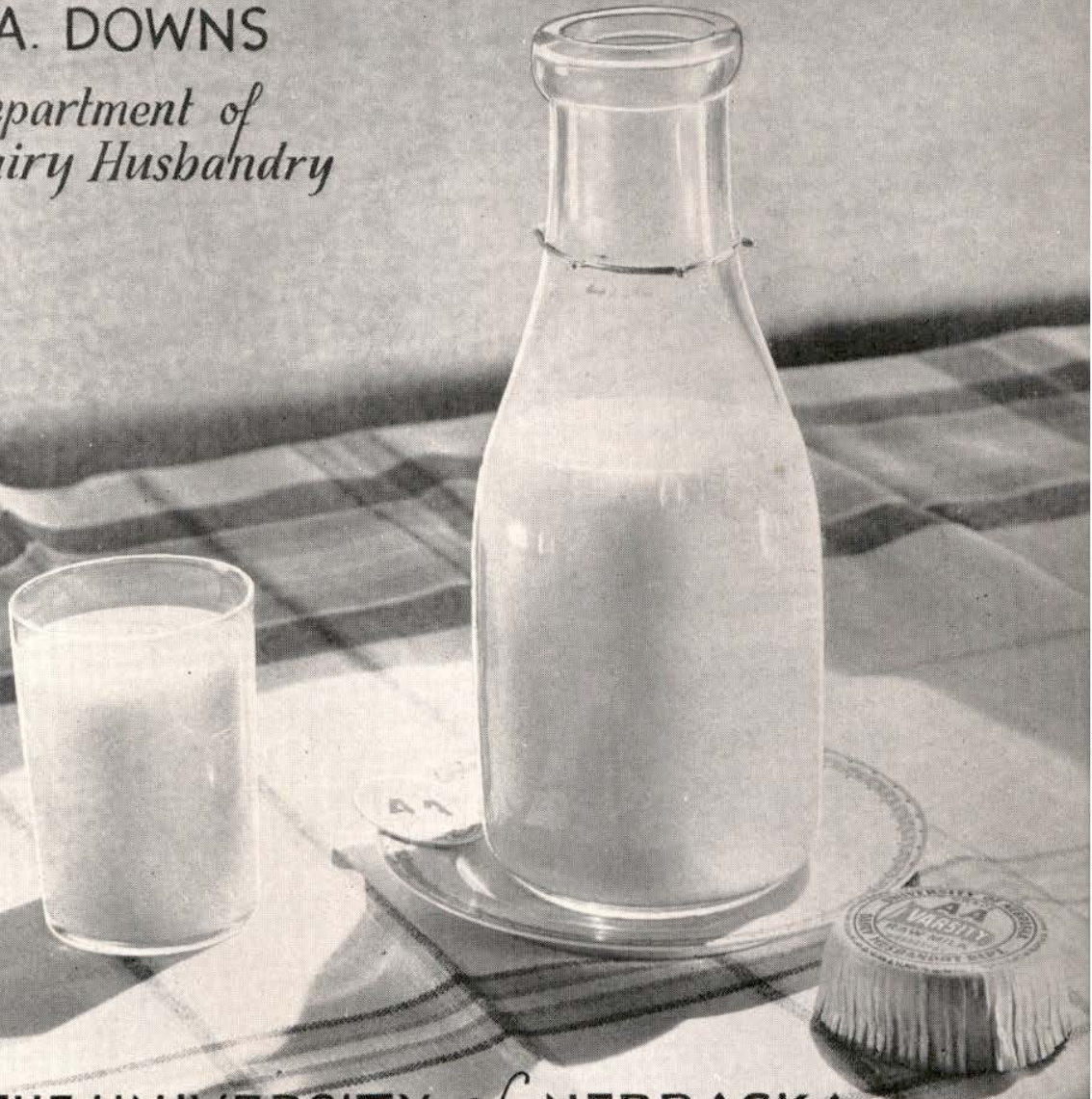
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# JUDGING QUALITY IN DAIRY PRODUCTS

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COLLEGE OF AGRICULTURE  
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# Judging Quality in Dairy Products

P. A. DOWNS

**I**N 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 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. No other tastes are known and they are sensed only by the minute organs called "taste buds" on the base of the tongue. All material in order to have a taste, must be soluble.

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 is 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 flavor and odors of dairy products.

That people differ in ability to taste—that is, to detect the presence of sour, sweet, bitter, and salt—has been demonstrated by Blakeslee and Fox.<sup>1</sup> 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

<sup>1</sup> A. F. Blakeslee and A. L. Fox, Tasters and non-tasters, Jour. of Heredity, Vol. 28, No. 3, March, 1932.



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 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 securing of these products usually originate in such organizations as the federal Bureau of Agricultural Economics and the Bureau of Dairy Industry, or in some other organization interested in 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 proposed but not yet adopted. 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 a city health department. 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. Dept. 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 given below. 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.

MILK SCORE CARD

Contestant's No. ....			Sample No. ....		
Factor	Student score	Official score	Grades		Criticism
			Score	Criticism	
Bacteria (45)	45.00				<b>Flavor:</b> Bitter Cardboard Cooked Cowy Disinfectant Feed Flat Garlic or onion  <b>Sediment:</b> See page 6 of this circular.
Flavor (25)	.				
Sediment (10)	.				
Temperature or acidity (15)	15.00				
Bottle and cap (5)	.				<b>Bottle and cap:</b> Absorbent cap protector Chipped mouth Dirty bottle Leaky cap Lip not protected Lip partially protected Not full Unsealed cap protector
TOTAL (100)	.				
PLACING					
GRADE ON CRITICISMS (TOTAL) .....					
TOTAL GRADE .....					

Approved by the American Dairy Science Association.

### 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 temperatures 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 placed in warm water until the milk attains a temperature of 70° to 90° F. Faint odors are more easily detected at these temperatures 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



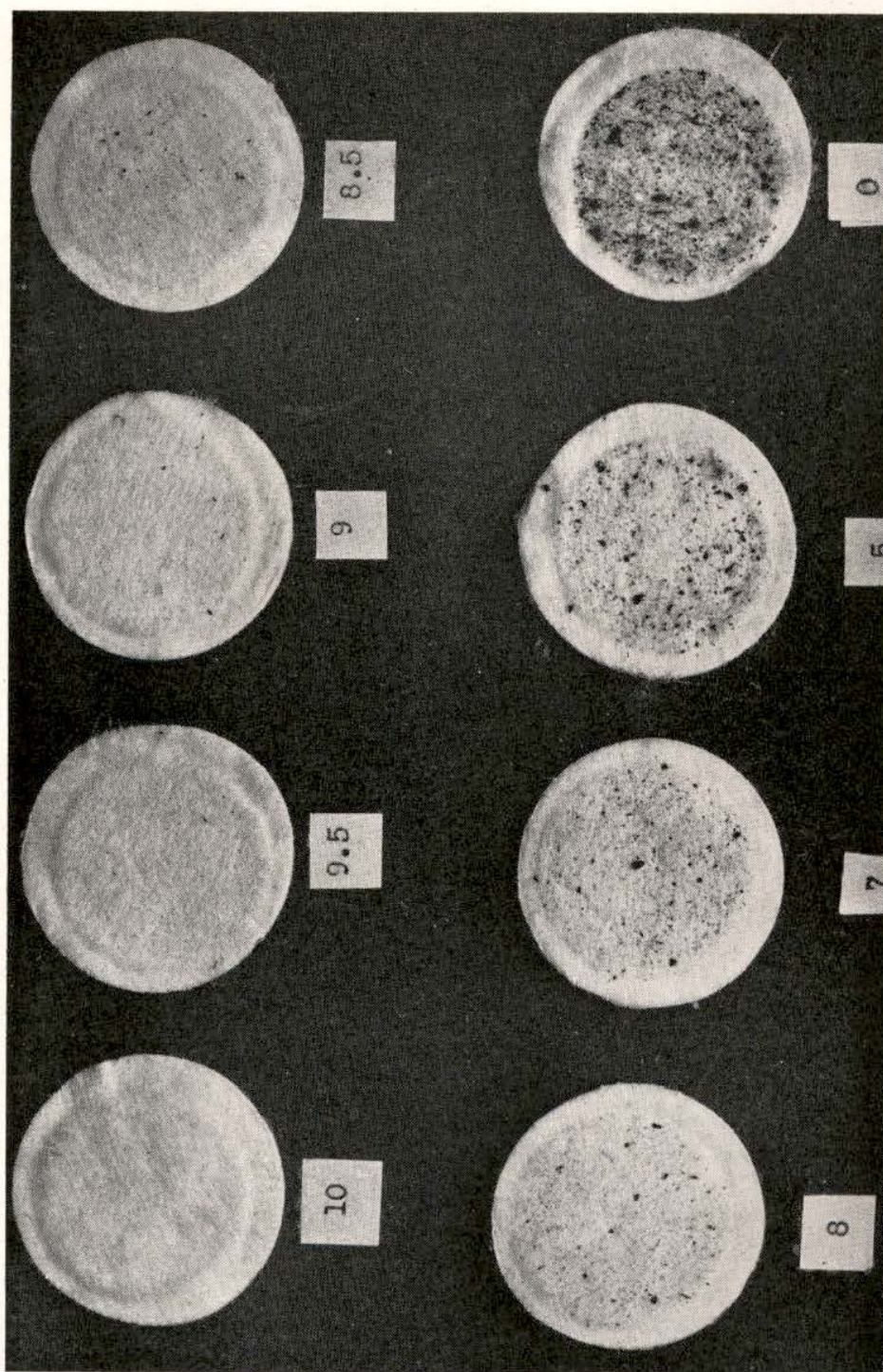


FIG. 1.—Standard disks for scoring sediment in milk.



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.

While no definite ratings can be given that will cover all varieties and intensities of flavors and odors, the following general guide may be used:

Description of flavor	Rating
Pleasant, full flavor, free from defects (no criticism required).....	23.0 to 25.0
Lacking full flavor, flat, very slight feed, slightly cooked.....	21.0 to 22.5
Cooked flavor, feed, salty, slightly cowy, slightly metallic, slightly bitter, slightly weedy or malty.....	18.0 to 20.5
Strong feed, weedy, garlic, bitter, unclean, musty, cowy, slightly high acid, slightly rancid, or cardboard (cappy).....	12.0 to 17.5
Rancid, strong cowy, high acid.....	0.0 to 11.5

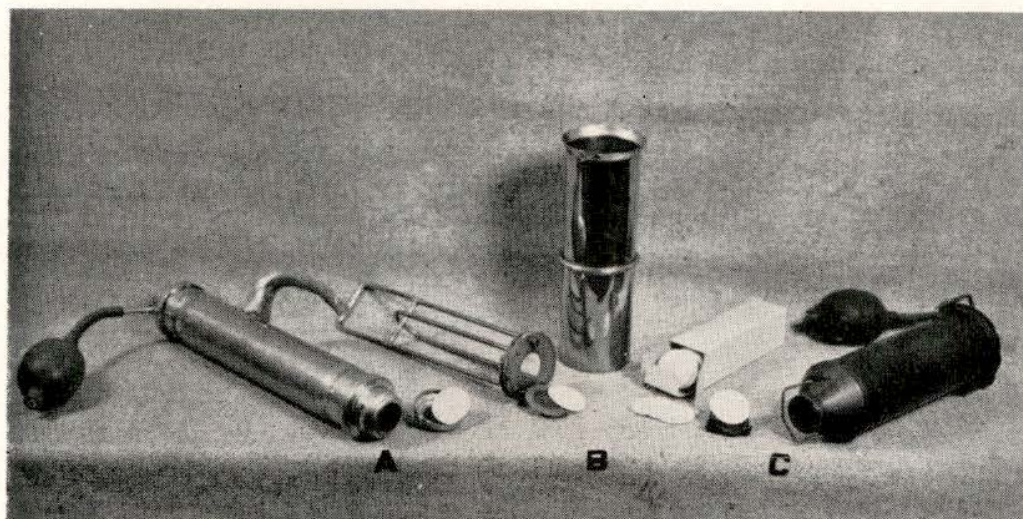


FIG. 2.—Types of sediment testers, with cotton disks.

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

**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 where a pint of milk is scored.



Number of tiny particles	Rating	Number of tiny particles	Rating
No perceptible trace.....	10.0	Four to six tiny particles.....	9.7
* One to two tiny particles.....	9.9	Six to eight tiny particles.....	9.6
Two to four tiny particles.....	9.8	Eight to ten tiny particles.....	9.6

Further reductions 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. The milk should be

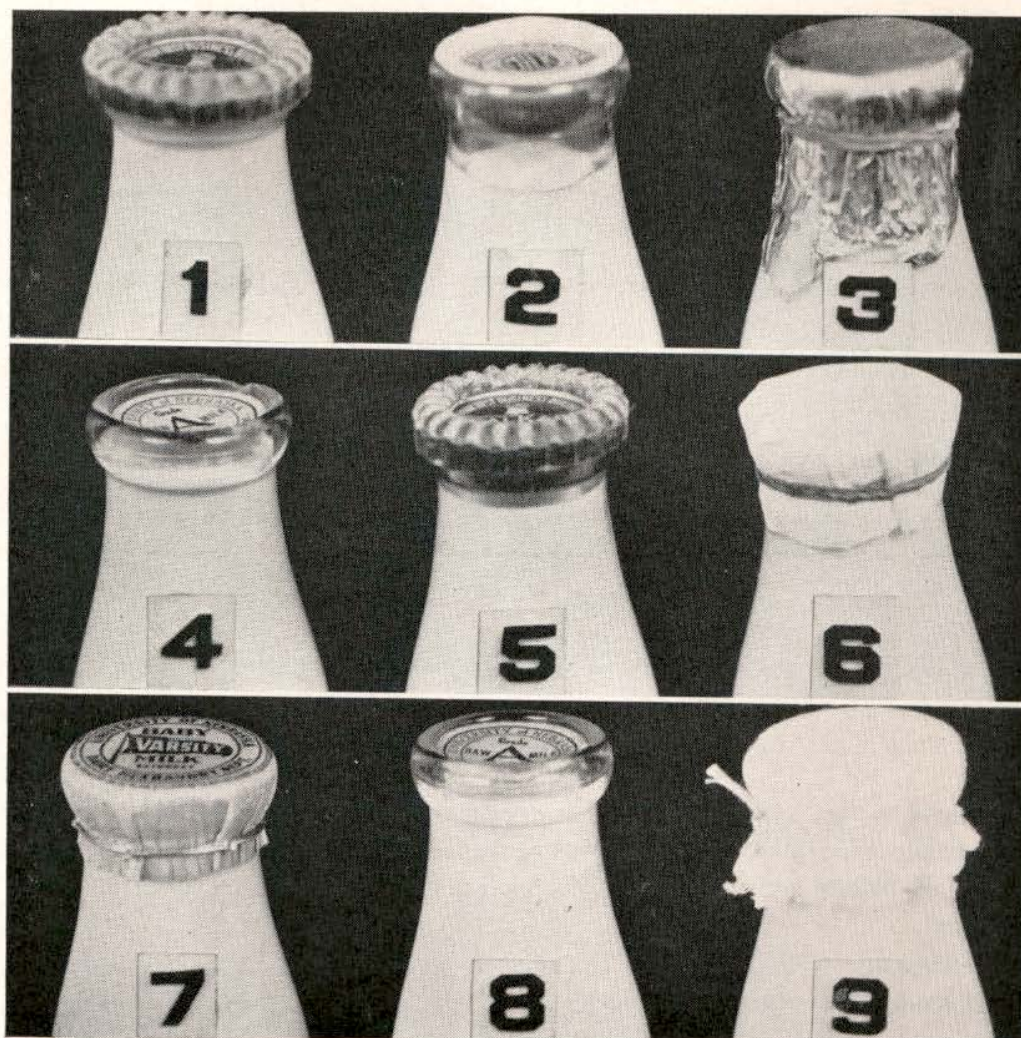


FIG. 3.—Bottle and cap samples prepared to show certain faults.

Criticism	Score
1. Lip partially protected (0.25).....	4.75
2. Lip partially protected (0.50). Not full (0.50).....	4.00
3. Unsealed cap protector (0.25).....	4.75
4. Lip not protected (1.0). Chipped lip (0.50).....	3.50
5. Lip partially protected (0.25). Not full (0.25).....	4.50
6. Absorbent cap cover (paper) (0.25). Unsealed cap protector (0.25).....	4.50
7. None (perfect score).....	5.00
8. Lip not protected.....	4.00
9. Absorbent cap cover (cheese cloth) (0.50). Unsealed cap protector (0.25).....	4.25



warmed slightly before it is run through the tester, as it will pass through the cotton disk much more quickly. A perfectly clean disk will score 10 with cuts for increasing amounts of sediment. Figure 1 will give an idea of the numerical ratings given to the disks. While only half-point cuts are shown, finer gradings are often made. Usually whole points are used between 0 and 7, and half points between 7 and 8, one-quarter points between 8 and 9.5, and one-tenth points between 9.5 and 10. (See suggested scores in paragraph above for this last group.)

**Bottle and cap.**—All samples should be in milk bottles. 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 which do not fit properly in the cap seats (Fig. 3). 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 securely sealed so that it cannot be removed without breaking the seal. If the bottle is closed with the usual cardboard milk cap, the pouring lip is unprotected and cut accordingly. It is also cut if covered with absorbent material such as cloth or common paper.

Types of defect	Suggested cuts
Bottle not full.....	0.25 to 1.0
Between $\frac{1}{4}$ to $\frac{1}{2}$ inch.....	0.25 cut
Between $\frac{1}{2}$ to $\frac{3}{4}$ inch.....	0.50 cut
Between $\frac{3}{4}$ to 1 inch.....	0.75 cut
Over 1 inch.....	1.00 cut
Dirty bottle (dirt inside of bottle).....	0.5 to 2.0
Cap poorly seated or leaky (if uncovered).....	0.1 to 1.0
Chipped lip .....	0.1 to 0.5
Pouring lip unprotected .....	1.0
Pouring lip partially protected.....	0.25 to 0.75
Cap covering non-water proof.....	0.25 to 0.75
Unsealed cap protector .....	0.25

#### TERMS USED IN SCORING MILK

##### Flavor criticisms:

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

**CARDBOARD**—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.

**COOKED**—A custard or caramel flavor caused by pasteurization or heating of milk to too high a 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. This flavor is due either to the condition of the cow or lack of high-flavored feed.



**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.

**HIGH ACID**—As bacteria grow in milk they ferment the lactose into lactic acid. The first appearance of such acidity is referred to as "high acid." A pronounced "high acid" flavor is called "sour". "Sour" milk is not salable.

**MALTY**—A flavor resembling that of malt. Often due to the development of certain bacteria and 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 the storage of milk in a musty cellar or milk house.

**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 the feeding of rancid feeds.

**SALTY**—Salty flavor is often due to a high sodium chlorine 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 short in pastures. Often resembles a wood flavor, due to the dry condition of weeds.

#### **Bottle and cap criticisms:**

**ABSORBENT CAP PROTECTOR**—A term used to indicate that the cap protector or hood is absorbent and not waterproof.

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

**UNSEALED CAP COVERING**—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.

**NOT FULL**—A bottle of milk should be full to within one-fourth inch of the cap.

### **JUDGING CREAM**

The judging of cream can be carried on wherever samples are available. No equipment is necessary except 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 and 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. For butter making a thin cream is expensive to handle, and when it sours often develops curd lumps which are objectionable. Cream which contains sediment or extraneous matter is not acceptable for food purposes by the Food and Drug Administration of the United States Department of Agriculture.



FIG. 4.—Cream is used in households in large quantities and should be of the highest quality.

#### CREAM SCORE CARDS AND THEIR USE

The 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.

The card used for the scoring of commercial cream and presented below takes into consideration the requirements for this type of product. Where laboratory facilities are available the complete score card may be used, including bacteria and yeast and mold count of the cream. Samples showing a total colony count of less than 500 per cubic centimeter, as determined by the use of skim milk, acidified malt, or other suitable agars



used in the determination of proteolytic bacteria and yeast and mold, should be considered perfect. A deduction of 0.1 point for each additional 1,000 colonies should be made. Where laboratory facilities are not available and when judging cream quality is done for instructional purposes, bacteria and yeast and mold count can be considered perfect.

### JUDGING PROCEDURE

Where the yeast and mold count is to be determined, this should be done 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.

#### CREAM SCORE CARD

Contestant's No.....			Sample No.....		
Factor	Student score	Official score	Grades		Criticism
			Score	Criticism	
Bacteria count (45)	45.00				<b>Flavor:</b> Flat      Cooked Bitter    Disinfectant Cowy     Garlic or onion Feed     Yeasty Musty    Metallic Salty     Unclean Weedy    Watery Rancid   Greasy
Flavor (25)	.				
Sediment (10)	.				
Acidity (15)	.				
Smoothness and body (5)	.				
TOTAL (100)	.				<b>Acidity:</b> Slightly sour Medium sour Very sour Rank sour  <b>Smoothness and body:</b> Thin      Boiling Dirty     Too thick Moldy    Curd lumps
PLACING					
GRADE ON CRITICISMS (TOTAL).....					
TOTAL GRADE .....					

**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 70° to 90° F. when examined. 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 is given as a guide in determining the score for certain flavor defects.

Description of flavor	Rating
Full flavor, free from defects .....	23.0 to 25.0
Lacking flavor (flat), very slight feed, slightly cooked or watery....	21.0 to 22.5
Cooked flavor, feed, salty, or slightly cowy.....	18.0 to 20.5
Strong feed, weedy, bitter, musty, cowy, yeasty, or unclean.....	12.0 to 17.5
Rancid, greasy, metallic, onion, or garlic.....	0.0 to 11.5



Samples showing disinfectant or coal oil, or defects pronounced enough to produce butter scoring 87 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. (See page 6.)

#### Method of Determining Sediment<sup>2</sup> in Commercial Cream

1. Use four 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, or 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 to 180° F. or above to dilute this mixture to about one pint.
6. Then filter through a Rapid-Flo filter disk (Johnson and Johnson). The mixture should at least be 160° F. before filtering; higher temperatures are desirable on some cream. (Do not heat the mixture.)

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

**Acidity.**—Acidity can be detected by taste and measured by titration. In judging, usually the taste has to be depended upon, but the opinion of the judge may be checked against the titratable acidity present. This acidity is determined by titrating nine cubic centimeters of cream with one-tenth normal sodium hydroxide solution, using phenolphthalein as an indicator. The number of cubic centimeters required divided by 10 gives the percentage of titratable acidity expressed as lactic acid.<sup>3</sup>

#### Suggested range of ratings

Criticism	Score	Rating
		Acidity test
Sweet cream .....	13.0 to 15.0	0.12 to 0.24
Slightly sour.....	10.0 to 12.5	0.25 to 0.35
Medium sour.....	7.0 to 9.9	0.36 to 0.60
Very sour.....	5.0 to 6.9	0.60 to 0.80
Rank sour.....	0.0 to 4.5	over 0.80

**Smoothness and body.**—Smoothness and body should be scored by observing the condition of the cream as it clings to the sampling rod as well as by the feel on the tongue. A perfect score would be allowed for a sample of cream, free from curd lumps, dirt, mold, and having a smooth even body of medium thickness.

#### Suggested range of ratings

	Rating
Free from curd lumps, dirt, and mold with even, smooth body of reasonable thickness .....	4.5 to 5.0
Small amount of curd lumps, slightly too thick or slightly too thin in body .....	4.0 to 4.4
Large amount of curd lumps, too thick or too thin; slight boiling; dirty ..	3.5 to 3.9
Cream that is moldy, boiling, or dirty.....	2.0 to 3.4

<sup>2</sup> Sediment is sometimes called extraneous matter.

<sup>3</sup> Philip A. Wright, Testing Milk and Cream, U. S. D. A. Misc. Pub. No. 161, 1933.



## TERMS USED IN JUDGING CREAM

## Flavor criticisms:

**BITTER**—A bitter taste which may be caused by feed or 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 having eaten 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 the addition of water to the cream or by excessive rinsing of the separator or cans.

**WEEDY**—A flavor resembling that of drying weeds. 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.

**YEASTY**—A flavor or odor resembling those resulting from alcoholic fermentation produced by yeast. It develops rapidly when cream is held at temperatures of 80° to 100° F. and results in much foaming or boiling and sometimes a bitter flavor. It can be retarded by holding at lower temperatures.

## Smoothness and body criticisms:

**BOILING**—If yeast is actively growing in a can of cream to the extent that carbon dioxide is formed fast enough to cause foaming, it is referred to as boiling.

**CURD LUMPS**—When thin cream becomes sour it has a tendency to produce lumps of curd. If the cream becomes quite warm these lumps contract and become hard.

**DIRT**—Particles of dirt or other foreign matter are sometimes found on the surface of cream or are visible to the eye during examination.

**MOLD**—When cream is held for some time a mold growth (*Oöspora lactis*) often develops on the surface.

**TOO THICK**—Used when cream is so high in fat that it will not flow.

**THIN**—Cream that is watery and low in fat does not keep well and is expensive to handle and transport. This may be due to rinse water being added to the cream.

## JUDGING BUTTER

The judging of 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. By this means the federal and private judges grade large amounts of butter which is 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



FIG. 5.—A fine, clean flavor is essential in high-quality butter.

"extras", while butter scoring 90 is designated as "Chicago standards". The score card used for grading purposes consists of a card of suitable size with space for information describing the lot of butter. The score is based upon the factors of flavor, which is allowed 45 points; body, 25 points; color, 15 points; salt, 10 points; and package, 5 points: making a total of 100 points.

For instructional work the following score card 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 6. It is important regardless of type of package that a representative sample be obtained by the use of a trier.



## BUTTER SCORE CARD

Contestant's No.....			Sample No.....		
Factor	Student score	Official score	Grades		Criticism
			Score	Criticism	
Flavor (45)					<b>Flavor:</b> Acidy      Woody      Storage Briny      Musty      Cheesy Cowy      Bitter      Neutralizer Feed      Garlic      Gasoline Fishy      Cooked      Metallic Flat      Greasy      Old cream Coarse      Heated      Unclean Oily      Yeasty      Burnt Weedy      Rancid      Tallowy
Body (25)					<b>Body:</b> Gummy      Mealy      Sticky Greasy      Salty      Cloudy brine Leaky      Weak      Crumbly
Color (15)					<b>Color:</b> Color specks      Mottled White specks      Wavy Uneven
Salt (10)					<b>Salt:</b> Gritty
Package (5)					<b>Package:</b> Dirty tub      Poor finish
TOTAL (100)					
PLACING					
GRADE ON CRITICISMS (TOTAL)....					
TOTAL GRADE .....					

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## 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 immediately under the nose so that the aroma can be observed. It should then be examined by good light for color defects. The body should be determined by the presence of free water on the plug as well as the resistance of the plug to the finger when pressed against it. A small amount of butter should then be placed in the mouth for the judging of flavor. The condition of the package should be observed before the work with the particular sample is finished.

**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 this prevents the detection of flavors to the best advantage. The atmosphere must be free from odors of all kinds which might interfere with the sense of smell



of the judge. 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.



FIG. 6.—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, and 64-pound wooden tub.

Description of flavor	Rating
Fresh, fine, sweet, and clean, if fresh make; or fine, sweet, and clean if storage butter (no criticism required) . . . . .	38.0 to 39.0
Fresh, sweet, and clean if fresh make; or sweet and clean if storage; also very slight feed, coarse, or flat . . . . .	37.0 to 37.5
Burnt, oily, heated, neutralizer, yeasty, feedy, briny, storage, cowy, acidy, cheesy, weedy, cooked, or tallowy to a slight degree . . . . .	35.5 to 36.5
Pronounced burnt, oily, heated, storage, neutralizer, cowy, yeasty, cheesy, weedy, or feedy. Slightly metallic, woody, bitter, or unclean. Very slight old cream . . . . .	33.5 to 35.0
Old cream, unclean, or musty. Slight gasoline, 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 amounts 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.

Description of body	Rating
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 25.5
Any of the above to a very pronounced degree . . . . .	23.0 to 23.5



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

Description of color	Rating
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.

Description of salt	Rating
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.

Description of package	Rating
Neatly packed in clean, sound packages .....	5.0
Dirty tubs or container 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 fine, sweet-cream flavor, which is required for fine butter which will score 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



absorption 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 the cows' eating wild garlic. Objectionable and can seldom be removed from milk or cream. Butter made from cream produced on pastures 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 this product in them. Cream or butter having this flavor is practically useless as a 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 which 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 overneutralized cream.

**OILY**—Butter-oil taste in butter which may be due to various causes, such as exposing cream to the hot sun, causing 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 enzyme and chemical action. When present to a pronounced extent butter is no longer salable 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 and develops this peculiar flavor. It develops more quickly in inferior butter than in the better types. The exact cause has not been demonstrated but it is believed to be due to chemical changes.

**TALLOWY**—Refers to butter which 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 which is objectionable and foreign to butter and 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 used in milking are the most common causes of flavors which we describe 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 had 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 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 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 or it may be caused by an "oiling off" of the butter-oil when butter is added to the cream for repasteurization, or by 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 when lacking in moisture.

**WEAK**—A condition used to describe butter which lacks the desired firmness and "standing up" properties. Usually caused by churning cream too soon after pasteurization or without cooling to a low enough temperature to secure proper firmness of the butterfat before churning.

**Color Criticisms:**

**COLOR SPECKS**—Reddish yellow specks throughout the butter 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 working remnants of other churnings into the butter.

**WHITE SPECKS**—Large numbers of small white specks (curd specks) throughout the butter is 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 undissolved salt due to insufficient working of the butter. Gritty butter is very often wavy or mottled in color.

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

**Package Criticisms:**

**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

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



FIG. 7.—High-quality cheddar cheese in a convenient-sized package.

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 United States Department of Agriculture, Bureau of Agricultural Economics, and set forth in U. S. D. A. Circular 157, is as follows:



	Score
Flavor .....	30
Body and texture.....	40
Finish and appearance.....	20
Color .....	10
Total.....	100

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.

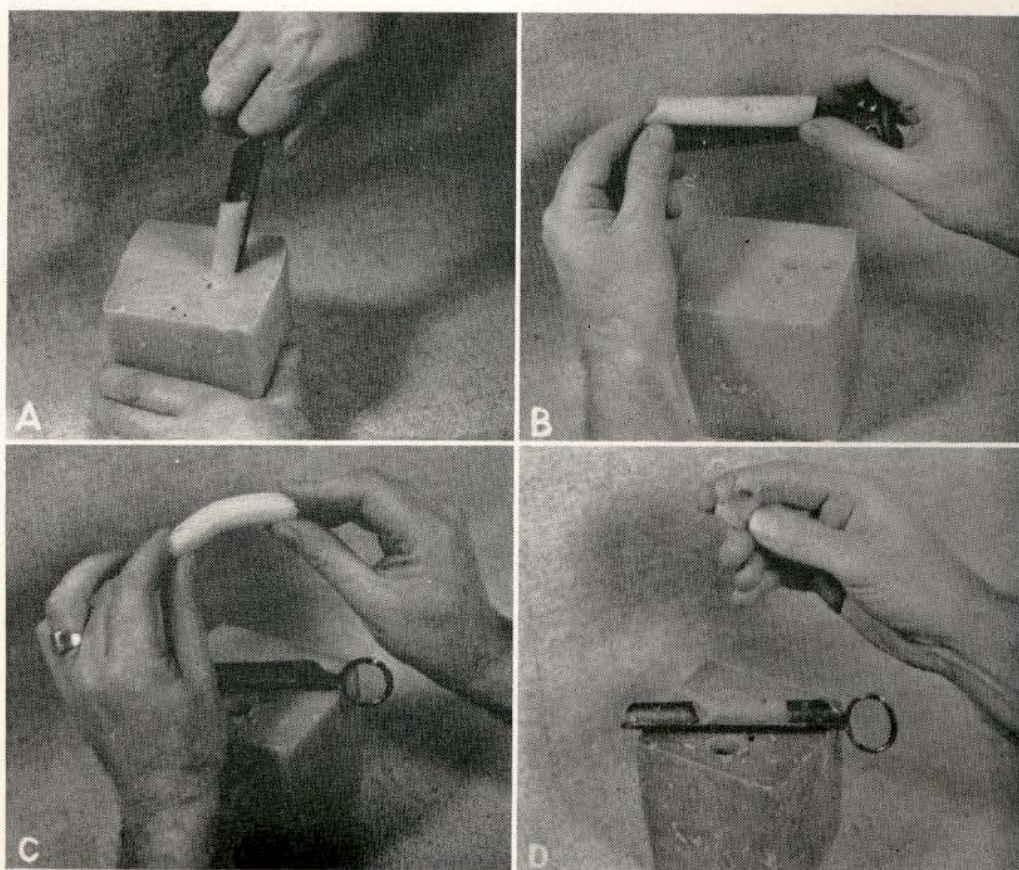


FIG. 8.—Steps in examining cheese.

The score card used throughout this country in educational work and approved by the American Dairy Science Association is shown below. This card allots 45 points for flavor and 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



## CHEESE SCORE CARD

Contestant's No. ....			Sample No. ....		
Factor	Student score	Official score	Grades		Criticisms
			Score	Criticism	
Flavor (45)					<b>Flavor:</b> Acidy      Fermented      Moldy Bitter      Flat      Rancid Cowy      Fruity      Weedy Feed      Unclean      Yeasty
Body and texture (30)					
Finish (15)					
Color (10)					
TOTAL (100)					<b>Body and texture:</b> Corky      Gassy      Spongy Crumbly      Mealy      Weak Curdy      Open      Yeast Flaky      Pasty      holes Sweet curd holes
PLACING					
GRADE ON CRITICISMS (TOTAL) ....					
TOTAL GRADE .....					
					<b>Finish:</b> Cracked rind      Uneven surfaces Huffed      Moldy Light spots      Rot spots Wrinkled bandage      Paraffin Soiled Scaly
					<b>Color:</b> Acid cut      Seamy Mottled      Wavy

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a more characteristic appearance and body. Cheddar cheese should be judged by the use of a trier. The sample should be drawn with 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 determined. This can best be observed by smelling the plug and by crushing and warming some of the cheese between the thumb and the 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 show a flinty appearance resembling the surface of broken flint when broken.

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. The plug when drawn from a cheese of ideal body should be 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.



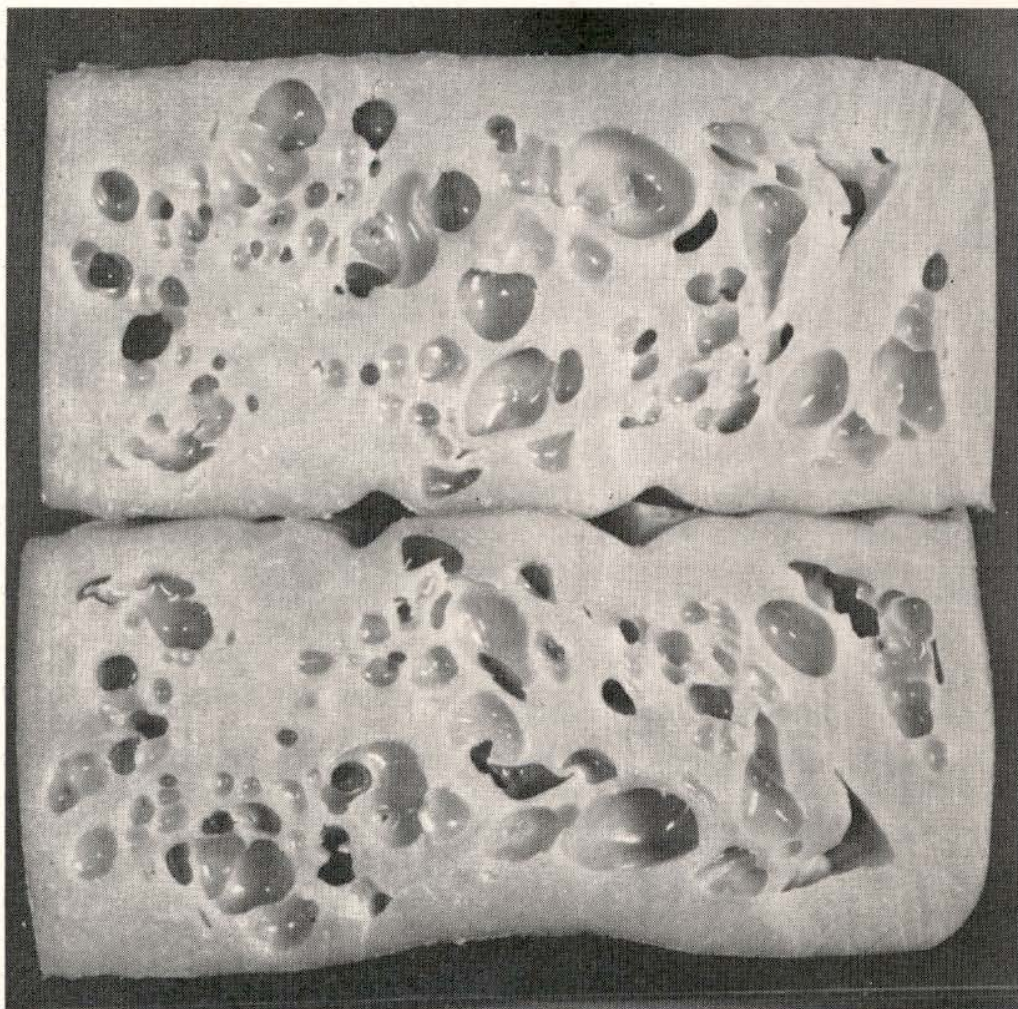


FIG. 9.—A marked case of sweet-curd holes in a sample of canned cheddar cheese.

CHARACTERISTICS AND RATINGS USED IN SCORING AMERICAN  
CHEDDAR CHEESE <sup>5</sup>

**Flavor.**—In the scoring of 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 consumers of cheese varies greatly, some desiring a fresh, very mild-flavored cheese, while others desire an aged cheese with a distinctly sharp taste.

<sup>5</sup> C. W. Fryhofer and Roy C. Potts, Handbook for use in the inspection of whole milk cheese under food products inspection law, U. S. D. A. Circ. 157.



Cheese which 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.

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 total score of cheese and its relation to flavor characteristics are as follows:

A highly pleasing flavor is an especially fine, clean flavor and aroma very fully developed and 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 91. Slight defects may appear in body and texture as well as in color in a 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", "acidy", 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 with 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	Rating
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	37.0 to 39.5
Flavors above present to pronounced degree or flavors such as acidy, bitter, fruity, unclean, fermented, moldy, rancid, yeasty, present to slight degree	35.0 to 36.5
Flavors such as acidy, 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 indicate readily such characteristics as "corky", "mealy", "crumbly", "weak", "pasty", or "spongy".

Cheese to receive the maximum rating of 30 points for body and texture 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.

Description of body and texture	Rating
Firm, waxy, smooth and not more than three small mechanical openings on a trier plug.....	29.0 to 30.0
Four to six mechanical openings and sweet curd holes on a trier plug, slightly weak.....	27.5 to 28.5
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.....	25.5 to 27.0
Many pin holes or ragged mechanical openings; distinctly corky, crumbly, mealy, pasty, weak.....	23.5 to 25.0
Spongy structure, yeast holes, very weak.....	20.0 to 23.0

**Finish and appearance.**—A neat, uniform, smooth finish gives a cheese an attractive appearance and increase its market value. Cheese to be given the full rating of 15 points for finish and appearance 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 used when "wrinkled bandage", "cracked rind", "uneven surface", "scaly paraffin", "rot spots", "mold", and "huffed" conditions are found on a cheese.

Description of finish	Rating
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 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 91 points. Cuts in color score are made when "white specks", "wavy", "mottles", "acid cut", or "seamy" conditions exist.

Description of color	Rating
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 those that are strong 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 conditions in milk or in the factory.

**FLAT**—Cheese that lacks flavor and aroma due to 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 that of 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 and 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 show a yeasty flavor.

**Body and texture criticisms:**

**CORKY**—A term used to describe a cheese that is hard, tough, and over-firm 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 properly knitted together. It is characterized by the plug 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 out" in color.

**OPEN**—This term indicates that the cheese is not compact but rather has openings throughout the cheese. These are usually due to the mechanical failure in pressing the curd and tend 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 in consistency. 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 and is often caused by excessive moisture but is not necessarily sticky like a pasty cheese.

**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 often 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 criticisms:**

**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 out". It is caused by the presence of too much acid in the curd.

**LIGHT SPOTS**—Sometimes spoken of as white specks and 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 so that it gives a mottled appearance. It is caused by an uneven distribution of the color in the different particles of cheese during the making process.

**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, dirty or has been soiled on the surface.

**WAVY**—A cheese that shows streaks of lighter color that appears 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 only been 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 here.



## 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:

Bacteria .....	20
Flavor .....	50
Body and texture.....	25
Package and color.....	5
	<hr/>
	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 instructional 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's No.....			Sample No.....		
Factor	Student score	Official score	Grades		Criticisms
			Score	Criticism	
Flavor (50)	.				<b>Flavor:</b> Cooked Egg powder Garlic High acid Lacks fine flavor Lacks flavoring Unnatural flavoring Lacks sweetness Dry or condensed milk Metallic Neutralizer Old ingredient Salty Too sweet Too high flavor Unclean Storage
Body and texture (25)	.				<b>Body and texture:</b> Buttery Crumbly Coarse and icy Sandy Fluffy Soggy Weak
Bacteria (20)	20.00				<b>Package and color:</b> No parchment Rusty cans Unnatural color Uneven color Unclean package
Package and color (5)	.				<b>Melting quality:</b> Curdy Wheys off Does not melt
TOTAL (100)	.				
PLACING					
GRADE ON CRITICISMS (TOTAL) ..					
TOTAL GRADE .....					

Approved by the American Dairy Science Association.

## JUDGING PROCEDURE

In the judging of 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 too soft is difficult to score, especially for body and texture. To show melting quality, a scoopful of each sample should be placed on a plate as the judging 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 will 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.

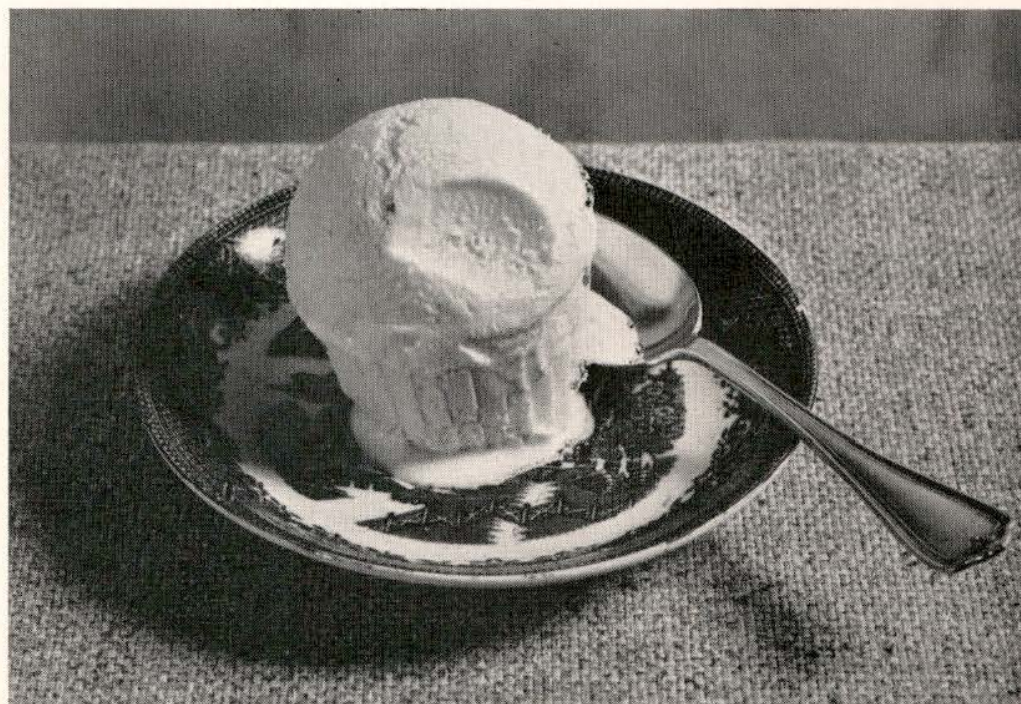


FIG. 10.—High-quality ice cream is a refreshing dessert.

**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	Rating
Highly pleasing and desirable. Fresh, creamy, clean flavor, flavoring well blended.....	45.0 to 50.0
Desirable but not too well blended. Too sweet, lacks sweetness, too high flavor, lacks flavoring, lacks fine flavor, slight egg, cooked, condensed, or dry milk.....	42.5 to 44.5
Objectionable flavor. High acid, egg, cooked, condensed or dry milk, unnatural flavoring, old ingredients, storage, feed, oxidized, salty.	39.5 to 42.0
Foreign (off) flavor. Salty, feed, high acid, neutralizer, old ingredients, oxidized, storage, and unclean.....	36.0 to 39.0
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.

Description of body and texture	Rating
Very desirable. Firm, smooth, velvety.....	24.5 to 25.0
Fairly desirable. Fluffy, crumbly, coarse or icy, weak or soggy .....	22.0 to 24.0
Undesirable. Sandy, or any of the following to a pronounced degree: crumbly, coarse or icy, buttery, weak.....	20.0 to 22.0

**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 additional cut on body and texture.

**Undesirable.**—Curdy, does not melt, spongy or wheys off. Make additional deduction in score for body and texture, but not to exceed one point.

**Color.**—Desirable color should be uniform and natural, in which case there should be no deduction. Undesirable, unnatural, or uneven color should have a maximum deduction of one point.

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

#### TERMS USED IN JUDGING ICE CREAM

##### Flavor criticisms:

**CONDENSED MILK or DRY MILK**—This term is used to describe a flavor resulting from the excessive use of condensed or dried milk products. While they are used in ice cream their flavor should not be noticeable.

**COOKED**—A flavor resembling boiled or over-heated 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 POWDER**—The use of egg yolk powder sometimes causes a noticeable flavor in ice cream. The most objectionable flavor is where poor flavored or stale egg powder is used.

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

**HIGH ACID**—When milk or milk products have a slightly sour flavor and odor it is 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 also may be caused by poor quality flavoring.

**LACKS FLAVORING**—An ice cream should be pleasingly flavored, but sufficiently strong 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 as when not enough sugar is used, 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 resembles 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 considerable time in storage. It gradually loses some of its delicate flavor and develops a “storage” flavor.

**TOO SWEET**—When a sample seems to be sweeter than the taste desired, this term is used. It is caused by too much sugar being used.

**TOO HIGH A FLAVOR**—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 synthetic flavor resembling vanilla. It may also result in the use of flavoring extracts other than vanilla in small amounts 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 and is very undesirable.

#### **Body and texture criticisms:**

**BUTTERY**—When the ice cream contains butter granules large enough so that they can 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 instead 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.

**GELATINE LUMPS**—Undissolved gelatine is sometimes found in ice cream. Such a condition is defined as “gelatine 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, refer to it 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.

**WHEYS OFF**—If the curdy condition has progressed to the point where the curd separates from the serum or whey, this term is used.

**Package and color criticisms:**

**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

Judging of dairy products can be carried on 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 the judging of milk, cream, and butter have been conducted for several years in Nebraska. Collegiate contests in judging of 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 that have taken part in these contests. A coach can impart to the pupil only 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. This information with other material as presented here it is hoped 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 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. Such samples not used for flavor determination should be kept cold until warmed for use.

Materials for preparing the bottle and cap exhibit should be available, such as parchment paper, tin foil, cloth, and string. A sediment tester and disks are necessary for preparation of sediment disks. Petri dishes for holding the disks are preferred but not absolutely necessary. Paper cups



for use in 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 number on the judging table. Usually 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 in judging seven 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., and hold for 40 minutes and cool.

**COWY**—Take a container of fresh, warm milk and allow it 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. By exposing the cloth to the cooling milk by hanging it over the container, the desired results can be obtained.

**DISINFECTANT**—The addition of a minute quantity of the disinfectant material or exposing the milk to a cloth upon which some of the 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 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 to five hours before milking will help to eliminate the flavors in the milk and tend 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**—The exposure of milk cooling 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 has been placed a few drops of butyric acid or a small amount of rancid butter.

**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**—The flavor is difficult to produce artificially and can best 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**—The flavor is usually obtained without much difficulty in the fall, especially during a dry season. The exposure of milk while cooling to some half-dried rag weed 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 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.

**Bottle and cap.**—A set of bottle and cap 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. Skimmilk 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.)

**ABSORBENT CAP PROTECTOR**—A piece of non-waterproof paper or cloth is placed over the top of bottle and fastened in place with wire, string, or rubber band.

**CHIPPED MOUTH**—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 NOT PROTECTED**—A bottle capped with an ordinary cap will be satisfactory.

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

**NOT FULL**—Adjust the amount of milk in bottle before it is capped.

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.



### 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 sufficient variety of flavors are 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 yeast flavor. Often the holding of cream at a temperature of 70° F. for three to four days will cause a moldy cream flavor.

### BUTTER SAMPLES

While it is desirable to have butter in tubs or other large containers so that a full trier of butter 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. Where 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 the package. A section or slice of a larger package, provided the judge can draw a trier full of cheese, will be satisfactory. Either white or 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 two-and-one-half-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 place a check mark to the right of the term or criticism that describes the defect. If the defect is not listed, write it in the blank space. The smallest cut should be one-half point, except where one-fourth point is used to break a tie. In sediment scores the smallest cut is one-tenth point. Detailed scoring guides for the different products designated for instructional use are very valuable, as copies can be made and furnished each student for study.

#### MILK

**Flavor—Perfect score, 25—Normal range, 12-24**

Highly pleasing and desirable, 23-25.

Fine, clean, pleasing—no criticism required on the card.

Desirable but lacking in quality, 21-22.5.

Flat (lacking in full flavor), very slight feed, slightly cooked.

Slightly objectionable, 18-20.5.

Cooked, slight feed, slightly salty, slightly cowy, slightly metallic, slightly malty. Objectionable, 12 to 17.5.

Strong feed, weedy, bitter, unclean, cowy, slightly high acid, slightly rancid, cappy or cardboard, garlic or onion, malty.

Very objectionable, 0 to 11.5.

Rancid, strong cowy, high acid, slightly disinfectant.

NOTE: Samples that are sour or strong disinfectant or unalable, score 0.

**Sediment—Perfect score, 10—Normal range, 5-10**

A perfectly clean disk scores 10 with deductions for increasing amounts of sediment. (See photo of standard disks.) Score whole points between 0 and 7, one-half points from 7 to 8, quarter points between 8 and 9.5, and one-tenth points between 9.5 and 10.

**Bottle and Cap—Perfect score, 5—Normal range, 3-5**

Perfect bottle and cap, 5 (no criticisms).

Clean bottle full of milk covered with waterproof hood cap and securely fastened.

Imperfect bottle and cap, 3-4.75.

Cuts made in score dependent upon defect. Based upon suggested cuts (see list, page 9).

NOTE: The factors of bacteria (45 points) and temperature or acidity (15 points) are not used in student judging contests and are considered perfect on the card.

#### CREAM

**Flavor—Perfect score, 25—Normal range, 12-25**

Very desirable, 23-25 (no criticism).

Clean, full, free from defects.



Desirable, 21-22.5.

Flat, very slight feed, slight cooked, watery.

Slightly undesirable, 18 to 20.5.

Cooked, feed, salty, slightly cowy.

Undesirable, 12-17.5.

Strong feed, unclean, yeasty, weedy, bitter, musty, cowy.

Very undesirable, 0 to 11.5.

Rancid, greasy, metallic, onion or garlic, very unclean, disinfectant.

**Acidity—Perfect score, 15—Normal range, 0-15**

Desirable, 13-15.

Sweet cream, 0.12 to 0.24 per cent acidity.

Desirable, 10-12.5.

Slightly sour, 0.25 to 0.35 acidity.

Undesirable, 7-9.9.

Medium sour, 0.36 to 0.60 acidity.

Undesirable, 5-6.9.

Very sour, 0.6 to 0.8 acidity.

Undesirable, 0-4.5.

Rank sour, over 0.8 acidity.

**Smoothness and Body—Perfect score, 5—Normal range, 2-5**

Satisfactory, 4.5-5.

No curd lumps, dirt, or mold.

Satisfactory, 4-4.4.

Small amount curd lumps, slightly too thick or too thin.

Unsatisfactory, 3.5-3.9.

Large amount curd lumps, very thick or too thin, slight boiling or dirty.

Unsatisfactory, 2-3.4.

Moldy, boiling, or dirty.

**Sediment—Perfect score, 10—Normal range, 0-10**

A perfectly clean disk scores 10 with deductions for increasing amounts of sediment. (See standard disks, page 6.)

NOTE: The factor of bacteria (45 points) is not used in student judging contests and is considered perfect on the score card.

**BUTTER**

**Flavor—Perfect score, 45—Normal range, 31-39**

Desirable, 38-39.

Fresh, fine, sweet, and clean (no criticism used on card).

Desirable, 37-37.5.

Fresh, sweet, and clean. Also very slight feed, coarse, or flat.

Slightly objectionable, 35.5-36.5.

Slightly burned, oily, heated, neutralizer, yeasty, feedy, briny, storage, cowy, acidy, cheesy, weedy, cooked, tallowy.

Objectionable, 33.5-35.

Pronouncedly burned, oily, heated, storage, neutralizer, cowy, yeasty, cheesy, weedy, feedy; slightly metallic, woody; bitter, unclean, very slight old cream.

Objectionable, 32-33.

Old cream, unclean, musty, slight gasoline, lime or alkaline, fishy, metallic.

Very objectionable, 30-31.5.

Garlic, gasoline, rancid, pronounced or stale old cream; pronounced oily, metallic, cheesy.

**Body—Perfect score, 25—Normal range, 23-25**

Desirable, 25 (no criticism).

Firm, waxy, good grain.



Undesirable, 24-24.5.

Cloudy brine, crumbly, greasy, leaky, mealy, salvy, sticky, weak, gummy.

Undesirable, 23-23.5.

Pronounced cloudy brine, crumbly, greasy, gummy, mealy, salvy, sticky, weak, leaky.

**Color—Perfect score, 15—Normal range, 13-15**

Desirable, 15 (no criticism).

Uniform color throughout. May be light, medium, or full golden yellow.

Undesirable, 13-14.5.

Color specks (reddish orange), mottles, uneven, wavy, white specks.

**Salt—Perfect score, 10—Normal range, 9-10**

Desirable, 10 (no criticism).

Uniform, all dissolved; may be unsalted, light salted, medium salted, heavy salted.

Undesirable, 9-9.5.

Undissolved or gritty. Very heavy salt (very briny).

**Package—Perfect score, 5—Normal range, 4-5**

Desirable, 5 (no criticism).

Neatly packed in clean, sound packages.

Undesirable, 4-4.5.

Dirty tub, poor finish.

NOTE: As the package can be easily soiled by the students, all samples should be given a perfect score on package in a student contest.

### CHEESE

**Flavor—Perfect score, 45—Normal range, 36-41**

Highly pleasing, 40-43 (no criticism).

Characteristic cheese flavor, well developed, clean, or desirable but lacking characteristic cheese flavor.

Desirable, 37-39.5.

Slightly bitter, slightly cowy, slightly feedy, slightly weedy.

Slightly objectionable, 35-36.5.

Pronouncedly cowy, pronouncedly feedy, pronouncedly weedy, moderately bitter, slightly acid, slightly fruity, slightly unclean, slightly fermented, slightly moldy, slightly rancid, slightly yeasty.

Objectionable, 30-34.5.

Pronouncedly acid, bitter, fruity, unclean, fermented, moldy, rancid, yeast.

**Body and Texture—Perfect score, 30—Normal range, 26-29.5**

Very desirable, 29-30 (no criticism).

Firm, waxy, smooth, and not more than three small mechanical openings on a trier plug.

Desirable, 27.5-28.5.

Firm, waxy, smooth but slightly open. (Four to six mechanical or sweet curd holes on trier plug.) May also be flaky.

Slightly objectionable, 25.5-27.

Slightly corky, crumbly, curdy, mealy, pasty, lumpy, weak, gassy; open (a few pin holes, 7 to 12 mechanical openings or sweet curd holes on a trier plug), sweet curd holes, yeast holes.

Objectionable, 23.5-25.

Distinctly corky, crumbly, mealy, pasty, gassy, weak, open; (many pin holes or ragged mechanical openings).

Very objectionable, 20-23.

Spongy structure, yeast holes, or weak.



**Finish—Perfect score, 15—Normal range, 14-15**

Desirable, 15.

Clean, neat, smooth rind. Sound and uniform in color.

Undesirable, 14-14.5.

Huffed, light spots, scaly paraffin, uneven surfaces, wrinkled bandage, moldy, soiled.

Very undesirable, 13-13.5.

Cracked rind, rot spots.

**Color—Perfect score, 10—Normal range, 9-10**

Desirable, 10.

Even and slightly translucent.

Undesirable, 9-9.5.

Acid cut, seamy, wavy, mottled, faded.

NOTE: Color should not be scored off unless defect is quite apparent.

**ICE CREAM**

**Flavor—Perfect score, 50—Normal range, 36-46**

Desirable, 45-50 (no criticism).

Fresh, clean, creamy, well blended.

Poor blending, slight off flavors, 42.5-44.5.

Lacks fine flavor, lacks flavoring, lacks sweetness, too high flavoring, too sweet; slight cooked, egg, condensed or dry milk.

Objectionable, 39.5-42.

Cooked, egg, condensed or dry milk, feed, high acid, old ingredient, oxidized, salty, storage, unnatural flavoring.

Foreign and off flavors, 36-39.

Feed, high acid, neutralizer, old ingredient, oxidized, salty, storage, unclean.

**Body and Texture—Perfect score, 25—Normal range, 20-25**

Very desirable, 24.5-25 (no criticism).

Definite defects, 22-24.

Coarse or icy, crumbly, fluffy, weak, soggy.

Objectionable defects, 20-22.

Pronounced coarse or icy, fluffy, weak, buttery, sandy.

NOTE: For undesirable melting quality (curdy, does not melt, wheys off) the maximum cut is one point. No cut is made if the ice cream melts freely to smooth and creamy consistency.

**Color and Package—Perfect score, 5—Normal range, 4-5**

Desirable, 5 (no criticism).

Defects, 3-4.5.

Unnatural or uneven color, unclean or rusty can, no parchment.

NOTE: The 20 points needed to make 100 are given to the bacteria count and are used when desired or when facilities permit, but not in student judging contests.

When the flavor is so bad as to make the sample unsalable, the flavor score is zero. In judging contests only salable samples are used, and the minimum flavor score is 36.

Since the can may become soiled and parchment disarranged by contestants, "package" is given a perfect score in student judging contests.

The contestant should score each item and place a check mark to the right of the defect. If the defect is not listed, write it in a blank space. The smallest cut on any item is one-half point except that one-fourth point may be used to break ties.

A combination of two or more defects often justifies giving a lower score value than that indicated for either defect alone.

**CONTESTS**

Only those persons that 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 of not only that person but also 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 mental 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 material needed by the judge is a good pencil and a butter trier. A six-inch-size butter trier will be handy to use. 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. A score card for each sample of the different products to be scored should be available and packaged 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 shall 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.



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

10. Each contestant should look his cards over carefully for mistakes in order to see that they are marked with proper placing of samples and then arranged in order with No. 1 card on top and turned in to the person in charge of the group.

#### GRADING OF CARDS

The work of the contestants shall be graded in the following manner: The scores, criticisms, and placing shall be graded separately, but the grades shall be added to form the total for the product. The lowest score wins. (See Fig. 11.)

- (A) Student should mark his card with his number and number of sample.
- (B) Place scores and placing of sample in first column and check criticisms describing defects observed.
- (C) The contestant's grade on score on each item is the difference between his score and the official score.
- (D) The criticism checked by the student should be the same as the official criticism.
- (E) The grade and criticism shall not exceed one point for any one item. If the student has one criticism right out of two, 0.5 is given as a grade.
- (F) The grade on placing is the difference between the student placing and the official placing.
- (G) The student's grade for the sample is the sum of the score grade, the placing grade, and the criticism grade.

MILK SCORE CARD

A Contestant's No. 16 Sample No. 3

Factor	Student Score	Official Score	GRADES		CRITICISMS
			Score	Criticism	
Bacteria (45)	45.00	—	—	—	Flavor: <input checked="" type="checkbox"/> Rotten <input checked="" type="checkbox"/> Malty <input checked="" type="checkbox"/> Cardboard <input checked="" type="checkbox"/> Metallic <input checked="" type="checkbox"/> Stale <input checked="" type="checkbox"/> Rusty <input checked="" type="checkbox"/> Cowy <input checked="" type="checkbox"/> Sour <input checked="" type="checkbox"/> Disinfectant <input checked="" type="checkbox"/> Salty <input checked="" type="checkbox"/> Unclean <input checked="" type="checkbox"/> Feed <input checked="" type="checkbox"/> Weedy
Flavor (25)	22.50	22.00	.5	.5	
Sediment (10)	8.50	8.00	.5		
Temperature or acidity (15)	15.00	—	—	—	
Bottle and cap (5)	4.00	4.00	—	—	
TOTAL (100)	95.00		1.0		
PLACING	2	4	2.0		
GRADE ON CRITICISMS			.5		
TOTAL GRADE			3.5		

CRITICISMS: Flavor: ☒ Rotten ☒ Malty ☒ Cardboard ☒ Metallic ☒ Stale ☒ Rusty ☒ Cowy ☒ Sour ☒ Disinfectant ☒ Salty ☒ Unclean ☒ Feed ☒ Weedy

Sediment: See page 8 of this circular.

Bottle and cap: Absorbent cap protector ☒ Chipped mouth ☒ Dirty bottle ☒ Leaky cap ☒ Lip not protected ☒ Lip partially protected ☒ Not full ☒ Unsealed cap protector

Approved by the American Dairy Science Association.

FIG. 11.—Explanation of use and grading of score card.



**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 22.50 and the judge's score is 22.0, the student receives a grade of 0.5 point.

**Criticisms.**—When the score of any item, such as flavor, sediment, etc., is cut, a critical descriptive term must be checked (except as specified on the score card). In grading a student's criticisms the maximum cut for each item shall be one point.

**Placing.**—The grade for placing is determined by the difference between the position of the contestant's samples and the official placing. If the contestant, for example, placed the highest-scoring sample fourth, he loses three points; if he placed the second highest sample seventh, he loses five points; and so on for all seven samples.

**Determining the grades and placings.**—The contestant's grade is found by adding the differences on scoring, placing, and criticism. The contestant having the lowest grade is placed first. A team's grade is the sum of the grades of its members. The team is placed according to its grade, the team having the lowest grade winning first place.

When two or more contestants tie, or teams have the same grade, the awarding of the prize is decided by determining which has the lowest score on flavor, and then on other items in the order in which they appear on the various score cards. If no prize is involved, the placing shall be given as 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 the card system. The large score sheet provides a place for the contestant's name and number as well as the team identification. For each product judged nine columns are provided, one for each of the seven samples, and one for the total score for the individual and another for the total score of the team. In addition a column should be provided for individual placing and one for the team placing, making a total of eleven columns for each product. 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 tabulating and addition. Additions can be checked by adding the 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 members of the Dairy Bureau of the United States Department of Agriculture at the National Collegiate Contest each year. This consists of transferring the scores of each student for the particular product to a card. The total score is determined by adding and the cards 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 all products are determined and ranked by sorting the cards. Either method of tabulation can be used with satisfactory results.

A new development in an effort to simplify tabulation is the introduction of the multiple score card. This score card holds the record of seven samples of the product to be scored. In addition a place is furnished for the tabulation of the grades on the seven samples. The method of grading consists of a cut-out card upon which the official scores are written. This card fits over the score card, thus saving the writing of the official scores on each contestant's card. This saves considerable time in grading. This new method of grading has not as yet been used in the national contest, but it is believed that such a system will soon be used. After it has been perfected it may be desirable to use such a system in smaller contests.

[6M]