

*Operation of the*  
**CREAM-BUYING  
STATION**

BY  
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# Operation of the Cream-Buying Station

By H. A. RUEHE, Chief in Dairy Manufactures

**M**UCH of the butterfat sold from corn-belt farms for buttermaking comes to the market in the form of farm-separated cream. Creameries have three methods of obtaining this cream: (1) buying it from producers who ship it direct to the manufacturing plant; (2) thru pick-up routes which a creamery may organize; (3) by establishing buying stations in producing areas.

When the cream is purchased in either of the first two ways, the buyer for the creamery has the opportunity of inspecting and testing each shipment and reporting its quality direct to the producer.

When cream is purchased thru a cream-buying station, however, the butter factory makes its contact with the producer thru a third party—the manager of the station. To be successful, this method of purchasing cream requires a well located and adequately equipped station, managed by someone thoroly trained in cream-buying methods. This means skill not only in weighing, sampling, and testing cream for its butterfat content, but also in grading it on a quality basis.

## THE OPERATOR AND HIS EQUIPMENT

### Operator Should Know Dairy Problems

Every cream buyer must of course know how to test cream for its butterfat, recognize cream of good quality, and know the general business routine connected with cream buying.

The best cream buyers, however, are those who make it a point also to become generally informed about dairying and dairy-manufacturing problems. The intimate acquaintance and association which a buyer has with producers places him in position to offer suggestions that will make for more economical production and for the delivery of cream of higher quality. An outline of such suggestions is given on pages 22 to 24.

This phase of station operation should appeal to every manager who realizes the importance of his task.

### **Well-Located, Clean Buying Room Needed**

Since cream quickly absorbs undesirable flavors and odors, it is important that the buying room and its surroundings be clean and free from objectionable odors. A location close to a railroad or a dusty road should be avoided because of the danger of the cream becoming contaminated with dust, soot, smoke, etc.

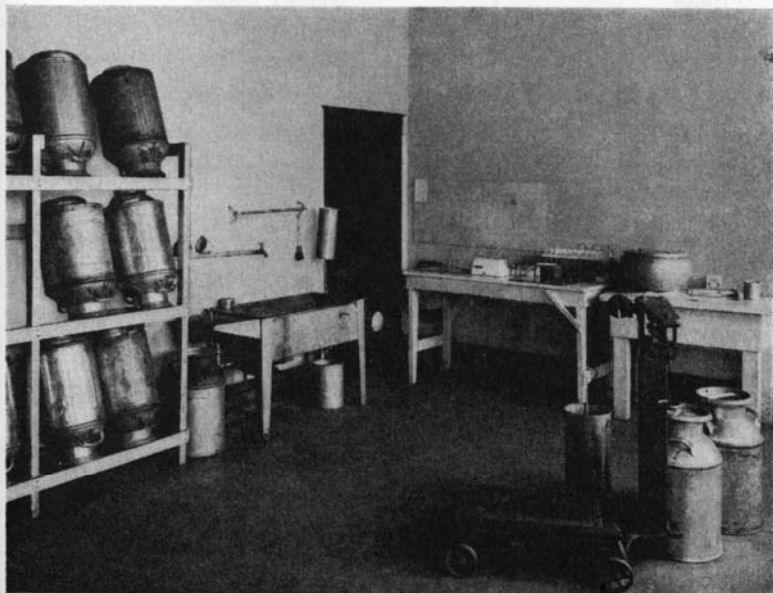
For the convenience of the operator the room should be light and airy, and for its influence on the cream producer it should be orderly and attractive. It should have plenty of windows, should be well screened, and the interior should be neatly painted in white or some other light color.

The room should be large enough to house all necessary equipment—can rack, can-washing equipment, and so forth—and should provide ample space for the proper handling and cooling of whatever amount of cream may be purchased.

### **Abundance of Hot Water Is Essential**

An abundance of hot water is absolutely necessary to the successful operation of a cream-buying station. Stoves using either kerosene or gasoline are the most common means of heating water in Illinois cream stations. The coil heating stove attached to a range boiler of 30 to 40 gallons capacity has also been used successfully. This stove heats an abundance of water and, at the same time, is less expensive than a

steam boiler, both in original cost and in operation. In the larger stations a steam boiler is often used to furnish both hot water and steam.



A well-arranged cream-receiving station

Note location of can washer, tester and testing equipment, platform scales, and can rack. Cleanliness and freedom from objectionable odors are two prime requisites for a cream station.

### Equipment and Supplies for Cream Station

Ordinarily a cream-buying station has the following equipment:

#### Large equipment

- Cream cans
- Platform scales
- Oil stove and vessel  
for heating water,  
or a can washer

#### Miscellaneous small equipment

- Can seals
- Grading sampling rod
- Rubber scraper
- Sediment-testing materials
- Cream stirrer

**For fat test**

Acid measure  
 Babcock centrifuge  
 Dividers  
 Pipets  
 Red reader, or glymol  
 Sulfuric acid  
 Sample jars  
 Test bottles  
 Test-bottle brushes  
 Thermometer  
 Torsion cream-test scales  
     with 9-gram weight  
 Water-bath pan

**For office**

Calculator  
 Cream station sign  
 Price sign  
 Report books  
 Shipping tags  
 Way envelops

**Platform Scales Require Good Care**

The scales that are used for weighing cans of cream are preferably of the platform type. They are accurate and sensitive, and should always be carefully handled. Since the atmosphere in which they are used is heavily charged with moisture, certain precautions must be taken to protect the parts from corroding, or the scales will become sluggish and inaccurate.

The serious trouble that station operators sometimes experience because of errors in weighing may be largely avoided by observing the following precautions:

1. Wipe the beam and weights *daily*.
2. Examine the scale at the beginning of *each day's operation* to make sure it is in balance. Check scale several times each day to see that it stays in balance.
3. At least *once each month* take the platform off and rub the knife edges carefully with a piece of fine emery cloth or sandpaper. Clean all working parts and put the scale into perfect working order.
4. Keep the platform *dry*.
5. Set the scale *level* on a solid foundation.
6. Never use oil on a platform scale.
7. Keep the scale beam locked except when weighing.

A scale cared for in this way will retain its sensitiveness and do accurate weighing for an almost indefinite period.

### **Cream Scale Is Station's Most Delicate Apparatus**

Torsion cream-test scales are the type now generally used for weighing samples of cream. Properly handled, a good cream scale will last for years. Carelessly handled it can be ruined in a short time. Exposure to dirt and rough handling are the usual causes of disorders in this important and sensitive piece of apparatus.

To get the best results with a cream scale, as with any scale, it should be set level on a solid foundation. To remove the effect of jarring floors, which are often a cause of errors in the weighing of cream samples, the shelf that supports the cream scale should be fastened to the wall. It should be only large enough to hold the scales. A three-sided shield arranged to surround the scale and prevent drafts of air from affecting its accuracy is advisable. A box for this purpose can be purchased, or one can be easily made from a small packing box.

The cream scale should never be placed on the same table with the tester, as the vibration of the tester during centrifuging will cause errors in weighing.

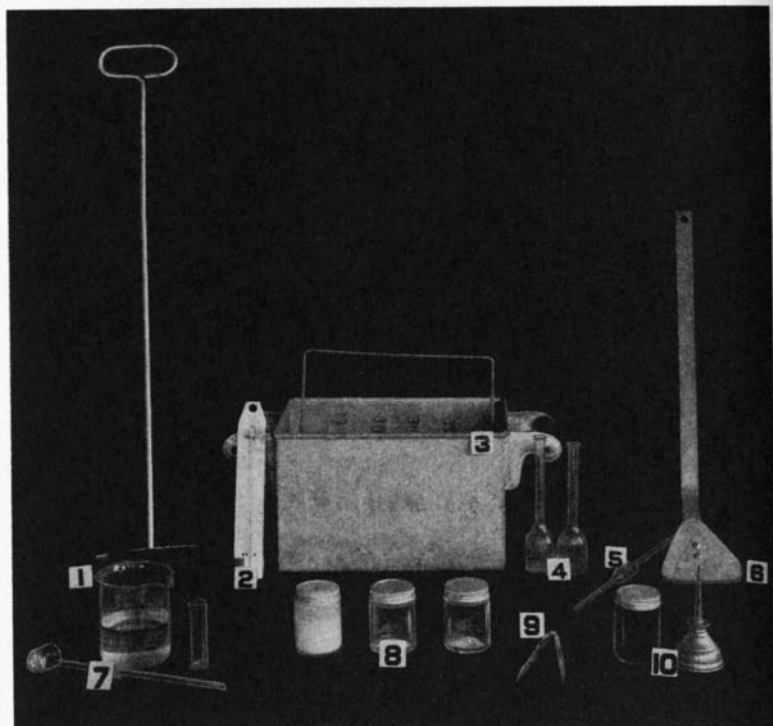
### **Testing Weights, Bottles, and Pipets**

*Testing weights.* The small weights used in testing cream are usually of the 9-gram size. These weights are sometimes inaccurate. When an operator is in doubt on this point, he should have the weights checked either by the field man or the central office.

These weights should always be kept free from dirt and grease, as any accumulation will add to their weight and errors will result. Also care should be taken not to drop them or chip them in any way. Wipe them frequently with a clean, dry, soft cloth.

*Testing bottles.* Two general types of cream-testing bottles are sold for commercial use. One gives the percentage of fat directly when 18 grams of cream is used and the other when 9 grams of cream is used. The 9-gram type is employed almost universally in Illinois cream stations.

*Pipets.* Transferring the cream from the sample bottle to the test bottle is done most efficiently with a pipet (page 13).



Equipment for making the cream test

(1) Cream stirrer that can also be used for sampling. (2) Thermometer for use with (3) the water bath, where test bottles are placed after they have been centrifuged and before they are read. (4) Bottles in which cream is placed for testing. (5) Pipet for adding cream to test bottles. (6) Rubber can-scraper for getting last of cream from cans. (7) Dipper for acid, beaker containing acid, and an acid measure. (8) Jars in which samples of cream are placed for testing. (9) Dividers for measuring fat column on neck of test bottle. (10) Jar of glymol, and a small oilcan for adding glymol to tests.



### Acid and Acid Measure

The acid measure is not only a guide to the amount of acid to use, but it also furnishes a convenient means of transferring the acid to the test bottle when only a limited number of tests are to be made. If preferred, a glass dipper may be used to measure the acid and pour it into the test bottle.

Commercial sulfuric acid (specific gravity 1.82-1.83) is used in making the cream test. Since the acid loses strength when exposed to the air, it should be kept in a bottle tightly sealed with a rubber or glass stopper.

The temperature of the acid also affects the test. To secure uniform results the acid bottle should be kept at a temperature of about 70° F.

### Cream Stirrer and Scraper

A lipped type of cream stirrer is especially convenient since it can be used not only for stirring the cream but also for taking the sample for testing. These stirrers are made with heavy handles strong enough to stir the very thick cream that is sometimes received.

For removing the cream that adheres to the inside of the can when emptying it, a small rubber scraper is useful. The can should be finally rinsed with about a quart of hot water to remove the last of the cream. The rinsings should be kept in a can and shipped separately, as they usually go into second-grade butter.

Where steam is available, a drip-saver may be arranged by building a metal drip shelf over a steam jet.

## MAKING THE CREAM TEST

Since butterfat is the principal and most valuable constituent of cream, the butterfat content is used as a buying basis for cream. One of the important duties of the station operator is to determine what this content is by making what is called the cream test. Strict observance of the following steps is necessary for an accurate test.

### Place Cans of Cream in Systematic Order

Prior to mixing and sampling the cream, the cans must be placed in some systematic order. A good plan is to make a list of the patrons and assign a number to each, then line the cans up in the same order. Details for doing this are not given here because they will necessarily differ according to the plan under which the cream is bought and the volume that is being handled.

### Thoroughly Mix Cream Before Sampling

The thorough mixing of the cream in each can before sampling it is an important step in the butterfat determination. Time and care spent at this point will forestall an undue amount of trouble in the remainder of the testing operations.

The richer cream tends to rise to the top of a can, lumps may have formed as the cream soured, and there is likely to be a considerable amount of heavy cream sticking to the sides of the can. All this means that the percentage of fat in the cream in one part of the can may be very different from that in another. The only way, therefore, to get a truly representative sample is to mix the cream thoroughly before taking the sample.

To get a complete mixture, stir the cream with a vigorous boiling motion until it is smooth and uniform in texture. Scrape sides and shoulder of can with stirrer, and make sure that these scrapings are mixed thoroughly with rest of cream. *Time and patience are absolutely essential for this operation.*

### **Heavy or Frozen Cream Requires Special Care**

Producers should be encouraged to market cream testing 35 to 40 percent in winter and 40 to 45 percent in summer. The delivery of frozen cream or cream so rich in butterfat and heavy in body that it cannot be readily stirred should be discouraged. Such cream is difficult to handle, and may result in loss to both the producer and the manufacturer.

Nevertheless frozen cream and excessively heavy cream are occasionally received and must be sampled and tested. The only satisfactory way to prepare such cream for sampling is to warm it to a point where it can be stirred. Even then the melted cream is much more difficult to sample properly than lighter cream or cream that has never been frozen.

To warm a can of cream let it stand in a warm room for several hours; or if it is desired to warm it more rapidly, set the can in a vessel of warm water. After the cream is melted, stir it vigorously, as already directed, and thoroly incorporate the scrapings from the sides and shoulder before taking the sample.

The practice of taking a spoonful of cream from the top of a can of heavy or frozen cream is to be condemned, for a representative sample cannot be obtained in this way.

### **Examine the Cream for Butter Quality**

While stirring the cream and carefully mixing it before taking the test sample, observe its quality from a buttermaking standpoint.

Has it a good clean smell? Is it free from all off-flavors?

Some experience and training are necessary in order to become a good judge of cream quality. Keeness of taste and smell must be developed.

Each patron's cream should also be examined at least once a month for the presence of extraneous matter. This is done by means of a sediment test. There are several methods that can

be used for this determination. Instructions and equipment should be supplied by the firm or organization for which cream is being bought.<sup>1</sup>

### Take Cream Sample From Can

After the cream in the can is thoroly mixed, take out a small sample with the sampling dipper or the cream stirrer if it is the dipper type, and pour the sample directly into a sample jar. Number the jar immediately.

When testing several samples, keep them in the same order as the cans. Preserve this order thruout the testing process.

### Weigh Cream in the Can

Weigh the can of cream on the platform scales. (Always make sure that the scale beam is locked when setting cans on or off the platform, for jarring the unlocked scale beam will soon impair the accuracy of the scale.)

As soon as the weight of the cream is determined, record it. Then empty the can and wash it and weigh the empty can. Subtract the weight of the empty can (the *tare*) from the gross weight of can and cream to get the *net weight* of the cream purchased. It is this weight that is used when computing the pounds of butterfat.

Record all weights as soon as they are determined. Trusting to memory causes errors.

### Prepare Sample for Testing

First set the bottles containing the samples of cream in a pan of warm water (110° to 115° F.) leaving them there until they are warmed to a temperature of 90° to 100° F. Then proceed to mix the samples by pouring them back and forth from one sample jar to another several times, until the cream

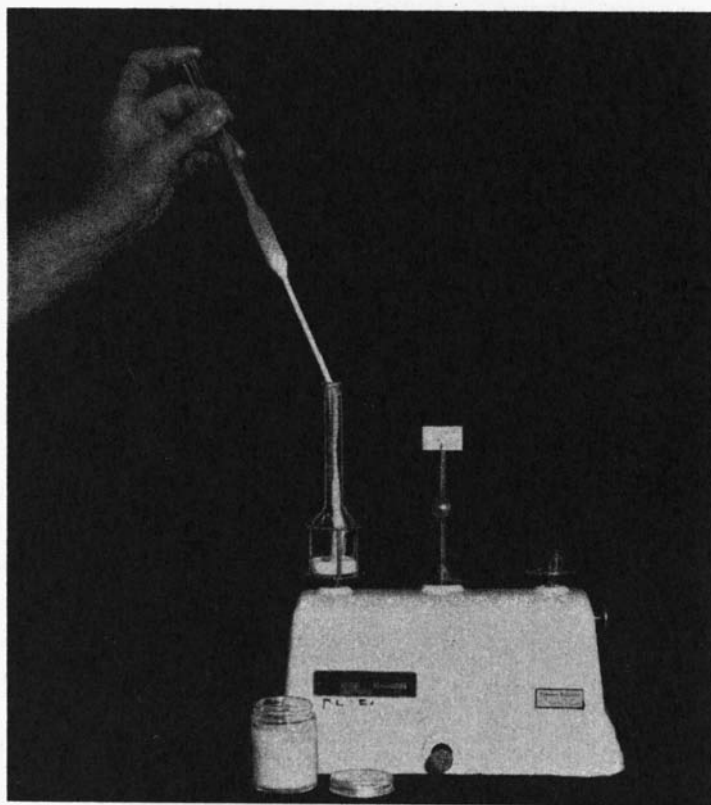
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<sup>1</sup>Instructions may also be obtained from Cream Grading Manual, issued by Illinois Dairy Products Association, 309 W. Jackson Blvd., Chicago.

appears smooth and well mixed. If the samples are to be kept any length of time before they are tested, they should be tightly covered to prevent evaporation.

### Weigh One Sample at a Time

As already noted, the cream scales should be balanced on a level, solid shelf fastened securely to the wall away from drafts of air. Under station conditions the best practice is to weigh one sample at a time.



Pipet is used to transfer cream to test bottle

The scale is first balanced with the bottle on it. Then the cream is added very carefully, for a drop or two too much or too little will mean a faulty test.

Place the empty test bottle in the left-hand holder and balance the scale carefully *with the bottle on it*. This is done by moving the counterweight back and forth until the point of balance is found.

Put the weight on the right-hand pan. Then with the pipet transfer enough of the thoroly mixed cream to the test bottle to bring it again into *exact* balance. Since a drop or two of cream too much or too little will result in an inaccurate test, this operation must be done with great care.

If a number of samples are being tested, it is usually best to weigh them all before proceeding with the next step in the testing. *Be sure that each test bottle is properly numbered.*

#### **Precautions:**

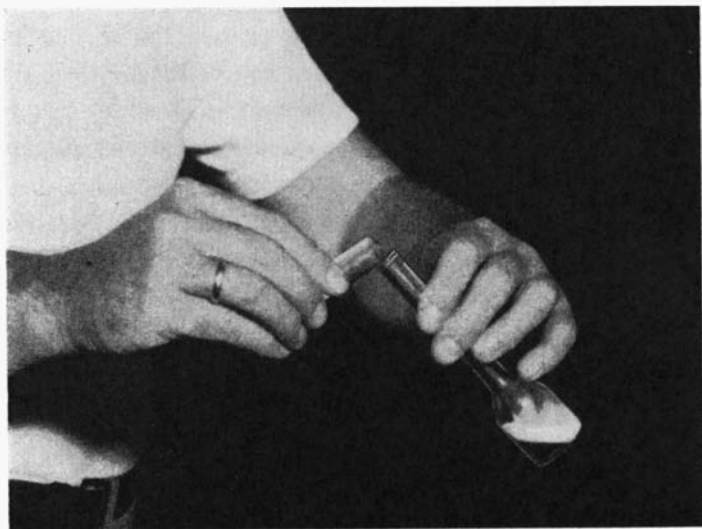
Since empty test bottles vary in weight, it is necessary to rebalance the scale each time a different bottle is used.

When bottles are placed on or removed from the balance pan, the scale should always be locked. In fact all manipulation of the pans should be accomplished thru the locking device and not by touching the pans. A scale should never be moved from one place to another without first securely locking it.

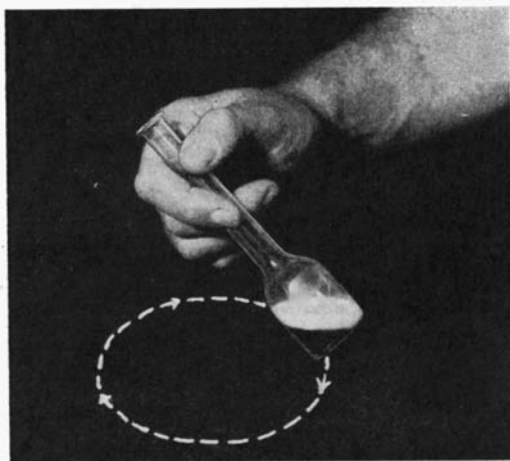
#### **Adding the Acid**

When 9-gram samples of cream are tested, about 9 cc. of sulfuric acid is added to each sample. By holding the test bottle in a slanting position and slowly rotating it, the acid can be added in such a way that it will flow down the side of the neck and wash any adhering cream into the bottle. The actual amount of acid necessary may vary considerably. The color of the mixture after the acid is added and mixed is the best guide as to the proper amount.

As soon as the acid is added, mix the sample thoroly by grasping the neck of the bottle as tho it were a pencil, and rotating the base in approximately a six-inch circle. Continue until the sample has turned a dark chocolate-brown, indicating that



While adding acid, hold test bottle in slanting position and keep turning it



Mix acid and cream by grasping test bottle as shown above and rotating base in about a 6-inch circle

the acid has completed its action on the solids-not-fat. Check further action by adding enough hot water (180° F.) to bring the contents up to the base of the neck of the bottle. When hard water is added to the acid mixture, some foaming may take place. It is therefore advisable to add a few drops of sulfuric acid to the water to remove its hardness.

Sample is now ready to be whirled in the tester (centrifuge).

### **Whirling Samples in the Tester**

Place the bottles in the tester in such a manner that the load will be balanced, and run the machine for five minutes at the speed indicated by the manufacturer.

Then let the machine stop gradually, and add enough hot water (180° F.) to bring all the fat up within the graduated portion of the bottle neck. Be careful not to add so much water that the fat is extended into the lip of the bottle or over the top.

Then whirl the bottles for three minutes.

To insure good results in testing, the temperature in the tester should be high enough to separate the fat completely. In steam machines the exhaust steam usually satisfies this requirement. Many electric testers have a heating device which will keep the tests warm.

### **Temper Fat Column Before Reading**

Cream test bottles give an accurate reading only when the temperature of the fat column is between 130° and 140° F. Therefore, to insure correct results, the fat column should be tempered before reading. This may be done by allowing the bottles to stand for 5 to 10 minutes in a water bath at 130° to 140° F. The water should come up to the top of the fat column. The test bottles should be removed from the bath one by one just before the test is read.

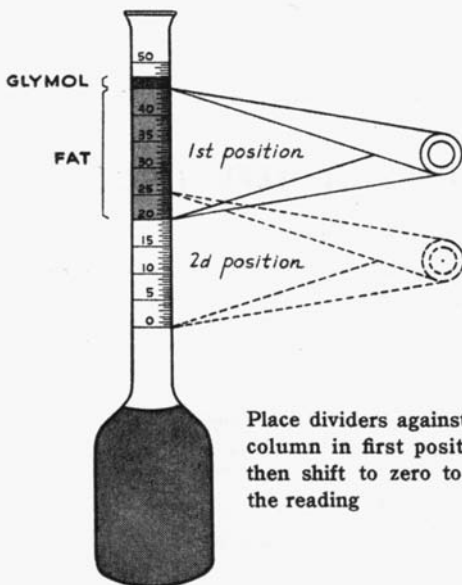


### Add Glymol to Top of Fat Column

After the fat is tempered and just before reading the test add a few drops of colored mineral oil (called glymol or "red reader") to the top of the fat column to destroy the upper curve of meniscus. The glymol should be added carefully drop by drop so that it will run down the bottle neck and not mix with the butterfat.

### Measure Fat Column With Dividers

The fat column is measured most easily with a pair of dividers. Place the dividers against the column, as indicated below. Then move them so that the lower leg of the dividers is at zero. The top pointer will then indicate the proper reading. Be very careful not to change the spread of the dividers when moving them to the reading position.



After taking the reading it is well to remeasure the fat column to see that no error has been introduced.

In reading the test, always hold the neck of the bottle in a vertical position and have the point of the reading level with the eye.

Record the test immediately.

### Calculating the Result

The reading thus obtained represents the percentage of fat in the cream. The pounds of fat in a given shipment of cream then equals the weight of the cream multiplied by the percentage of fat in the cream. The pounds of fat multiplied by the price per pound paid at the station will give the total amount due on a given shipment of cream.

*Example:* Suppose Mr. A. delivers a 5-gallon can of cream and the net weight of the cream is 39 pounds. The cream tests 41 percent. There are then  $39 \times .41$ , or 15.99 pounds of butterfat in this cream.

If the price per pound of fat is 35 cents, then the can of cream is worth  $$.35 \times 15.99$ , or \$5.60.

## CAUSES OF DEFECTIVE TESTS

When a finished sample is taken from the tester, the fat column should be clear and have an amber-yellow color without any foreign material at either the top or the bottom of the column.

It is impossible in this circular to discuss fully all the causes of defective tests, but the following outline suggests those that are more common.

### Columns too dark

1. Temperature of cream or acid too high
2. Too much acid
3. Too strong acid
4. Water not added soon enough

**Columns too light**

1. Cream too cold
2. Acid too cold
3. Too little acid
4. Acid too weak
5. Water added too soon
6. Low temperature of tester
7. Insufficient whirling

**Dark foreign matter at bottom of fat column**

1. Acid too strong
2. Too much acid
3. Acid or cream too warm
4. Water not added soon enough
5. Acid and sample not mixed immediately after all the acid was added
6. Incomplete mixing of cream and acid

**CARE OF TEST BOTTLES**

Inaccuracies in testing are frequently caused by test bottles not being washed free from fat before they are used. A dirty bottle may increase the test  $\frac{1}{2}$  to 5 percent. The following method of washing bottles will clean them thoroly.

Empty the bottles as soon as the tests are read; that is, before the fat has had time to solidify in the neck. Then wash them immediately.

Fill a pail about two-thirds full of water just warm enough to be used comfortably; add 2 tablespoonfuls of some good washing powder or soap chips. Take as many bottles as can be held conveniently in one hand; immerse them in the pail and allow them to fill partially with the alkaline water. Shake thoroly and discard the first rinsings into the drain, then place bottles in pail again and wash one by one with a bottle brush.

After all the bottles have been washed, empty the pail and refill with warm, clean water using no washing powder, and rinse the bottles thoroly.

Test bottles handled in this way will never be a source of trouble. Clean test bottles are one of the marks of a careful workman.

## PROBLEM OF STATION SHORTAGE

One of the main difficulties in the station method of obtaining cream is the discrepancy that sometimes occurs between the total amount of butterfat that a station operator may have paid for on a given day and the amount of butterfat in the sum total of the day's shipment from the station. This discrepancy is called shortage. It seldom represents an actual loss in butterfat, but is usually the result of a number of small errors in weighing and testing each patron's cream, together with loss caused by careless handling.

### Operator Can Largely Avoid Shortage

By adhering strictly to the following rules, an operator can avoid most of the shortage problem:

1. Use extreme care in weighing each can of cream, being careful to watch the break in the scales.
2. Use care in preparing the can of cream for sampling.
3. Rinse the cans properly and save all drippings and rinsings and ship them to the manufacturing plant in a separate can.
4. Use clean glassware and utensils.
5. Centrifuge all cream tests the full 8 minutes—5 minutes the first time and 3 minutes the second time.
6. Test and read the results accurately. Be sure to use the water bath and glymol.
7. Use extreme care in recording and calculating these results.

### Financial Loss Resulting From Shortage

To realize the loss that shortage may cause, suppose a buying station is paying 35 cents a pound for butterfat. It then pays \$35 for every 100 pounds of fat which it is supposed

to have received. If, however, the station has a shortage of 5 percent, the creamery will receive only 95 pounds of fat, for which it will have paid \$35. Each pound of butterfat will then have cost the creamery 36.84 cents, or 1.84 cents more than the price quoted. It is easy to see that losses like this would ultimately ruin any butter factory.

### **How to Check Amount of Shortage**

An operator may find it a satisfaction to check his daily operations himself and know whether or to what extent his methods are resulting in shortage. This is not hard to do.

If cream is shipped from the station daily, it is obvious that the total butterfat in the shipment should equal the total butterfat purchased on that day, if all tests and calculations are correct. To see whether this is true, at the end of the day carefully weigh the cream in each shipping can; stir each can thoroly, and take a sample of the cream and test it. The total butterfat in all the cans should equal the total pounds of butterfat purchased on that day. (The "day," for this purpose, is the time from one shipment to the next, and is largely determined by train or truck schedules.)

Checking shortage is comparable to the practice of a banker in balancing his books at the end of each day's business.

## **CARE OF CREAM CANS**

### **Washing the Patrons' Cans**

In most plants receiving dairy products it is customary to wash producers' cans before returning them. This custom has extended to the cream station, and many operators will doubtless find it an important factor in improving the grade of cream delivered to them. In the first place it makes for a clean station, with clean cans and clean utensils, and this cannot fail to influence producers toward greater cleanliness. In the second

place the facilities at the station for washing and sterilizing the cans should be far superior to those on the average farm. Note the following suggestions for handling patrons' cans.

1. Rinse each can with lukewarm water.
2. Wash in a sink two-thirds full of hot water containing some good washing powder. When a can washer of the jet type is used, the water should be at least 180° F. *Do not use soap.*
3. Rinse the can thoroly with hot water. If steam is available, invert the can over a steam jet for at least 30 seconds.
4. Immediately invert the uncovered can on a drying rack so that it will drain and dry. Remember that drying is quite as important as washing in making cans a fit receptacle for dairy products.
5. Never use towels or cloth to wipe the inside of a cream can.

#### Care of Station Shipping Cans

Empty shipping cans received from the creamery should be hauled from the depot immediately upon their arrival. On reaching the cream station, the covers should be removed and the cans inverted on a rack. Cans should be rinsed with clean water just previous to filling them with cream.

Cans are an important part of the investment of the creamery industry; and the station operator can do much to see that they are fit receptacles for cream and are not needlessly damaged by careless handling or lost by careless shipping directions. Cans deserve much more attention than they often have received.

#### HOW PATRONS CAN IMPROVE CREAM QUALITY

Cream producers, and even some station operators, seem to have a misconception regarding the quality of cream necessary to produce good butter. The fact is that even with our improved methods of butter manufacture, poor cream will not make good butter.

Since no one is in better position to influence cream producers to deliver a higher quality grade of cream than is the station operator, he should be familiar with the farm practices that affect cream quality, and should pass on to his patrons any suggestions that will be helpful. Following is a list of practices that most operators will have opportunity to suggest to some of their patrons, to the advantage of both patrons and buyer.

1. Keep the cows away from strongly flavored feeds and such plants as wild onion, ragweed, pepper grass, etc. This is especially necessary for four hours before milking.
2. Keep the cows clean and wipe off their udders before milking.
3. Use covered milk pails.
4. Strain the milk thru a clean, single-service, cotton filter pad.
5. Milk with dry hands.
6. Remove all milk from the barn immediately and separate it at once.
7. Set the separator so that it will skim cream that will test 35 to 40 percent in winter and up to 45 percent in summer.
8. Wash, scald, and dry the separator and all utensils immediately after using them. The separator bowl may be dried in a warm oven, tho the oven should not be so warm that it will melt the tin on the bowl parts. Setting utensils in the sun is a good practice, as the sunshine acts as a germicide.
9. Keep all utensils and separator parts dry and free from dust when not in use.
10. Cool the cream immediately after skimming it by setting the can in cold, running water. A cooling tank may be constructed that will cool the cream with the water that is used to fill the stock tank.
11. After the cream has been cooled, keep the can tightly covered.
12. Never mix warm cream with cold cream—cool it before mixing it with previous skimmings.
13. Do not let the cream freeze in cold weather.
14. Stir the cream at least twice a day; this will keep it smooth and free from lumps. Use a clean metal stirrer. A wooden paddle is insanitary.

15. Deliver cream frequently, at least twice a week in winter and three times a week in warm weather.
16. Use containers and utensils made specifically for milk and cream. Be sure they are clean and sterile before using them. Do not use rusty or makeshift containers such as lard or sirup pails. (The use of the latter is illegal in Illinois.)
17. The use of water-dilution separators should be discouraged because they do not skim efficiently and they produce a thin cream of poor quality.

## CREAM-TEST QUESTIONS AND ANSWERS

**Question:** Describe the process of sampling a can of cream.

*Answer:* Mix cream thoroly by vigorous stirring until it is smooth and free from lumps. With a clean, dry dipper take out one to two ounces of cream and place in sample jar. Number sample jar for identification.

**Question:** How is a sample of cream prepared for testing?

*Answer:* Warm sample bottle containing the cream to a temperature of about 90° F. so that the cream will mix readily. (Frozen or lumpy cream must be warmed slowly to prevent butterfat from oiling off.) Mix the warmed sample by pouring it back and forth into a clean cup. Immediately after mixing, weigh out sample in test bottle, using a clean, dry pipet.

**Question:** Why is it necessary to use only clean test bottles?

*Answer:* Foreign material in the test bottle may cause an inaccurate test. If a test bottle contains oil or fatty material, the reading of the finished test will be increased.

**Question:** Will the use of a wet pipet affect the test?

*Answer:* Yes. The pipet should be rinsed with hot water between samples, and the last drops of water blown out. It should then be rinsed in the same manner with cream two or three times before a sample is transferred to the test bottle.



**Question:** Why is the cream sample weighed into the test bottle?

*Answer:* It is necessary to have exactly 9 grams of cream in the test bottle. The specific gravity of cream varies with its fat content, also the cream may contain varying amounts of air or gases, and it is therefore necessary to weigh the sample.

**Question:** Do all empty cream test bottles weigh the same?

*Answer:* No. Therefore the cream scale must be properly adjusted each time a new bottle is used.

**Question:** What type of cream test bottle is most commonly used?

*Answer:* Fifty-percent 9-gram, 6-inch bottles are most common.

**Question:** What is the correct weight to be used in testing?

*Answer:* A 9-gram weight. This weight must be kept clean since any accumulation of dirt may cause too much cream to be weighed into the test bottle, thus causing an inaccurate test.

**Question:** What care should be given the cream scale?

*Answer:* The cream scale, beam, and pans must be wiped clean before each weighing. The scale should set level on a solid shelf and be protected from drafts.

**Question:** What acid is used in testing?

*Answer:* Commercial sulfuric acid with specific gravity of 1.82-1.83.

**Question:** How much acid is used in testing?

*Answer:* Eight to 9 cc. of acid is used, depending upon the temperature of the cream and the acid and the strength of the acid.

**Question:** What is the proper temperature of acid and cream at the time of mixing?

*Answer:* About 70° F.

**Question:** What causes light-colored and curdy fat columns in tests?

*Answer:* Acid is too weak; acid or cream is too cold; not enough acid; water was added to test bottle too soon; or bottle was not shaken sufficiently after the acid was added.

**Question:** What causes dark-colored or charred fat columns?

*Answer:* Acid too strong; too much acid added; temperature of cream or acid too high; or water not added soon enough.

**Question:** When is water added to the test bottle?

*Answer:* After the acid is added to cream in test bottle, it is thoroly shaken; and when the contents are dark chocolate-brown, water is added until the contents come up to the base of the bottle neck. Water is added a second time after the bottle has been whirled 5 minutes.

**Question:** How many times are tests whirled in the centrifuge?

*Answer:* Twice. First for 5 minutes and then for 3 minutes.

**Question:** What is glymol, or "red reading" oil, and why is it used?

*Answer:* Glymol is a colored mineral oil having a specific gravity lower than butterfat. It is added to the top of the fat column to destroy the meniscus.

**Question:** What is the meniscus?

*Answer:* The meniscus is the curved surface of a liquid contained in a tube of small diameter. It will appear at the top of the fat column in the neck of the test bottle.

**Question:** At what temperature should tests be read?

*Answer:* Tests should be read between 130-140° F., preferably about 135° F. At a temperature much below 130° F. the fat column shrinks and gives a low reading; at a temperature much above 140° F. it expands and gives too high a reading.

**Question:** How would you test cream so high in butterfat that the neck of the bottle will not hold all the fat?

*Answer:* Prepare a new sample. After the cream and acid are mixed and before centrifuging, pour part of sample into a second bottle, complete the test, and add readings of both bottles.

**Question:** How does the percent of fat affect the specific gravity of cream?

*Answer:* The richer the cream the lower the specific gravity and the lower the weight of a gallon of cream.

**Question:** Does the souring of cream change its test?

*Answer:* No, it does not. The fact is that sweet cream is less viscous and can therefore be more completely mixed and more accurately weighed.

CREAM STATION OPERATORS who desire to do their job in the best possible way will find in this circular specific instructions for making an accurate cream test, directions as to the proper care of station equipment, and suggestions that will help some of their patrons improve the butter-making quality of the cream they deliver.

Assuming a well-located, clean buying room and the right equipment, the interest and skill of the operator become of first importance in the successful operation of a cream-buying station.