

11-1934

Accounting for Creamery and Dairy Products

John H. Worman

Follow this and additional works at: <https://egrove.olemiss.edu/jofa>



Part of the [Accounting Commons](#)

Recommended Citation

Worman, John H. (1934) "Accounting for Creamery and Dairy Products," *Journal of Accountancy*. Vol. 58 : Iss. 5 , Article 3.

Available at: <https://egrove.olemiss.edu/jofa/vol58/iss5/3>

This Article is brought to you for free and open access by the Archival Digital Accounting Collection at eGrove. It has been accepted for inclusion in Journal of Accountancy by an authorized editor of eGrove. For more information, please contact egrove@olemiss.edu.

Accounting for Creamery and Dairy Products

BY JOHN H. WORMAN

Dairying had its beginning in antiquity, at a time when nomadic tribes roamed over wide areas seeking pasturage for their flocks. In these simple surroundings, the art of butter-making also originated, probably when some traveler found his milk churned to butter after a long trip on camel's back.

After long years of evolution, we have our modern creameries and dairies. The first creamery should, in all probability, be credited to the Swiss, who early sent their cows to a central organization in the upper pastures, where most of the milk was made into cheese, and each farmer was paid in due ratio, according to the yield of his few cows. Modern creameries and dairies are said to date from 1866, when the first distributing society was founded in Denmark.

Through the use of modern machinery and equipment, milk is now converted into several varieties of dairy products, with annual sales running into billions of dollars, so that dairying and its allied industries rank, approximately, fifth in the United States.

Milk production is highly technical, because of legal requirements of cleanliness, etc., and competition is so keen that the margin of profit is very small.

The large dairy usually purchases its raw products from small dairy farmers. The raw milk is delivered daily by the producers, either to small creameries, milk shipping stations or direct from the farm to the dairy plants, where the milk is subjected to chemical and bacteriological analyses and is put through several processes before it is ready for delivery to our homes.

The main products, which are the results of processes and manufacturing operations to be discussed later, are here briefly described in order that the accounting methods set forth later may be better understood.

GRADES OF MILK

Under standard milk ordinances, now in effect in most cities, the following grades of milk are produced:

Grade A (raw) Bacterial count not to exceed 10,000 per cubic centimeter at the time of delivery.

Accounting for Creamery and Dairy Products

Pasteurized:

- Grade A Bacterial count same as Grade A raw milk.
- Grade B Bacterial count not to exceed 50,000 per cubic centimeter at time of delivery.
- Grade C Bacterial count not to exceed 50,000 per cubic centimeter,— used only for cooking and manufacturing purposes.

The minimum milk standard is as follows:

Butterfat	3.0%
Milk solids	8.5
Water in fluids	88.5
Total	100.0%

CREAM

Cream is extracted by separating it from the skimmed milk in the process of utilizing surplus milk, or else it is purchased outright. It is produced in grades ordinarily known as “heavy,” “medium” and “light” cream. Cream, both sweet and sour, is sold direct to the trade, and the surplus is churned into butter.

MANUFACTURED PRODUCTS

Buttermilk:

Buttermilk is made from milk, from which the butterfat has been removed. The milk is heated to a temperature of approximately 180° for a period of one hour to kill all harmful bacteria, and then it is cooled to 70° before being inoculated with lactic acid bacillus, which produces what is known ordinarily as buttermilk. Bulgarian buttermilk is similarly produced from whole milk by inoculation with lacto bacillus bulgaris. The bacteria are allowed to propagate for 18 hours at 70°, after which the curd is broken, cooled, stirred to a creamy consistency and bottled.

Cottage cheese:

Cottage cheese is fresh curd of milk, produced by allowing bacteria to grow for a time in skimmed milk. The curd is cut into small bits, and heated; the whey, or watery portion is then drained off, after which the curd is cooled, washed and mixed with cream and salt.

Butter:

Butter is produced by churning cream, and is composed approximately of:

Butterfat	80%
Milk solids	1

Salt.....	3
Water.....	16
	<hr/>
Total.....	100%

Other by-products:

The great variety of dairy products such as powdered or condensed milk, cheese, ice-cream, etc., make it impracticable to attempt to discuss them all, and these comments will be confined to the operations of fluid-milk dealers, who manufacture buttermilk, cottage cheese and butter mainly to utilize their surplus milk.

FUNCTIONAL DEPARTMENTS

Functional control of costs and expenses is made possible by proper departmentalization. Departmental expenses fall, naturally, into two classes, as follows:

- 1—Producing
- 2—Non-producing

Under producing come purchasing, processing and manufacturing, while non-producing includes sales, administration and service departments.

PURCHASING

When the milk is delivered to a plant, it usually is received by two employees, who weigh and sample it by taste for freshness and flavor. Since butterfat content is the basis on which milk is purchased, samples must be sent to the laboratory for testing. These tests are made eight or nine times monthly (or as agreed) and the tests are averaged at the end of the month. The average serves as the basis of settlement with the shippers.

The receiving employees make a duplicate report on each shipper's supply. The original is given to the shipper as a receipt and the duplicate is sent to the office, daily. From this the shippers' ledger is posted. This report should show the shipper's number, date, pounds received and disposition, either to pasteurizing or separating departments. Milk is usually converted from a poundage basis to gallons after leaving the receiving department, and the conversion is made on the basis of 8.6 pounds to the gallon.

The total milk receipts should be reconciled daily with reports of milk utilized in the various departments, on the basis of butterfat content, and the shrinkage should be ascertained, both in pounds (butterfat) and percentage. In most plants this shrinkage should never exceed 3 per cent. This reconciliation must be made in order to account for the disposal of all milk received at the plant.

Pounds of butterfat are computed by multiplying the pounds of milk received by the average daily test, e.g.—50,000 lbs. received, average test 4.4 per cent. butterfat (B.F.) in pounds equals 50,000 times 4.4 or 2,200 lbs. Thus, if the milk actually utilized in the plant for the day was 2,145 lbs. (B.F.), the shrinkage was 55 lbs. or 2.5 per cent.

PROCESSING

Processing includes the following operations:

- 1—Filtration
- 2—Pasteurization
- 3—Standardization
- 4—Separation
- 5—Washing
- 6—Filling
- 7—Cooling

Upon leaving the receiving room the milk is carried by sanitary pipes to a preheater, which heats the milk to 110°. From this heater it flows into a filter, where dirt and other foreign substances are removed. The preheating is necessary in order to make the milk flow freely, since cool milk will not filter properly.

The milk flows from the filter into the pasteurizing vats (usually 300-gallon capacity) for pasteurization. Pasteurization consists of heating the milk to a temperature from 142° F. to 145° F. for thirty (30) minutes and then cooling rapidly to 40° F. by passing over brine pipes in a stainless steel cooler. The brine temperature is kept at 10° above zero F. and the milk enters at the top at a high temperature, reaching the bottom at 38° to 40° F.

While in the pasteurizing vat, the milk is standardized; that is, if the milk to be bottled or otherwise disposed of is to test 5 per cent., enough cream is added to bring the whole quantity up to the test required.

After being pasteurized, the milk is transferred at accumulated cost either to the bottle filler or to the separators.

In the separating department, centrifugal machines separate the milk, so that less than .01 per cent. of fat remains in the skimmed milk. The cream realized from the separation of milk from the pasteurizing department or from returned milk is standardized to various grades in whatever quantities are required for sale to customers, and that part is immediately transferred to the cold room for distribution, while the remainder is transferred to vats preparatory to churning. The cost of separating is partly compensated by the value of the skimmed milk utilized in the manufacture of buttermilk and cottage cheese. The skimmed milk value is computed on an arbitrary basis, usually 20 per cent. of the cost of the whole milk at the separator.

The pasteurized milk necessary to meeting the bottling requirements is transferred to the filling department (at accumulated cost), where it is bottled and capped by automatic machinery at the rate of 70 pints or 50 quarts a minute. The milk is then taken by conveyors to the cold room for distribution to customers.

Empty bottles and cases are carefully washed and sterilized. Bottle-washing machines wash and sterilize approximately 800 bottles at once. Sixteen minutes are required for proper sterilization. The clean bottles travel by conveyor (untouched by hands) to the filler machines. Careful inspection is made of clean bottles on the conveyor line to remove any chipped or broken bottles.

COST OF PRODUCTS

Each department should make out a daily report showing opening inventory, receipts, transfers and closing inventories. This information is assembled by a clerk, who accumulates the data on summary sheets for the purpose of showing monthly costs. These reports, etc., should be kept in pounds (and gallons if desired), and the money value should be computed at the end of the month.

The finished cost of milk in the cold room consists of the cost of raw product (which in the milk industry constitutes the greater portion of the finished product cost), with processing costs assembled from the departmental expense accounts and allocated monthly to the various departments. The expenses should be gathered in cumulative form, so that it will be necessary to distribute only monthly totals.

Accounting for Creamery and Dairy Products

There are many methods of distributing overhead or departmental expenses, but probably the most troublesome of all is the method used in distributing steam, refrigeration, water and heat, which is best accomplished by means of standards ascertained by each company for its own use.

Expenses applicable to departments should be prorated to the products which pass through any particular department, on the basis of units handled in that department. As a product is transferred from one department to another, the cost as accumulated in the previous department should be carried over to the succeeding department, so that the cost at each step of production may be known and the loss occasioned by reason of the transfer from one department to the other should be placed upon the department relieved, as for example:

	Gallons	Unit cost	Product cost
Milk transferred from pasteurizing department . . .	50,000	\$.300	15,000
Total shown by filler reports	49,500	.323	15,000
Shrinkage	500		

The shrinkage of 500 gallons (1%) is absorbed in the product cost, 49,500 gallons divided into the accumulated cost of \$15,000 or a unit cost of \$0.323 per gallon, instead of \$0.30, carried over from the previous department. To this product cost would be added washing, filling and cold room expense as allocated on some "unit" method of allocation, such as cans, cases, boxes, etc.

MANUFACTURING

In the manufacture of buttermilk and cottage cheese, there is the cost of the skimmed or raw milk transferred, to which is added the respective departmental expenses; and in the case of cottage cheese, there are container and packing expenses.

BUTTER MAKING

All cream received should be weighed and sampled for butterfat content, for the purpose of determining proper payment, where cream is received from the shipper, or for purposes of credit to other departments, when products are transferred to the butter department. After being pasteurized the cream is pumped into vats for "ripening." These vats should be measured for volume

of cream and tested by composite sample to determine the butter-fat content. This is necessary in determining churn over-run. From plant report summary and cost sheets the churn-room report would be approximately as follows:

(Figures not actual)	Cream gallons	Pounds B.F.	Unit cost	Cost value
Cream purchased.....	3,400	9,500	\$.30	2,850
Surplus cream.....	1,300	4,500	.30	1,350
Cream dumped.....	500	1,400	.30	420
<hr/>				
Total to churns.....	5,200	15,400		4,620
Add—over-run—20%.....		3,080		
Churn-room expenses.....				115
<hr/>				
Total to packing room.....		18,480	\$.256	4,735
Less—print loss—2%.....		370		
<hr/>				
Butter packed.....		18,110	\$.261	4,735
Add—packing expense.....				300
Cold-room expense—pro-rata.....				15
<hr/>				
Cost of butter packed.....		18,110	\$.278	5,050
<hr/> <hr/>				

RETURNED AND SURPLUS PRODUCTS

Milk dealers make a constant effort to reduce the loss due to returned products, which seem to be a necessary evil, and such losses must be carefully and thoroughly checked, to guard against increased losses through collusion of employees.

Distributors of fluid milk and cream are burdened with the problem of an over-supply of milk in the months of high production, because sufficient milk must be assured to meet consumer demands in the season of low production. This surplus milk must either be sold in bulk at any price obtainable or be manufactured into by-products. The surplus product, if costed at average cost value, will be burdened with an inflated cost, and it is better to cost it at an equivalent of the prevailing market price. The difference between actual cost and the surplus raw product value represents surplus product loss, which should be allocated to fluid-milk cost on a basis of fluid-milk-product sales.

PRODUCT COST STATEMENT

The product-cost statement should be prepared to show, in analytical form, the actual cost and profit or loss for each product

handled, according to size of package and whether sold at retail or wholesale. When prepared on the basis of sales units or points (variously established), the statement may be made to show unit cost and profit or loss according to products for statistical and managerial purposes.

COLD-ROOM AND LOAD OUT REPORTS

Finished products in cold room are the equivalent of unconverted cash and must be protected against theft and errors in reporting. If practicable, a storekeeper should be put in charge of the cold room to check carefully all goods in and out of the room. All removals should be on the basis of requisitions showing disposition to retail routes, wholesale routes, special deliveries and retail stores or selling stations. Receipts and disbursements of the cold room should be summarized on a daily cold-room report. This report shows an opening inventory by actual count (a.m.) to which all receipts properly classified are added. From this total charge are deducted all requisitions for withdrawals, extras to routes and stores, transfers, breakage, etc., resulting in a "balance to be accounted for (p.m.)." Here the report should provide for another actual count, say at 7 p.m. in order definitely to place responsibilities for shortages on the day or night attendant.

At this point the route "load out" reports are summarized and deducted from the "balance to be accounted for (p.m.)," which leaves a balance on hand to be verified by an actual (a.m.) count, all "overs" and "short" to be noted at the bottom of the cold-room report. The overage or shortage of each product should be carefully checked daily by some responsible person. The daily variations should be summarized and careful comparisons made monthly, from which standard losses may eventually be established.

The accuracy of the "load out" summaries should be closely watched, as these reports are sometimes made to cover up discrepancies of route men and others.

ROUTE ACCOUNTS

The territory served by the dairy is subdivided into routes, and each route is served by a delivery crew consisting of a driver and a helper. Route service is supplemented by special delivery service, which takes care of orders requiring immediate delivery.

Route accounts are handled differently from customers' accounts in most industries. The number of customers served sometimes runs into thousands even in a medium-sized business. A greater part of the work of keeping customers' accounts falls on the delivery men or route men. Route sheets are made up the first of each month and are arranged in order of delivery when turned over to the route men. These sheets show unit sales of products by days and the record of sales is entered when the delivery is made.

Different colored sheets are used for cash and credit customers.

The route men are charged at sales price with all products taken out, according to a loading requisition and "load out" sheets, and also for extras. Credit is given for products returned, as per "return" slips and the wholesale or other discounts and the result is the net total daily sales. Settlement should be made daily for the net total sales, after deducting for "charge" sales made, bottles purchased, coupons, etc., and after adding collections made on charge accounts. In this manner control is maintained over the driver's balances. The route books are compared at regular intervals with the current balances outstanding as shown by the office accounts or route men's settlement sheets.

The settlement sheets should provide space for reconciling bottles, cans, etc., in service. These sheets are checked by the cashiers and recapitulations are made, by clerks, on a route sales sheet providing for a full month's sales. The same sheets are also summarized to show daily sales in quantities and amounts, by products, according to size of container.

PATRON'S SETTLEMENT SHEET

The patron's settlement sheet is peculiar to the industry and needs some explanation. It sets up in convenient form, the daily weights of milk furnished by patrons, also the pounds of butterfat of cream purchased, as cream is usually paid for on the day following receipt. It shows the total value of milk purchases for the month and also the deductions for advances, supplies furnished, dairy products taken for own use, and sometimes for association expenses, if included in the purchasing agreement.

Milk is usually purchased on the basis of a certain fixed daily or monthly maximum, and any milk in excess is paid for as surplus milk, at a different base price, according to the then prevailing

buying plan, and the patron's sheets should provide space for separate computation of "regular" and "surplus" requirements. At the end of the month or other pay period, the sheets are computed and cheques for undrawn balances are mailed to patrons.

BOTTLE LOSS

Many methods are used to account for bottles. Sometimes they are classified physically, as current assets, sometimes as fixed assets, and at other times are written off as expense, when put into service.

The best method probably is to set up the bottles in service by actual inventory of filled and empty bottles in use and to make an estimate of bottles out on routes, i.e., two, three or more to each customer, based on two times the average daily sales units. The total bottles in service, thus computed, should be valued at, say, one-half the original cost per unit, and would be shown as a current asset in the balance-sheet. New bottles should be charged to manufacturing and operating supplies, when purchased, and credited thereto when put into actual use and charged to "bottles in service." At the end of the month, or other period, a new inventory of bottles in service should be taken, in the manner described above, and the difference between the new inventory and the debit balance in bottles-in-service account should be charged to bottle loss, which is a profit-and-loss account. Milk cans and bottle cases should be classified as fixed assets and valued at cost less 40 per cent. or 50 per cent.

Other inventories do not present any special problems of valuation not found in other industries.

PROPERTY, PLANT AND EQUIPMENT

Fixed assets, particularly buildings and machinery, present somewhat of a problem. Buildings are usually of a special type, which can not readily be converted to other purposes, and this should be taken into consideration in setting salvage values and in establishing depreciation rates. The machinery and equipment accounts present the problem of numerous kinds of special items, most of which have a different useful life, for which a composite rate can not be used in setting up depreciation reserves.

The rates of depreciation usually applicable to the different types of machines and equipment are too varied to describe here. The rates can best be established by experience, but suggested

uniform rates have been formulated by milk dealers associations and by the bureau of internal revenue.

A recent treasury decision, 4422, February 28, 1934, makes it mandatory to classify fixed assets according to length of life, in order that the taxpayer may be able to substantiate for federal income-tax returns the rates of depreciation used.

RESALE VALUE OF ROUTES

Competition in the acquisition of routes and customers has brought about a condition that requires comment. Dairy customers are often acquired by purchase from other dealers, by campaigns of direct solicitation, and sometimes by payment of a "premium" to the customer for his trade. This cost of acquiring trade is usually charged to an account called resale value of routes. This account is almost in the same category as goodwill, and it is very difficult to place a value on it for balance-sheet purposes. The proper valuation would be cost outlay, reduced periodically for loss of customers, but the time involved makes it difficult for an accountant to make any verification.

BALANCE-SHEETS

Balance-sheet items requiring special comment have already been mentioned. A study of balance-sheets and operating statements of dairies and milk dealers will reveal that there is a very rapid turnover, due to the more or less perishable nature of the products handled. For this reason, a large current ratio is not necessary; a ratio of slightly in excess of one to one is considered sufficient. A condensed pro-forma balance-sheet follows:

BLANK CREAMERY & DAIRY COMPANY

Balance-sheet—August 31, 193—

Assets

Current assets:

Cash in banks and on hand		\$	xxxx
Customers' notes receivable (less reserve \$xxxx)			xxxx
Customers' accounts receivable:			
Route accounts—drivers	\$	xxxx	
Retail accounts—office		xxxx	
Wholesale accounts—office		xxxx	
	\$	xxxx	
Less—reserve for doubtful		xx	xxxx

Accounting for Creamery and Dairy Products

Inventories:		
Finished products, milk, cream, cheese, etc.— at cost	\$ xxxx	
Bottles in service—at cost less 50%	xxxx	
Operating supplies—at cost	xxx	xxxx
Total current assets		\$ xxxxx
Prepaid insurance, interest, stationery, etc.		xxx
Real estate—not used for plant purposes		xxxx
Property, plant and equipment—at cost:		
Land	\$ xxx	
Buildings	xxx	
Machinery and equipment	xxx	
Cans and cases in service	xxx	
Office furniture and fixtures	xxx	
Delivery equipment	xxx	
	\$ xxxxx	
Less—reserve for depreciation	xxxx	xxxxx
Resale value of routes (state basis)		xxx
Total		\$ xxxxxxx

Liabilities

Current liabilities:		
Notes payable—banks	\$ xxxx	
Notes payable—machinery	xxxx	
Accounts payable—trade	xxxx	
Accounts payable—patrons for milk and cream.	xxx	
Outstanding milk tickets, and store bottles	xxxx	
Accrued liabilities	xxxx	
Provision for federal taxes	xxxx	
Total current liabilities		\$ xxxxxxx
Capital stock—common:		
Authorized 1,000 shares of \$xxx each		
Whereof outstanding 750 shares	\$ xxxxxx	
Earned surplus	xxxxx	xxxxxxx
Contingent liabilities reported—(state nature and amount)	\$ xxxxxx	
Total		\$ xxxxxxx

OPERATING STATEMENTS

The detail of operations to be presented depends entirely upon conditions and the scope of the examination. It is unnecessary to repeat statements of details of operations and relative statisti-

The Journal of Accountancy

cal data, if already prepared by the company's accounting department. A condensed profit-and-loss account, supplemented by a schedule of departmental expenses, follows:

BLANK CREAMERY & DAIRY COMPANY

Condensed profit-and-loss account for the year ended August 31, 193—

Sales:		
Retail sales		\$ xxxxx
Wholesale sales		xxxxx
Total gross sales		\$ xxxxxxx
Less—sales discounts and allowances		xxxx
Net sales to customers		\$ xxxxxxx
Cost of sales:		
Cost of production:		
Purchases of raw product	\$ xxxxx	
Purchasing expenses	xxxx	
Cost of raw materials	\$ xxxxx	
Processing expenses	xxxx	
Manufacturing expenses	xxxxx	
Total cost of production	\$ xxxxxx	
Add—purchases of finished products	xxxxx	
	\$ xxxxxx	
Deduct—inventory increase:		
Finished products—August 31, 193—	\$ xxxx	
Finished products—August 31, 193—	xxxx	xxxxx
Cost of sales		xxxxxxx
Gross margin (or loss) on sales		\$ xxxxxxxx
Operating expenses:		
Selling expenses	\$ xxxxx	
Administration and general expenses	xxxxx	xxxxx
Net operating profit (or loss)		\$ xxxxxxxx
Miscellaneous income:		
Interest earned—etc.		xxxx
Miscellaneous charges:		
Interest paid	\$ xxxxx	
Loss on capital assets sold	xxx	xxxxx
Provision for federal taxes		\$ xxxxxx
Net income (or loss)		\$ xxxxxx

Accounting for Creamery and Dairy Products

BLANK CREAMERY & DAIRY COMPANY

Statement of departmental expenses for the year ended August 31, 193—

Purchasing expenses:	
Country buying expenses.....	\$ xxxxx
Transportation.....	xxxxxx
Receiving labor.....	xxxxxx
Laboratory expense.....	xxxx
Total purchasing expenses.....	\$ xxxxxxx
Processing expenses: (detail by processes)	
Pasteurizing expenses.....	\$xxxx
Standardizing expenses.....	xxxx
Separating expenses.....	xxx
Washing bottles, cans, etc.....	xxxx
Filler-room expenses.....	xxxx
Cold-room expenses.....	xxxx
Total processing expenses.....	xxxxxxx
Manufacturing expenses: (detail by kinds)	
Butter expenses.....	\$xxxx
Butter packing.....	xxx
Buttermilk expenses.....	xxxx
Cottage cheese.....	xxxx
Total manufacturing expenses.....	xxxxxxxxx

Statistical data:

Kind of expense:	Unit cost	Unit
Purchasing.....	\$xxxxx	Gallons purchased
Pasteurization.....	xxxxxx	Gallons pasteurized
Separating.....	xxxxxx	Gallons separated
Washing.....	xxxx	Bottles or cans
Filler room.....	xxxx	Bottles or cans
Cold room.....	xxxx	Cases, boxes, cans
Butter manufacturing.....	xxxx	Pounds
Butter packing.....	xxxx	Pounds
Buttermilk manufacturing.....	xxxx	Gallons
Cottage cheese.....	xxxx	Pounds

Selling and administration and general expenses are similar in classification to those of other industries and no schedules are considered necessary. Selling and administration expense statistics are computed to fractional cents per point. The point basis is usually established by starting with one quart of milk equalling one point, and other products are converted to points, their unit value depending on their cost and sales value as well as the length of time necessary to complete the delivery to customers.