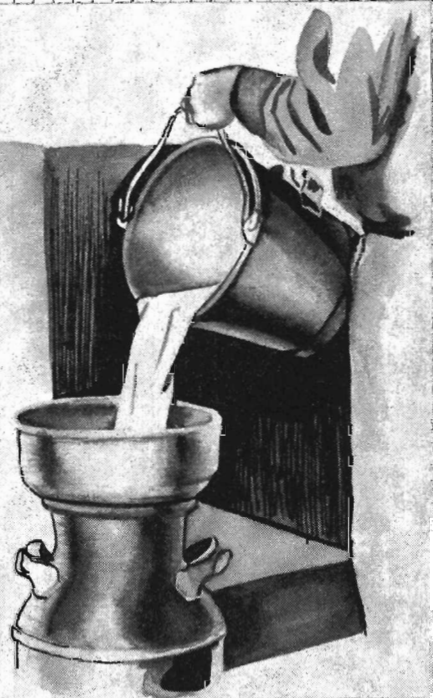


# Quality milk-



**does it  
cost more  
to produce?**



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Agricultural Experiment Station  
Oregon State College, Corvallis

# Quality Milk:

Does It Cost More to Produce? . . . . .

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## Summary Table of Findings

Item	Grade A farms in Willamette Valley and Tillamook County	Factory milk farms— all in Tillamook County
Number of farms studied .....	23	31
Average number of cows per farm.....	34.6	32.5
Total milk production per cow (4% FCM).....	8,857	7,262
Average value of milk cows, per head.....	286	256
Total hours of labor per cow per year.....	103	90
Average value of dairy buildings per cow.....	\$237	\$130
Average value of dairy equipment per cow.....	\$ 31	\$ 22
Average net cost of milk production, omitting cost of all feed:		
Per cow per year.....	\$216	\$184
Per 100 pounds (4% FCM).....	\$ 2.44	\$ 2.53
Average number of bacteria (standard plate count in raw milk).....	36,654	150,867
Logarithmic average number of bacteria (Standard plate count in raw milk).....	12,710	54,090

Does it cost more to produce high quality milk than it does to produce milk of lower quality?

We do not have the whole answer. For certain parts of Oregon, however, we do have some facts: the cost of dairy buildings, equipment, labor, and miscellaneous costs, in the production of both high quality and lower quality milk.<sup>1</sup>

All costs of production have been included, except for feed. Feed costs, although usually amounting to almost half of the total costs of production, have been intentionally omitted from this study in order to focus attention on those items of cost which are usually uppermost in any discussion comparing high quality milk costs to costs for milk of lower quality.

For a long time we have suspected high quality milk to be associated with high quality buildings and high quality methods (see footnote, Table 9 for explanation). In like manner, we have

suspected that the production of poor quality milk would be generally associated with poor quality buildings and poor quality methods. These opinions have been substantiated, at least in part, by results obtained in a recent study relating quality of milk to quality or "score" of the buildings and to the operator's methods.<sup>2</sup>

Always we have had exceptions. Today we find clean milk being produced under a great variety of conditions. The finest and most expensive buildings do not guarantee high quality milk, although they may be a factor in its production. The cheapest and the most rundown set of buildings do not necessarily result in the production of low quality milk. A great deal depends upon the dairy farmer himself—upon the particular way he does his work.

Many people believe that it costs more to produce milk of high quality than milk of low quality. What are the facts as shown by our present study?

### Production Costs, Except Feed

All information was obtained from the dairy farmers by the farm survey method. All quantities, prices, and values were supplied by the farm operators themselves and represent their own judgment and not the judgment of the enumerator who took the record.

#### Costs compared to milk quality

Omitting the value of feed fed, but including all other costs, the results of this study indicate that high quality milk costs more to produce, per farm and per cow, than lower quality milk.<sup>3</sup> Those farms producing the higher

<sup>1</sup> Most of the lower quality milk included in this study was still higher in quality than would be required to meet the minimum standards in many of the important cities of the United States.

<sup>2</sup> Based on unpublished data indicating a significant positive correlation between the quality of milk produced and the "quality" of methods used by the operator. This was true both on farms producing Grade A milk and on farms producing factory milk. On Grade A farms there was also a significant positive correlation between quality of milk and quality (score) of dairy buildings on the farm.

<sup>3</sup> Quality was measured solely by bacteria count in raw milk. The value of feed was omitted because most questions regarding the relative costs of producing Grade A and factory milk have revolved around the costs of buildings, equipment, man labor, and miscellaneous costs.

quality milk (Grade A farms) also had the higher producing cows. *Considered on a hundredweight basis therefore, it was found there was no essential difference in cost between high quality milk and milk of lower quality.* In other words, through good management and adequate feeding, resulting in higher production per cow, the dairymen producing the higher quality milk actually overcame or offset the higher costs of producing Grade A milk. Detailed cost records were obtained from 54 dairy farmers in Western Oregon in the spring of 1952 (Table 1). Seventeen Grade A farms studied were in the Willamette Valley and 6 were in Tillamook County. All 31 factory farms studied were in Tillamook County. No consistent relationship seemed to exist between the quality of milk produced and its cost of production, omitting feed costs. The indicated net cost of production (omitting feed) for Grade A milk was \$2.44 per hundredweight compared with \$2.53 for factory milk. This difference is not large enough to be significant. In fact, the cost "per cow" on Grade A farms, as will be shown later

in Table 2, was higher by \$32 per cow than on factory milk farms.

Not only was there no significant difference between Grade A and factory milk farms with regard to costs of production per hundredweight (omitting feed costs) but also there was no clear cut relationship between quality of milk and cost of production on "Grade A" farms and on "factory" farms taken by themselves (Table 1). For example, as one moves from Grade A milk with a very low bacteria count to Grade A milk of higher and higher bacteria count, there is no consistent increase or decrease in production costs per hundredweight. The same thing is true when one examines the production costs of factory milk of higher and lower quality. There is no consistent trend, either up or down (Table 1).

From these results we can not say that in Oregon *all* factory milk costs as much to produce as Grade A. We can only conclude this: factory milk coming from the 31 farms in the Tillamook area (as represented by these 31 farms where production per cow is lower and where, in recent years, special empha-

**Table 1. Production Costs Not Related to Milk Quality<sup>1</sup>**

Quality group (bacteria count) <sup>2</sup>	Grade A		Factory		All farms	
	Number of farms	Average cost of production (omitting feed) per 100 lbs. <sup>3</sup>	Number of farms	Average cost of production (omitting feed) per 100 lbs. <sup>3</sup>	Number of farms	Average cost of production (omitting feed) per 100 lbs. <sup>3</sup>
2,833 to 9,999....	5	\$2.70	0	\$.....	5	\$2.70
10,000 to 19,999....	5	2.32	1	1.80	6	2.25
20,000 to 39,999....	5	2.56	5	2.48	10	2.52
40,000 to 79,999....	7	2.30	8	2.48	15	2.37
80,000 to 159,900....	0	.....	9	2.60	9	2.60
160,000 to 319,999....	1	2.58	4	2.32	5	2.36
320,000 to 613,133....	0	.....	4	3.02	4	3.02
All farms .....	23	\$2.44	31	\$2.53	54	\$2.49

<sup>1</sup> Grade A, Willamette Valley and Tillamook; factory farms in Tillamook only.

<sup>2</sup> Represents 12-months' average-bacteria content, standard plate count in raw milk.

<sup>3</sup> Includes all costs, except feed, of producing 100 pounds of 4.0 per cent fat-corrected milk.

sis has been put on quality) apparently costs about the same per 100 pounds to produce (omitting feed costs) as Grade A milk, whether the latter comes from Tillamook County or from the Willamette Valley. This is true even though it cost \$32 more per cow to produce Grade A milk, where production per cow is higher, than it did to produce factory milk.

If this study had included feed costs it is possible the total cost of producing Grade A milk, even on a hundred-

weight basis, might have been higher than on factory milk farms. This could be true because of the additional feed required to obtain the higher production per cow on Grade A farms. It is of interest to note that the average bacteria count of all the factory milk sampled was 150,867<sup>1</sup> compared to an average count of 36,654<sup>1</sup> for the Grade A milk. From Table 1 it can be seen that 14 out of the 31 factory farms studied (45 per cent) produced milk with a bacteria count actually less than

<sup>1</sup> Number of bacteria per millilitre, standard plate count, in raw milk.

**Table 2. Grade A Production Costs Higher Per Cow; About Same Per 100 Pounds Milk; Compared to Factory<sup>1</sup>**

Item	Per cow		Per 100 pounds milk		Per pound butterfat	
	Grade A	Factory	Grade A	Factory	Grade A	Factory
<b>Labor</b>					<i>Cents</i>	<i>Cents</i>
Operator's direct ....	\$ 85	\$105	\$1.06	\$1.56	22.5	34.5
Operator's overhead	12	8	.15	.12	3.2	2.6
Family .....	15	11	.18	.17	3.9	3.6
Hired .....	35	10	.44	.14	9.3	3.1
<b>Total labor .....</b>	<b>\$147</b>	<b>\$134</b>	<b>\$1.83</b>	<b>\$1.99</b>	<b>38.9</b>	<b>43.8</b>
Use of buildings <sup>2</sup> .....	24	16	.30	.24	6.4	5.3
Use of equipment <sup>2</sup> .....	6	4	.08	.07	1.6	1.5
Breeding .....	7	5	.08	.08	1.8	1.8
Depreciation on cows..	11	17	.14	.25	3.0	5.6
Interest on cows @ 5%	14	13	.18	.19	3.8	4.2
Veterinary and medicine .....	7	5	.08	.07	1.7	1.5
Hauling milk .....	22	10	.28	.14	5.9	3.2
Miscellaneous <sup>3</sup> .....	29	21	.36	.32	7.6	7.0
<b>Total gross cost (omitting feed) ..</b>	<b>\$267</b>	<b>\$225</b>	<b>\$3.33</b>	<b>\$3.35</b>	<b>70.7</b>	<b>73.9</b>
<b>Credits</b>						
Calves .....	\$ 19	\$ 11	\$ .24	\$ .17	5.1	3.8
Manure .....	28	28	.35	.42	7.4	9.2
Other .....	4	2	.04	.03	.9	.7
<b>Total credits .....</b>	<b>\$ 51</b>	<b>\$ 41</b>	<b>\$ .63</b>	<b>\$ .62</b>	<b>13.4</b>	<b>13.7</b>
<b>Total net cost (omitting feed) ..</b>	<b>\$216</b>	<b>\$184</b>	<b>\$2.70<sup>4</sup></b>	<b>\$2.73<sup>4</sup></b>	<b>57.3</b>	<b>60.2</b>

<sup>1</sup> Feed cost not included in order to focus attention on any differences between Grade A and factory milk in the cost of labor, building, and equipment requirements for Grade A production.

<sup>2</sup> Includes interest, depreciation, and repairs.

<sup>3</sup> Includes such items as Dairy Herd Improvement Association dues, official testing, electricity, advertising, and use of auto.

<sup>4</sup> The cost on a 4.0 per cent fat-corrected basis was \$2.44 for Grade A and \$2.53 per 100 pounds for factory milk.

the 80,000 maximum permitted for Grade A milk in Oregon.<sup>1</sup>

**Grade A, factory milk costs compared**

In Table 2 a detailed cost of production comparison between Grade A and factory milk is presented on three bases of comparison; namely, "per cow," "per 100 pounds milk," and "per pound butterfat."

Labor costs amounted to \$147 per cow on Grade A farms compared with \$134 per cow on factory milk farms. Because production per cow was lower on factory farms (see Table 7) the final labor cost per 100 pounds of milk and per pound of butterfat were both higher for factory farms than for Grade A farms.

Hours of labor per cow on a yearly basis averaged 103 on Grade A farms against approximately 90 hours on factory farms (Table 3). Time requirements for the specific jobs of feeding and milking were very similar, on a per cow basis. Again, however, because the factory cows gave less milk, the time spent in milking per 100 pounds of milk and per pound of butterfat was higher on factory farms than on Grade A farms. The real difference in labor requirements occurred in the "other, including overhead" classification. Here

we find 40 hours for Grade A and only 25 for factory farms, per cow, on an annual basis. This classification included time spent in cleaning the barn, cleaning the milk house, and time spent on miscellaneous tasks done throughout the year that should be correctly charged to the milking herd. In fact, outside of feeding and milking, it included all the other operator's time actually spent on the milk cows throughout the year.

To make the two sets of dairy farms more comparable, all the farms studied, including both Grade A and factory barns, had stanchion barns.

Types of labor and rates per hour are shown in Table 4. On factory farms the operator did three-fourths of the work on the milk cows, his family did another 10 per cent and he hired only 13 per cent. On Grade A farms, however, the operator did a little over one-half the work on the milk cows, his family 11 per cent, and he therefore had to hire one-third of the work done. Grade A farms were more diversified than factory milk farms and therefore the operator had other enterprises to tend to. Grade A farms got 79 per cent of their total receipts from dairying whereas the factory farms got 92 per

**Table 3. Grade A Labor Costs Higher Per Cow; About Same Per 100 Pounds Milk, Compared to Factory**

Operation	Per cow		Per 100 pounds milk		Per pound butterfat	
	Grade A	Factory	Grade A	Factory	Grade A	Factory
	<i>Hours</i>	<i>Hours</i>	<i>Minutes</i>	<i>Minutes</i>	<i>Minutes</i>	<i>Minutes</i>
Milking .....	50.1	52.3	38	47	8	10
Feeding .....	12.7	11.7	10	10	2	2
Other, including overhead...	40.1	25.5	30	23	6	5
Yearly total .....	102.9	89.5	78	80	16	17

<sup>1</sup> The logarithmic average of all the bacteria counts taken on the 31 factory farms studied at Tillamook was only 54,090.

cent from dairying. Rates per hour were quite similar with the exception that Grade A farms paid higher wages for hired help than did factory farms.

On Grade A farms the operator and his family completed two-thirds (67 per cent) of the work, therefore hiring

one-third. On factory milk farms, the operator and his family did 87 per cent—thus hiring only 13 per cent.

Hired help employed on Grade A farms cost \$1.04 an hour compared to only \$0.82 an hour on factory milk farms.

**Table 4. Overall Labor Rate About Same**

Type of labor	Grade A		Factory	
	Portion of total time	Rate per hour	Portion of total time	Rate per hour
	<i>Per cent</i>		<i>Per cent</i>	
Operator .....	56	\$1.69	77	\$1.63
Family .....	11	1.24	10	1.29
Hired .....	33	1.04	13	.82
All labor .....	100	\$1.43	100	\$1.49

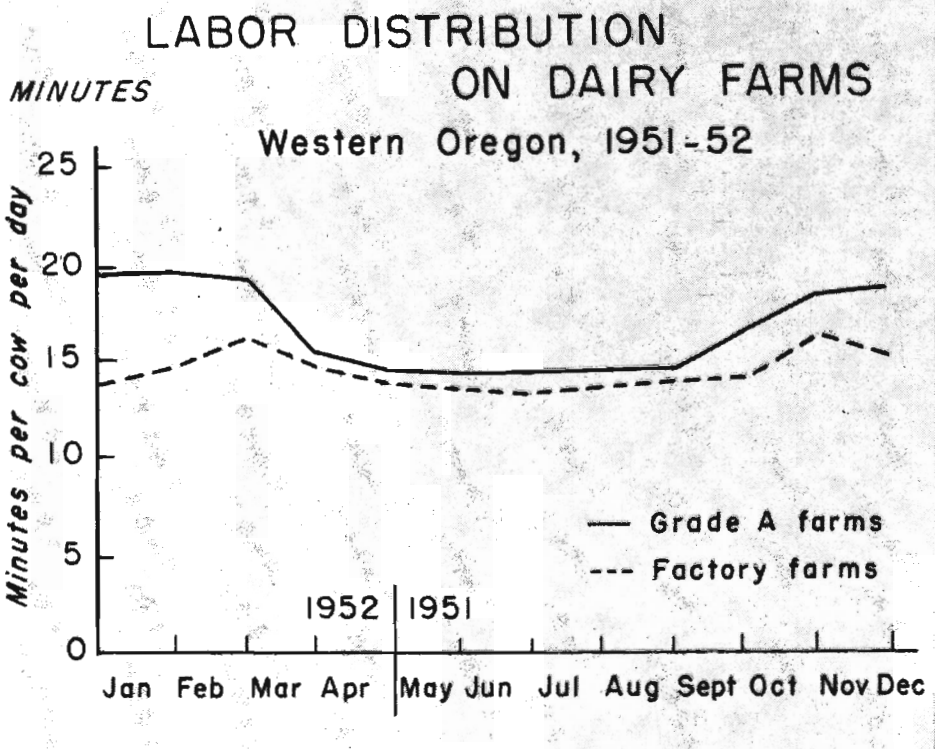


FIGURE 1. Seasonal labor distribution compared.

As a result of these situations, the overall labor rates per hour on Grade A and factory farms were almost the same.

*The seasonal distribution of labor* from month to month on factory farms was more uniform than for Grade A farms (Figure 1). During the pasture season, April through September, both Grade A and factory milk producers put about 14.5 minutes on each cow each day. Beginning in October and extending through March, much more time was required because of the extra work on barn feeding and cleaning. During this winter feeding period many cows on factory farms were dried up, therefore less chore time was required than on Grade A farms. This falling off in milk production is quite common on factory milk farms since there is no particular incentive, as there is on Grade A farms, to push for continued high production through the winter months. Dairy men on Grade A farms strive for more uniform milk production throughout the year in order to maintain their "quota."

*Buildings* used for the milking herd on Grade A farms were valued by the operators, at the time of the study, at an average of \$8,197 per farm (Table 5). This investment in dairy buildings

on Grade A farms was practically twice as high as on factory farms. The \$8,197 per farm in no way represents the present replacement cost of the dairy buildings on Grade A farms. It only represents the present depreciated value of the buildings as determined by the operators.

On farms producing factory milk the present average depreciated value of buildings per farm was only \$4,222. This represented only about one-half the investment in buildings found on Grade A farms.

It follows, from the above discussion, that annual costs of dairy buildings on Grade A farms should be higher than on factory farms (Table 2). This was found to be true per cow, per 100 pounds of milk, and per pound of butterfat produced. The relative difference, however, in the total annual costs, between these two groups of farms, was considerably less than the difference in the total building investment per farm. This was due not only to the fact that a finer, more expensive building will last longer than a cheaply constructed one, but also to the fact that the annual production per cow on the Grade A farms was 1,595 pounds greater than for cows on factory farms<sup>1</sup> (Table 7). Grade A farms also

**Table 5. Grade A Building Values Higher Than Factory**

Item	Per cow		Per 100 pounds milk		Per pound butterfat	
	Grade A	Factory	Grade A	Factory	Grade A	Factory
Dairy barn .....	\$179	\$119	\$2.23	\$1.76	<i>Cents</i> 47.4	<i>Cents</i> 38.8
Milk house .....	13	3	.17	.05	3.6	1.1
Other buildings .....	45	8	.56	.12	11.8	2.6
Total* .....	\$237	\$130	\$2.96	\$1.93	62.8	42.5

\* The present average value of all buildings (for the milking herd only) per farm was 8,197 for Grade A farms compared with \$4,222 for factory farms.

<sup>1</sup> This has been figured on a 4 per cent fat corrected basis.



had two more cows per farm. So we find that although Grade A farms, compared with factory farms, had almost twice the investment in dairy buildings, the annual cost per cow was only 50 per cent higher; the cost per 100 pounds of milk, 25 per cent higher; and the cost per pound of butterfat, 21 per cent higher.

*Dairy equipment* used for the milking herd on Grade A farms was valued by operators (at the time of the study) at an average of \$1,075 per farm (Table 6). This investment in dairy equipment on Grade A farms was approxi-

ence in the annual cost of dairy equipment on Grade A farms was not as great compared with factory farms as the difference with respect to the investment per farm.

*Other costs* of production included breeding, depreciation on cows, interest on cows, veterinary and medicine, hauling milk, and miscellaneous (Table 2). The only significant differences between Grade A and factory farms in this group of costs were in connection with depreciation on cows, milk hauling, and several miscellaneous items including Dairy Herd Improvement

**Table 6. Grade A Dairy Equipment Values Higher Than Factory**

Item	Per cow		Per 100 pounds milk		Per pound butterfat	
	Grade A	Factory	Grade A	Factory	Grade A	Factory
Milking machine .....	\$11	\$11	\$ .14	\$ .16	<i>Cents</i> 3.0	<i>Cents</i> 3.6
Cooler and hot water equipment .....	10	5	.13	.08	2.6	1.7
Other .....	10	6	.12	.09	2.6	1.9
Total <sup>1</sup> .....	\$31	\$22	\$ .39	\$ .33	8.2	7.2

<sup>1</sup> The present average value of all dairy equipment (for the milking herd only) per farm was \$1,075 for Grade A farms compared with \$711 for factory farms. At the time of the study no farm bulk storage tanks were included.

mately 50 per cent higher than on factory farms (\$711). At the time of this study no farm bulk storage tanks were included.

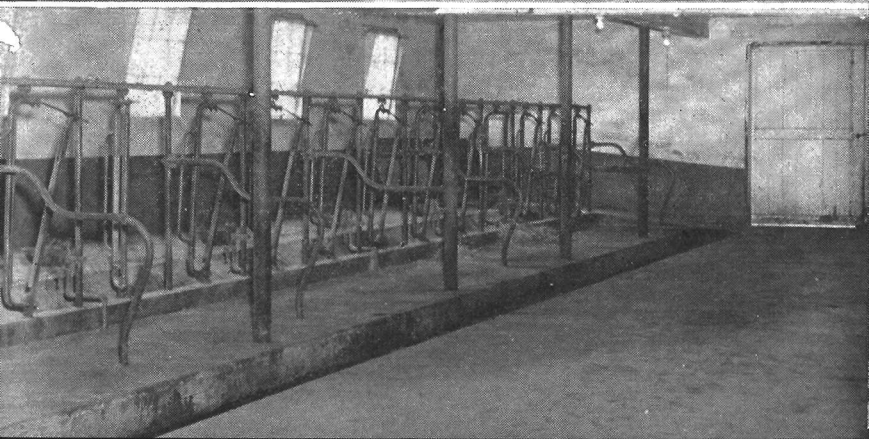
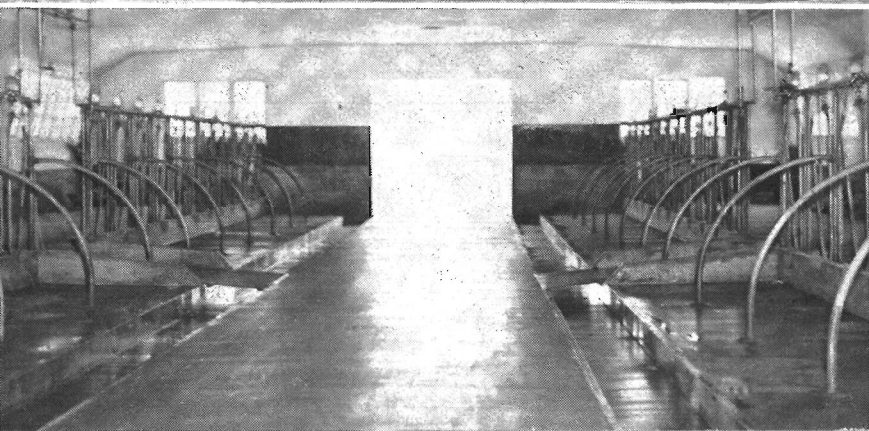
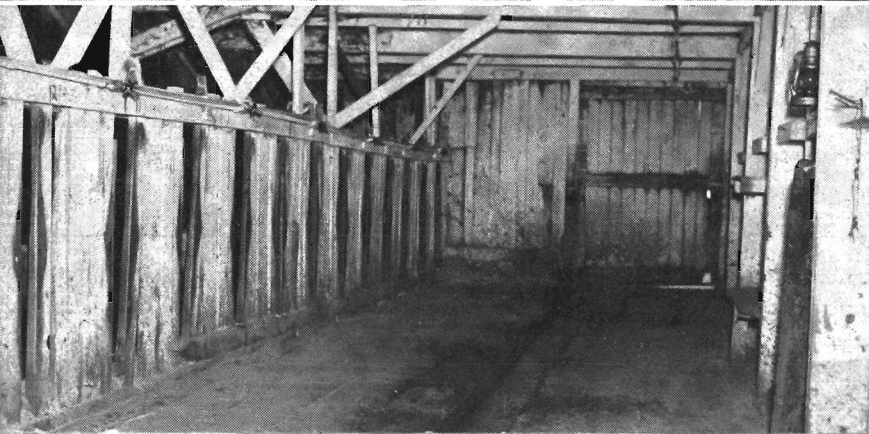
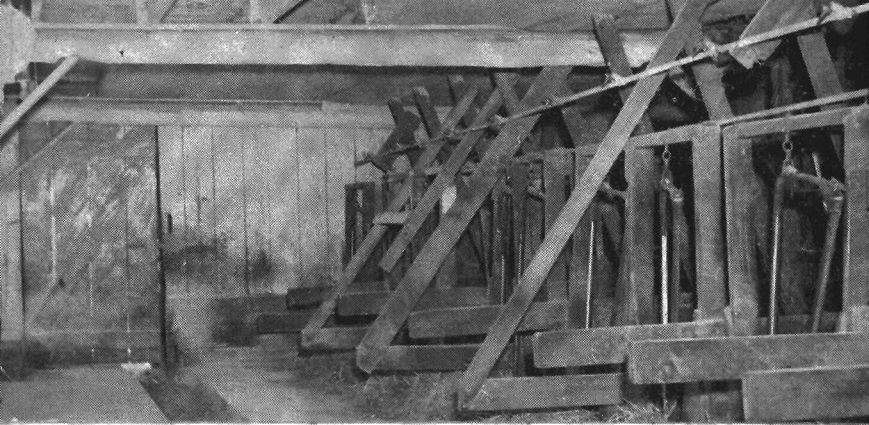
On farms producing factory milk the present average depreciated value of dairy equipment was only \$711. This was only 66 per cent of the value of dairy equipment on Grade A farms.

From the foregoing discussion it follows that the annual cost of dairy equipment on Grade A farms should be higher than on factory farms (Table 2). This was true per cow, per 100 pounds of milk, and per pound of butterfat produced. In the case of dairy buildings, however, the relative differ-

Association dues, official testing, etc. Depreciation on cows was larger on factory farms mainly because the cows sold from factory farms during the year were sold at a greater loss (\$6.00 per cow), compared with what they were worth at the beginning of the year, than were the cows from Grade A farms.

*Total gross costs*, omitting the value of feed fed, were surprisingly similar on Grade A and factory farms (Table 2). On a per hundredweight basis they were \$3.33 for Grade A farms as against \$3.35 for factory farms.

*Total credits* per 100 pounds of milk, and per pound of butterfat, were al-



## Which Farm Produced Cleanest Milk?

1 On this page are typical stanchion barns (left) and their milk houses 1  
(right) found in this study.

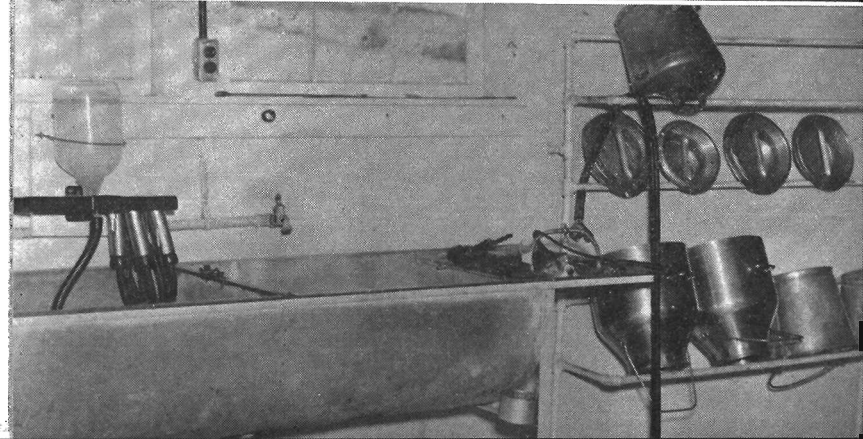
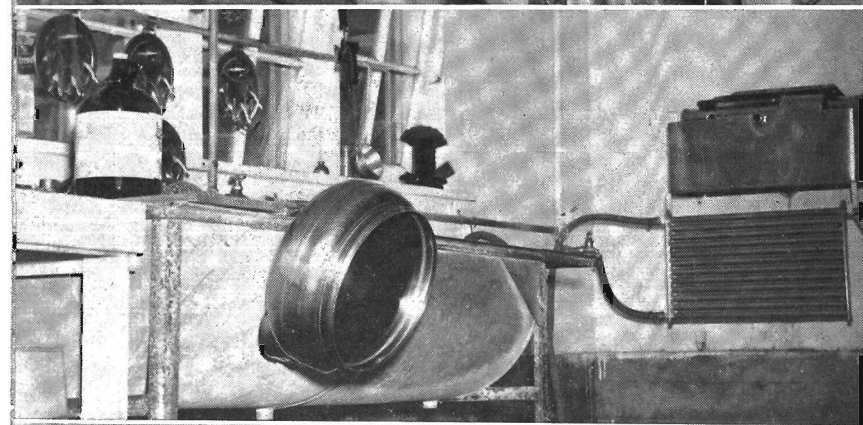
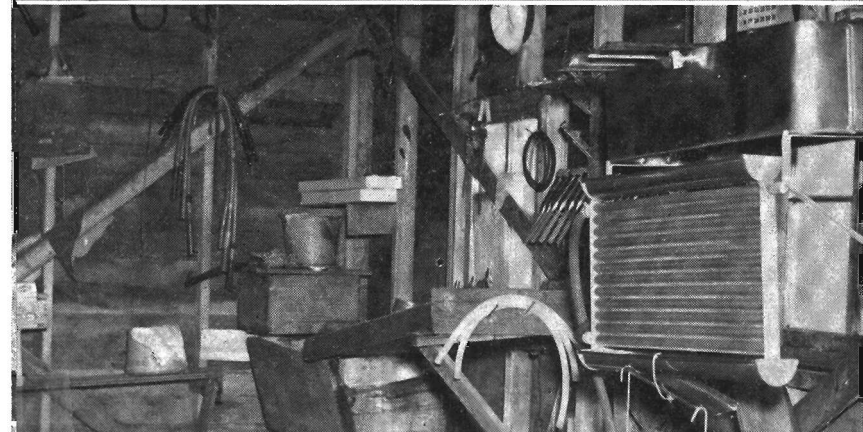
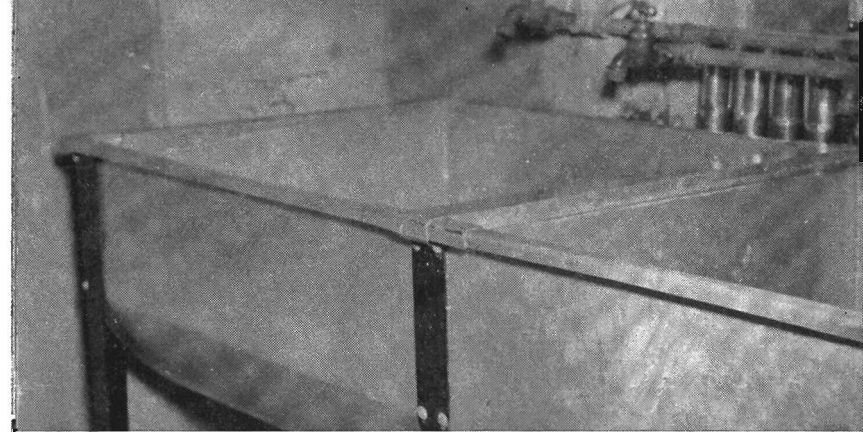
2 Milk produced on each of these farms was of high quality even though all were not Grade A farms. (The bacteria count of the milk coming from each of these farms was well within the limits set for grade A—80,000 per milliliter.) 2

## How Would You Rank These Four Farms?

Judging only from the pictures, which farm produced the cleanest milk?

3 Believe it or not, the pictures are arranged in the proper order. That is, farm 1 produced the cleanest milk, farm 2 produced the next cleanest, etc. All of the farms are Grade A farms except farm 2 which is a factory milk farm. 3

4 Although buildings and equipment are important, the dairyman himself, and his methods of dairying, are even more important in producing quality milk. 4



most identical, although the credit for calves was \$8 higher per cow on the Grade A farms (Table 2).

*Total net cost*, omitting the value of feed fed, was \$32 per cow higher on Grade A farms than on factory farms, but practically the same on the basis of 100 pounds of milk produced and also on the basis of one pound of butterfat (Table 2).

No attempt in this study, nor in this publication, has been made to compare the total cost of producing Grade A

milk with the total cost of producing factory milk. Comparisons have been made rather on important items of cost such as labor, buildings, and equipment wherein considerable differences in costs of production have been presumed to exist between milks of different quality (bacteria content). Omitted from this study has been the actual cost of the feed fed. Usually feed costs make up from 40 to 50 per cent of the total gross costs of milk production.

### Description of Farms Studied

All of the 54 farms included in this study were dairy farms. On Grade A farms, 79 per cent of the total receipts came from the dairy enterprise (Table 7). On factory farms, 92 per cent came from the dairy enterprise. Grade A farms were somewhat larger in acreage than factory farms although the average number of cows per farm was about the same.

Cows on Grade A farms were higher producers than were cows on factory farms. They gave considerably more milk and more butterfat.

The present value of all the land and buildings on Grade A farms was approximately \$49,000 compared to \$31,000 for factory farms. The total farm value (including land, buildings, livestock, machinery, and equipment)

**Table 7. Description of Farms Studied**

Item (average per farm)	Grade A	Factory
Number of farms studied.....	23	31
Total area per farm, acres.....	159	85
Cropland per farm, acres.....	118	57
Average number of cows.....	34.6	32.5
Average weight per cow, pounds.....	994	923
Total milk production per cow, pounds.....	8,000	6,720
Total butterfat production per cow, pounds.....	377	305
Average butterfat test, per cent.....	4.71	4.54
Total production of 4.0 per cent fat-corrected milk per cow, pounds.....	8,857	7,262
Total labor on farm, man months.....	24.4	16.7
Average price received per milk per 100 pounds.....	\$6.45	\$4.86
Value of land and buildings (present value).....	\$48,954	\$31,168
Value of all dairy stock.....	14,019	10,053
Value of all other livestock.....	705	579
Value of machinery and equipment.....	9,691	3,882
Total farm value.....	73,369	45,682
Total farm value per cow.....	2,120	1,406
Average value of milk cows, per head.....	286	256
Total hours of labor per cow per year.....	103	90
Average number of bacteria (standard plate count in raw milk).....	36,654	150,867
Share of total farm receipts from dairy, per cent.....	79	92

averaged \$2,120 per cow on Grade A farms and \$1,406 per cow on factory farms (Table 7).

The quality of milk, as judged by the bacteria count, was considerably higher on Grade A farms than on factory farms. Average "count" for Grade A milk was 36,654; for factory milk, 150,867 (Table 7). It was to be expected factory milk would not have the high quality of Grade A milk, but the

surprising thing was that factory milk was as high in quality as it was.

During the 12 months of this study, the average price received by Grade A producers was \$6.45 per hundred-weight compared with \$4.86 per hundredweight for factory milk (Table 7). This is a point of particular interest.

Additional comparisons are presented in Table 7.

### Seasonal Milk Flow

Grade A milk is usually produced under conditions of more uniform supply from month to month than is true of factory milk. This is shown clearly by data presented in the first and last columns of Table 8. Willamette Valley Grade A farms produced a uniform supply each quarter, whereas factory milk farms in Tillamook County produced only 13 per cent of a yearly supply in the first quarter of the year compared to 40 per cent during the flush season or second quarter of the year. Seasonal production of milk on Grade

A farms in Tillamook County was more uniform than on factory farms, but far less uniform than on Grade A farms in the Willamette Valley.

Seasonal production from all Grade A farms studied in Western Oregon was very similar to the seasonal pattern existing in the Portland milkshed during the same period.

The contrast in seasonal milk flow between Grade A farms in the Willamette Valley and factory milk farms in Tillamook County is presented graphically in Figure 2.

**Table 8. Grade A Milk Flow More Uniform Than Factory Throughout Year**

Period	Grade A				Factory (on farms studied)
	On farms studied			On all farms in Portland milkshed <sup>1</sup>	
	Willamette Valley	Tillamook	Both areas		
	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>	<i>Per cent</i>
First quarter .....	24	19	22	23	13
Second quarter .....	26	35	29	29	40
Third quarter .....	27	27	27	26	31
Fourth quarter .....	23	19	22	22	16
Annual total .....	100	100	100	100	100

<sup>1</sup> From Milk Marketing Administration, Portland, Oregon.

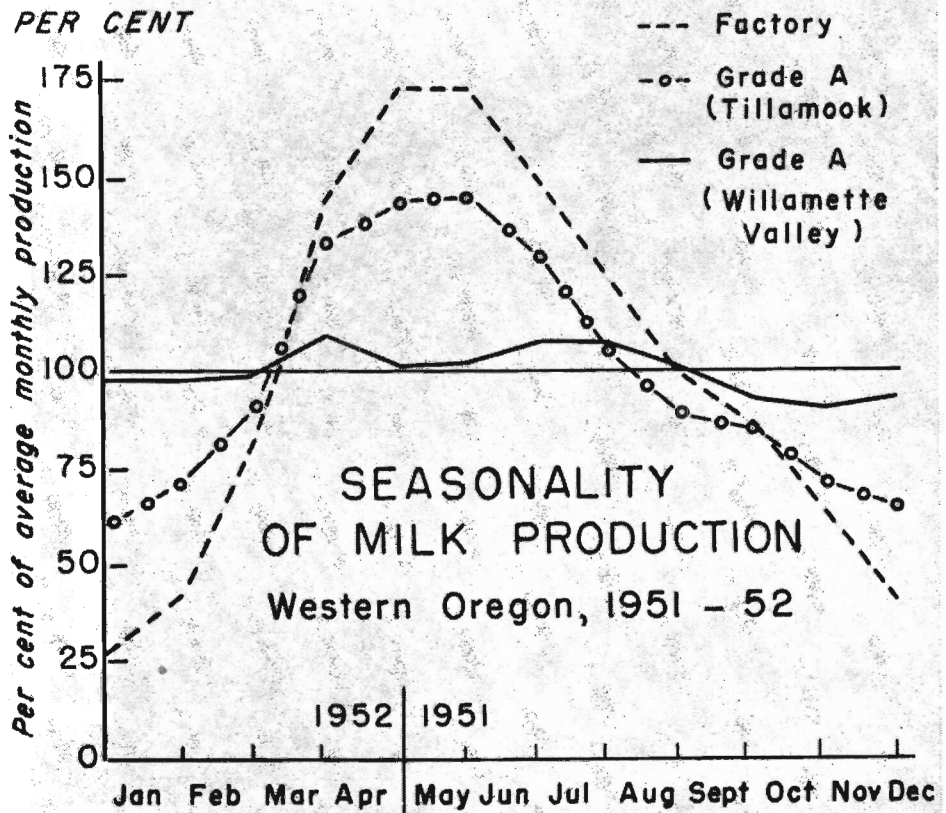


FIGURE 2. Seasonal milk flow, Grade A and factory, compared.

### How Research Was Conducted

#### Procedure followed

Quality of milk was determined by the bacteria count. This was done by J. L. Covington of the Department of Dairy Husbandry, Oregon State College, in connection with a larger study of the quality of milk as it may be related to dairy farm structures, equipment, methods and sanitation. Bacteria count represents the number of bacteria per millilitre, standard plate count, in raw milk.

Cost of production information was obtained by trained enumerators from

individual farm operators during the late spring and early summer of 1952. Economic data cover the period May 1, 1951 to April 30, 1952.

Cost of production information in this study was procured from dairy farmers by the farm survey method. All quantities, prices, and values were supplied entirely by operators themselves and represent their own judgment and not the judgment of the enumerator taking the record. Many times answers supplied by farmers were based upon actual records kept.

At other times it was necessary for a farmer to give the enumerator his best estimate based upon his own experience and judgment.

**Sample selection**

The 54 dairy farms reported in this bulletin were chosen from a larger sample of 170 farms included in a broader study of quality of milk as it may be related to dairy farm structures, equipment, and methods. The original sample (170 farms) was selected mainly by going to the unloading dock and sampling each farmer's shipment of milk brought to the plant by a particular truck. This was done at four receiving stations in Western Oregon. To be included, the individual farm must have consigned at least two or more cans of milk.

For purposes of the immediate study here reported, the list of 170 farmers was divided into two groups—Grade A, and factory milk farms. Each of these groups was again divided into

three groups: those having stanchion barns, milking barns, and milking parlors. Since the latter two groups were very small, and for reasons of more accurate comparison, the present sample was selected from farms having stanchion barns exclusively.

The Grade A group and the factory group were arranged, then, each in the order of quality of milk produced, starting with the farm having the lowest bacteria count and running up to the highest. Then every other card was chosen (with a random start so as to decide whether to take the first or the second card).

Next, the "non-cooperators" were eliminated. These consisted of places that had been sold subsequent to the time when the bacteria counts were taken, places where the building setup had been changed, and a few other places where individual circumstances were involved. When each such card was eliminated, the card closest to the one eliminated was chosen. This meth-

**Table 9. Quality of Milk as Related to Various Farm Scores**

Item	Grade A		Factory	
	98 farms <sup>1</sup>	23 farms <sup>2</sup>	72 farms <sup>1</sup>	31 farms <sup>2</sup>
Average number cows in herd .....	28.8	34.6	32.7	32.5
Average bacteria count <sup>3</sup> ..	53,010	36,654	140,829	150,867
Range <sup>3</sup> .....	2,833-437,900	2,833-233,550	7,158-1,083,083	16,350-613,133
Total farm score <sup>5</sup> .....	914	919	589	586
Building score <sup>5</sup> .....	173	177	93	92
Equipment score <sup>5</sup> .....	161	165	99	95
Methods and sanitation score <sup>5</sup> .....	580	577	397	399

<sup>1</sup> These represent the farms included in the larger study relating quality of milk to various farm "scores" and will be published later as a Station Bulletin.

<sup>2</sup> These are the farms selected from the larger sample of 170 farms. They are the farms included in the economic analysis presented in the present publication.

<sup>3</sup> Standard plate count, in raw milk; number of bacteria per milliliter, annual basis.

<sup>4</sup> Each figure represents a 12-months' average count for a farm.

<sup>5</sup> Top or maximum scores were as follows: Total farm score 1,000; building score 190; equipment score 170; methods and sanitation score 640.

The *building score* included such items as construction of the cow stable floor and gutters, lighting, ventilation, dust proof walls and ceilings, and manure disposal. Also included was the location and size of the milk house, its walls and ceiling, light and ventilation. The *equipment score* included such items as milk house utensils, source of water (both hot and cold), wash sink, and cooling device. The *methods and sanitation score* included such items as the health of the cows, cleanliness of the barn, milk house, operator's hands and clothing, whether cows' udders were properly washed and dried, type of milk containers, cooling system, and general neatness of premises.

od of sampling resulted in a list of 28 Grade A, and 35 factory milk farms—all with stanchion barns.

**Representativeness of data**

As reported in this bulletin, the final number of cases studied consisted of 23 Grade A and 31 factory farms. These are believed to be representative of the larger sample of 170 farms.

In Table 9, data are presented to show how closely the 23 Grade A farms and the 31 factory milk farms

in this study resemble the 98 Grade A and the 72 factory milk farms included in the larger study relating quality of milk to various farm "scores" and to be published as a Station Bulletin. A great deal of similarity exists between the two samples of farms when the various factors indicated in Table 9 are compared. This tends to substantiate the statement that the 54 farms included in the present study are representative of the 170 farms included in the larger study.

**APPENDIX**

**Table 10. Average of 23 Farms Producing Grade A Milk (All stanchion barns)**

<b>Quality of milk</b>	
Average actual bacteria count, in raw milk, when sampled.....	36,654
<b>Farm scores<sup>1</sup> during milk sampling period</b>	
Building score .....	177
Equipment score .....	165
Methods and sanitation .....	577
Total farm score .....	919
<b>Size and type of farm</b>	
Total acres .....	159
Total cropland .....	118
Average number of cows.....	34.6
Average weight per cow.....	994
Total months labor.....	24.4
Receipts from dairy.....	79%
Present value of land and buildings..	\$48,954
Present value of dairy stock.....	14,019
Present value of all other livestock..	705
Present value of machinery and equipment .....	9,691
Total farm value.....	\$73,369

**Man labor requirements**

Operation	Yearly requirement (hours)			
	Total	Per cow	Per cwt.	Per lb. B.F.
Milking .....	1,734	50.1	.63	.13
Feeding .....	440	12.7	.16	.03
Other (including overhead)	1,389	40.1	.50	.11
Total .....	3,563	102.9	1.29	.27

**Present value of buildings (milking herd only)**

Item	Per farm	Per cow	Per cwt.	Per lb. B.F.
Dairy barn .....	\$6,187	\$178.78	\$2.23	47.4¢
Milk house .....	467	13.50	.17	3.6¢
Other buildings .....	1,543	44.58	.56	11.8¢
Total .....	\$8,197	\$236.86	\$2.96	62.8¢

<sup>1</sup> For explanation of farm scores, see footnote 5, Table 9.

**Table 10. Average of 23 Farms Producing Grade A Milk (Continued)**

**Present value of dairy equipment (milking herd only)**

Item	Per farm	Per cow	Per cwt.	Per lb. B.F.
Milking machine .....	\$ 396	\$11.44	\$ .14	3.0¢
Cooler .....	262	7.57	.10	2.0¢
Hot water equipment.....	82	2.37	.03	0.6¢
Other .....	335	9.69	.12	2.6¢
<b>Total .....</b>	<b>\$1,075</b>	<b>\$31.07</b>	<b>\$ .39</b>	<b>8.2¢</b>

**Cost of production**

Item	Total hours	Rate	Per farm	Per cow	Per cwt. milk	Per lb. B.F.
<b>Labor :</b>						
Operator's direct .....	1,750	\$1.68	\$2,938	\$ 85	\$1.06	22.5¢
Operator's overhead .....	240	1.75	419	12	.15	3.2
Family labor .....	406	1.24	503	15	.18	3.9
Hired labor .....	1,167	1.04	1,217	35	.44	9.3
<b>Total labor .....</b>	<b>3,563</b>	<b>1.43</b>	<b>5,077</b>	<b>147</b>	<b>1.83</b>	<b>38.9¢</b>
Use of buildings .....			830	24	.30	6.4
Use of equipment .....			214	6	.08	1.6
Breeding .....			233	7	.08	1.8
Depreciation on cows .....			396	11	.14	3.0
Interest on cows (average value @ 5%).....			495	14	.18	3.8
Veterinary and medicines .....			227	7	.08	1.7
Hauling milk .....			770	22	.28	5.9
Miscellaneous .....			992	29	.36	7.6
<b>Total gross costs (excluding feed).....</b>			<b>\$9,234</b>	<b>\$267</b>	<b>\$3.33</b>	<b>70.7¢</b>
<b>Miscellaneous credits :</b>						
Calves .....			663	19	.24	5.1
Manure .....			969	28	.35	7.4
Other .....			120	4	.04	.9
<b>Total credits .....</b>			<b>1,752</b>	<b>51</b>	<b>.63</b>	<b>13.4</b>
<b>Total net cost (excluding feed).....</b>			<b>\$7,482</b>	<b>\$216</b>	<b>\$2.70</b>	<b>57.3¢</b>

**Production**

Item	Yearly total (lbs.)		Test %	Price		Value
	Milk	B.F.		100 lbs.	Lb. B.F.	
Sales .....	267,527	12,609	4.71	\$6.45	.....	\$17,256
Home use (including calves) .....	9,359	443	4.74	6.32	.....	591
<b>Total .....</b>	<b>276,886</b>	<b>13,052</b>	<b>4.71</b>	<b>\$6.45</b>	<b>.....</b>	<b>\$17,847</b>
<b>Per cow .....</b>	<b>8,000</b>	<b>377</b>			<b>.....</b>	<b>\$ 516</b>

Production of 4% FCM total 7,050,398 lbs.; per cow, 8,857 lbs.  
 Net cost of production (excluding feed) per 100 lbs. 4% FCM, \$2.44.



**Table 11. Average of 31 Farms Producing Factory Milk  
(Tillamook County, Oregon—all stanchion barns)**

**Quality of milk**

Average actual bacteria count, in raw milk, when sampled..... 150,867

**Farm score<sup>1</sup> during milk sampling period**

Building score ..... 92      Methods and sanitation..... 399  
 Equipment score ..... 95      Total farm score ..... 586

**Size and type of farm**

Total acres .....	85	Present value of land and buildings..	\$31,168
Total cropland .....	57	Present value of dairy stock.....	10,053
Average number of cows.....	32.5	Present value of all other livestock....	579
Average weight per cow.....	923	Present value of machinery and	
Total months labor.....	16.7	equipment .....	3,882
Receipts from dairy.....	92%	Total farm value .....	\$45,682

**Man labor requirements**

Operation	Yearly requirement (hours)			
	Total	Per cow	Per cwt.	Per lb. B.F.
Milking .....	1,703	52.3	.78	.17
Feeding .....	380	11.7	.17	.04
Other (including overhead)	829	25.5	.38	.08
<b>Total .....</b>	<b>2,912</b>	<b>89.5</b>	<b>1.33</b>	<b>.29</b>

**Present value of buildings (milking herd only)**

Item	Per farm	Per cow	Per cwt.	Per lb. B.F.
Dairy barn .....	\$3,847	\$118.20	\$1.76	38.8¢
Milk house .....	112	3.44	.05	1.1¢
Other buildings .....	263	8.07	.12	2.6¢
<b>Total .....</b>	<b>\$4,222</b>	<b>\$129.71</b>	<b>\$1.93</b>	<b>42.5¢</b>

**Present value of dairy equipment (milking herd only)**

Item	Per farm	Per cow	Per cwt.	Per lb. B.F.
Milking machine .....	\$359	\$11.03	\$ .16	3.6¢
Cooler .....	61	1.88	.03	.6¢
Hot water equipment.....	105	3.23	.05	1.1¢
Other .....	186	5.71	.09	1.9¢
<b>Total .....</b>	<b>\$711</b>	<b>\$21.85</b>	<b>\$ .33</b>	<b>7.2¢</b>

<sup>1</sup> For explanation of farm scores, see footnote 5, Table 9.

**Table 11. Average of 31 Farms Producing Factory Milk (Continued)**

**Cost of production**

Item	Total hours	Rate	Per farm	Per cow	Per cwt. milk	Per lb. B.F.
<b>Labor:</b>						
Operator's direct .....	2,102	\$1.63	\$3,419	\$105	\$1.56	34.5¢
Operator's overhead .....	153	1.71	262	8	.12	2.6
Family labor .....	278	1.29	360	11	.17	3.6
Hired labor .....	379	.82	311	10	.14	3.1
<b>Total labor .....</b>	<b>2,912</b>	<b>1.49</b>	<b>4,352</b>	<b>134</b>	<b>1.99</b>	<b>43.8¢</b>
Use of buildings .....			530	16	.24	5.3
Use of equipment .....			144	4	.07	1.5
Breeding .....			178	5	.08	1.8
Depreciation on cows .....			554	17	.25	5.6
Interest on cows (average value @ 5%) .....			417	13	.19	4.2
Veterinary and medicines .....			149	5	.07	1.5
Hauling milk .....			316	10	.14	3.2
Miscellaneous .....			694	21	.32	7.0
<b>Total gross costs (excluding feed).....</b>			<b>\$7,334</b>	<b>\$225</b>	<b>\$3.35</b>	<b>73.9¢</b>
<b>Miscellaneous credits:</b>						
Calves .....			376	11	.17	3.8
Manure .....			911	28	.42	9.2
Other .....			69	2	.03	.7
<b>Total credits .....</b>			<b>1,356</b>	<b>41</b>	<b>.62</b>	<b>13.7</b>
<b>Total net cost (excluding feed).....</b>			<b>\$5,978</b>	<b>\$184</b>	<b>\$2.73</b>	<b>60.2¢</b>

**Production**

Item	Yearly total (lbs.)		Test %	Price		Value
	Milk	B.F.		100 lbs.	Lb. B.F.	
Sales .....	210,592	9,546	4.53	\$4.85	.....	\$10,224
Home use (including calves) .....	8,130	380	4.67	4.90	.....	398
<b>Total .....</b>	<b>218,722</b>	<b>9,926</b>	<b>4.54</b>	<b>\$4.86</b>	<b>.....</b>	<b>\$10,622</b>
<b>Per cow .....</b>	<b>6,720</b>	<b>305</b>			<b>.....</b>	<b>\$ 326</b>

Production of 4% FCM total 7,327,537 lbs.; per cow, 7,262 lbs.  
 Net cost of production (excluding feed) per 100 lbs. 4% FCM, \$2.53.

### **Acknowledgments**

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