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Agricultural Experiment Station

STORRS, CONNECTICUT

For the Year Ending

June 30, 1930

Printed by Order of the General Assembly

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LETTER OF TRANSMITTAL

To His Excellency, Governor Wilbur L. Cross:

In accordance with the statutes relating thereto, I have the honor to transmit herewith the Forty-second Annual Report of the Storrs Agricultural Experiment Station for the year ending June 30, 1930.

Arthur F. Greene,
Secretary of the Board of Trustees,
Connecticut Agricultural College.

Publication
Approved by
The Board of Control

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STORRS
Agricultural Experiment Station

The Cost of Cooling Milk with Electricity

DEPARTMENT OF DAIRY INDUSTRY

CONNECTICUT AGRICULTURAL COLLEGE

STORRS, CONNECTICUT

The Cost of Cooling Milk with Electricity

E. O. ANDERSON*

When electric cooling units were first brought to the attention of dairy farmers as a quick and efficient means of cooling milk and thus producing a high quality product, one of the first questions asked was, "How much does it cost to operate them?" To answer this question in terms of local conditions, a study was made on a series of typical Connecticut dairy farms.

It should be kept in mind that while the results presented are based on certain actual farm conditions, and are therefore quite typical, the cost of electric power varies widely from farm to farm. The charge for power on this service line was probably higher than in other sections of the state. In order to make the data apply to any given case, it is only necessary to replace the cost per kilowatt hour of electric current by the rate charged in that service area, or to the farm in question.

Sources of Information and Methods

(1) Data for a period of one year reported herein were taken on seven cooling tanks located on seven farms in North Coventry, Connecticut.

(2) On all the farms except No. 1 and No. 2 the milk was canned warm and the cans were placed in the cooling tank until delivery. On Farm No. 1 most of the milk was bottled. The bottles were immersed in the cooling tank and remained there until delivery was made the following morning. On Farm No. 2 about 80 quarts of milk were bottled each day. The milk was bottled warm and cooled in the tank. The remainder of the milk was canned while warm and the cans placed in the cooling tank until delivered.

*The author is indebted to the several farmers on whose farms the data were obtained, to the Rockville-Willimantic Lighting Company for installing the meters, and to Mr. E. E. Tucker, County Agent of Tolland County, for his assistance and suggestions.

(3) The milk was cooled to a temperature between 38° and 45°F. The amount of milk cooled for home consumption was taken into consideration.

(4) The wet storage method of cooling milk was used in cooling the milk in all cases.

(5) Since it is not known how long a compressor will last, a theoretical depreciation of 10 percent per year was used.

(6) Depreciation on the cooling tanks was computed at 10 percent.

(7) Insurance and taxes were not taken into consideration because in the opinion of the writer it is a matter of conjecture just what part of the total cost of the insurance carried on farm equipment can be ascribed to the mechanical unit and cooling tank.

(8) Interest was figured at the rate of 5 percent on the average value for the year; that is, the average of the beginning and ending inventories.

(9) During the period reported, no repairs were necessary on any of the units.

(10) A meter was installed on each unit. Monthly readings and the quantity of milk cooled each month were recorded.

(11) The following method was used in calculating the *actual* cost of electric current for cooling milk:

The units studied were on the same service line. The method of charging was rather complex, consisting of several items:

(a) The *Line Charge.* In order to secure the service, the farmers were obliged to guarantee a minimum income to the company. Hence, a charge of $2.00 per month was made to each user.

(b) The *Flat Rate Charge.* On all of the farms except No. 5 electricity was used for lighting the house. The charge for lighting was 10 cents per month for each 100 square feet of floor area.

(c) The *Minimum Charge.* Each farm was metered and a base consumption, in kilowatt hours, was assigned by the company. For various reasons this base varied from farm to farm. All current up to this minimum was charged to the farmer at *seven* cents per kilowatt hour.

(d) The *Excess Rate.* Any current used in excess of his assigned minimum was sold to the farmer at *three* cents per kilowatt hour.

Thus the sum of all these items made the total cost to the farmer. The *actual* cost per kilowatt hour is obtained by dividing the metered consumption into this total cost. The details are shown for each farm in Tables 8 to 14.

(12) The following method was used in calculating the theoretical cost of current for cooling milk:

Assuming that the power used on the farm before a mechanical milk cooling unit was installed paid for the line and flat rate charges, plus the original current at seven cents per kilowatt hour, then the power used for cooling milk would be charged at three cents per kilowatt hour. The cost of cooling milk on these farms was therefore calculated at three cents per kilowatt hour.

Construction of Tanks

The construction of the cooling tanks and units used is given in Table 1. Two of the seven cooling tanks were made of concrete and permanently built in. The other five were of the "walk in" type. Of these five, two were reconstructed Cooley Creamers, two were home made wooden tanks, and one was made by a well known commercial house. Figure 1 shows one of the concrete cooling tanks. Figure 2 illustrates one of the home made wooden cooling tanks with meter connection for determining power used. All of the cooling tanks were insulated with three to four inches of cork on the sides and bottom. The lids were insulated with two inches of cork. The average cost of the mechanical units was $343.57, and of the cooling tanks, $125.41.

The Actual Cost of Cooling Milk

The data on the actual cost of cooling milk by electricity are shown in Tables 2 and 3. Complete data for each farm are given in Tables 8 to 14 inclusive, which appear at the end of this paper.

The average cost of cooling milk on these seven farms using the wet storage type of refrigeration was 15.07 cents for each 100 pounds of milk during 1929-1930. The average annual production of milk was 85,566 pounds, or 235 pounds of milk daily.

The cost varied from 13.64 cents to 20.12 cents for each 100 pounds of milk cooled.

The power charge was 7.01 cents or 46 percent of the total cost. Depreciation of the unit was 4.01, of the tank 1.47, and the interest on investment was 2.58 cents for each 100 pounds of milk cooled.

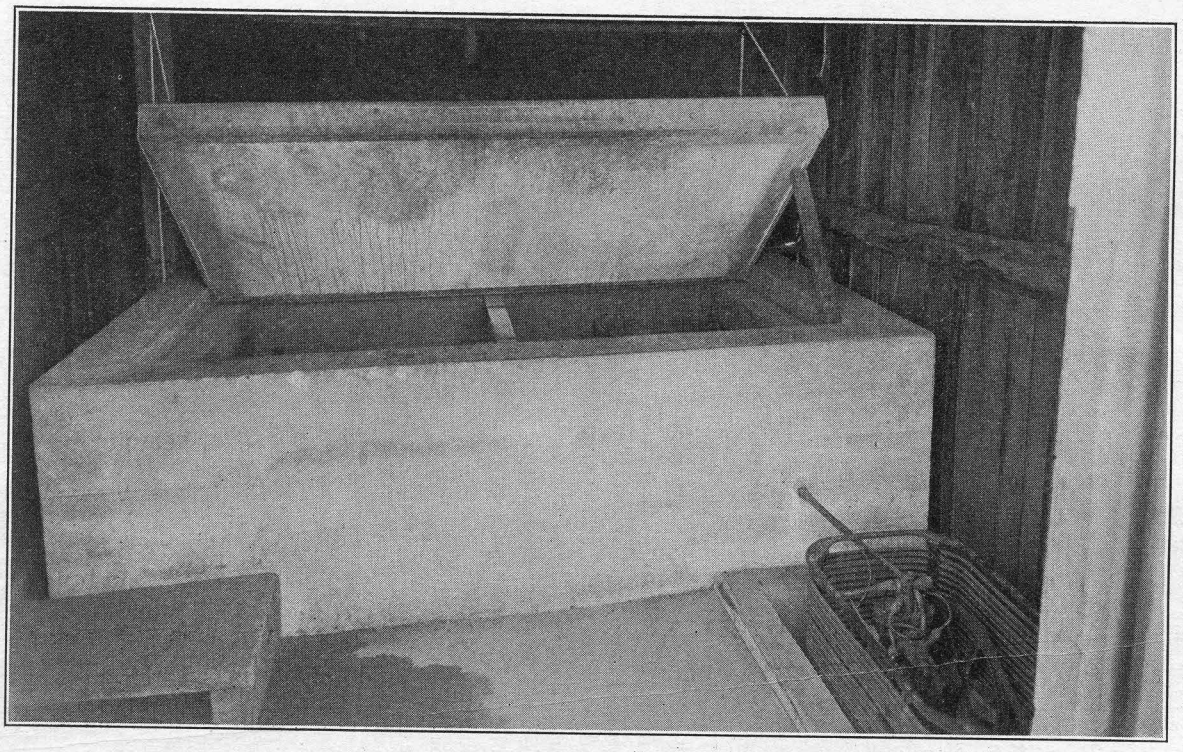

FIG. 1. Insulated Concrete Tank and Cooling Unit on Farm No. 4.

TABLE 1. *Construction and Cost of Cooling Tanks and Units*

Farm	No. 1	No. 2	No. 3	No. 4	No. 5	No. 6	No. 7
Cost of Tank	$200	$93	$140	$210	$30	$140	$65
Cost of Unit	479	318	325	390	310	273	310
Material	Concrete	Wood	Wood	Concrete	Reconstructed Cooley Creamer	Wood & Metal	Reconstructed Cooley Creamer
Inner Lining	Concrete 8″	Zinc	Gal. Iron	Concrete 4″	Zinc	Gal. Iron	Gal. Iron
Cork Insulation							
Sides, Inches	4	4	4	3	4	3	4
Bottom, Inches	4	4	4	3	4	3	4
Lid, Inches	2	2	2	2	2	2	2
Outside Lining	Concrete 8″	Plank 2″	Plank 1¼″	Concrete 4″	Wood ½″	Galvanized Iron	Wood 1″
Tank Dimensions							
Length, Inches	149½	83	59	72	57	48	57
Width, Inches	39	31½	31	40	25¾	40	26¾
Height to overflow, Inches	25½	25	21	25¼	25	25½	25
Cooling Units	Two	One	One	One	One	One	One
Motor Horsepower	¾	⅓	½	⅓	¼	⅓	⅓
Auxiliary Cooling	Winter Air	Spring Water	None	Winter Air	None	None	Winter Air
Method of Cooling Compressor	Air	Air	Air	Air	Air	Air	Air
Method of Operation	M & A	M & A	A	M & A	A	A	M & A

M=Manual. A=Automatic.

While a comparison of different thicknesses of insulation for cooling tanks has not been undertaken in this study, the fact that the power charges were approximately 50 percent of the total cost of cooling milk with electricity emphasizes the necessity of provision for insulation when installing cooling systems.

TABLE 2. *Actual Cost of Cooling Milk*

(1929-1930)

Farm No.	Annual Production	Power	Depreciation Unit	Depreciation Tank	Interest	Repairs	Total	For each 100 lbs. milk
	Lbs.	$	$	$	$	$	$	$
1	139,696	90.34	47.90	20.00	32.35	0.00	190.49	0.1364
2	102,272	47.68	31.80	9.30	19.49	0.00	108.27	0.1059
3	84,348	66.63	32.50	14.00	20.92	0.00	134.05	0.1589
4	80,620	41.59	39.00	21.00	28.50	0.00	130.09	0.1614
5	65,343	81.30	31.00	3.00	16.15	0.00	131.45	0.2012
6	64,796	35.61	27.30	14.00	19.36	0.00	96.27	0.1486
7	61,883	57.00	31.00	6.50	17.81	0.00	112.31	0.1815
Average	85,566	60.02	34.34	12.54	22.07	0.00	128.99	
Ave. per 100 lbs. milk		.0701	.0401	.0147	.0258	0.00	.1507	.1507

Estimate of Cost with Three Cent Rate

When a base of three cents per kilowatt hour is used, the average cost of cooling milk is 10.78 cents per 100 pounds. This is shown in Table 4. Compared with the actual cost as shown in Table 2, it is 4.29 cents cheaper per 100 pounds of milk. At a lower charge per kilowatt hour, the cost would be proportionably less.

When the charge for power is calculated at three cents per kilowatt hour, this item becomes 2.72 cents per 100 pounds of milk, or 25 percent of the total cost. (See Table 5). This is a decrease of 21 percent from the actual cost of power. The depreciation of the unit is 4.01 cents and that of the tank 1.47 cents. This depreciation is 51 percent, or over half, of the cooling costs. Interest on investment increases from 17 to 24 percent.

The power cost per 100 pounds of milk at actual charges was 7.01 cents, and at 3 cents per kilowatt hour, 2.72 cents. This difference is to be expected, but even at the higher rate the cooperating farmers believe that cooling milk with electricity is much cheaper than with ice.

Manual Versus Automatic Control

It has been assumed by many farmers that if they would operate the compressors manually less power would be necessary to cool the milk. Four of the seven units studied were operated on a combined manual and automatic control. Of these four, three were not operated during December, January, February and March, with the exception of one which was operated for a short time in February. The three remaining units were operated on a strictly automatic basis. Hence, it was possible to make a comparison of the two methods of control. The data on current consumption per month for both groups are given in Table 6.

Manual control of the units does not decrease the amount of power necessary to cool 100 pounds of milk. Under manual control 1.106 kilowatt hours of power were needed to cool 100 pounds of milk as compared to 1.096 kilowatt hours when the compressor was automatically operated. Instead of reducing the power consumed under manual control of the compressor, there was a slight increase per 100 pounds of milk cooled. Obviously, there is no return for the extra trouble of turning the unit off and on. It is safe to assume that the milk will be cooled to a more uniformly low temperature when the unit is automatically controlled.

The monthly cost of electricty per 100 pounds of milk for the units which were operated automatically was usually less than the average for all units. This is shown in Table 7.

TABLE 3. *Distribution of Actual Costs in Cooling Milk*

(1929-1930)

Cost Item	Average Annual Costs	Average Costs for each 100 lbs. Milk produced	Percent of Total
Power	$60.02	$.0701	46
Depreciation, Unit	34.34	.0401	27
Depreciation, Tank	12.54	.0147	10
Interest	22.07	.0258	17
Repairs	00.00	.0000	00
Total	$128.97	$.1507	100

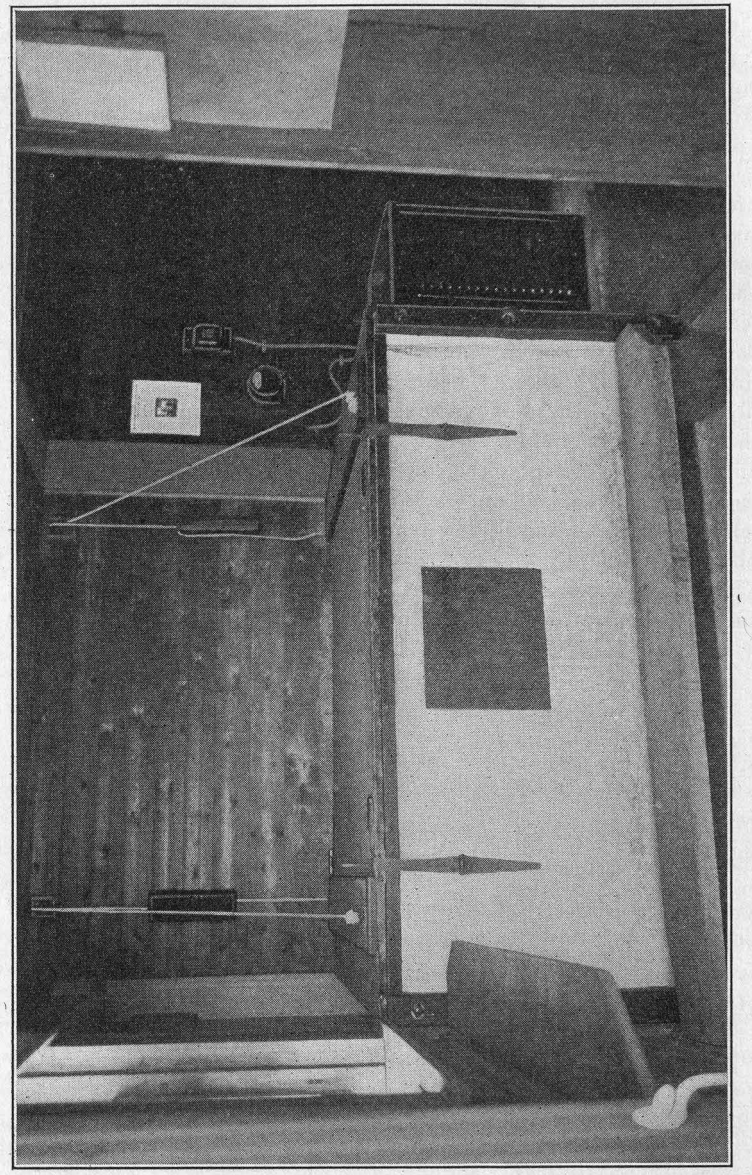

FIG. 2. Cooling Equipment on Farm No. 3. Meter is shown just above the right end of cooling tank.

The month of the highest average cost for electricity for each 100 pounds of milk cooled was July, when the cost was 12.92 cents as compared to 2.76 cents during January. The same relationship is true for the units operated automatically.

It cost the four all year around consumers of electricity 3.21, 2.59, 3.09 and 3.61 cents respectively for power to cool each 100 pounds of milk during December, January, February and March. During this interval the manually operated units were not consuming very much power for cooling. However, as pointed out, in the long run the manually controlled units required more power to cool each 100 pounds of milk than did the automatically operated units.

TABLE 4. *Computed Cost of Cooling When Power Is Charged at Three Cents per Kilowatt Hour*

Farm No.	Annual Production Lbs.	Power $	Depreciation Unit $	Depreciation Tank $	Interest $	Repairs $	Total $	Average per 100 lbs. milk $
1	139,696	46.11	47.90	20.00	32.25	0.00	146.26	.1047
2	102,272	22.80	31.80	9.30	19.49	0.00	83.39	.0815
3	84,348	22.20	32.50	14.00	20.92	0.00	89.62	.1062
4	80,620	17.97	39.00	21.00	28.50	0.00	106.47	.1321
5	65,343	16.50	31.00	3.00	16.15	0.00	66.65	.1020
6	64,796	19.95	27.30	14.00	19.36	0.00	80.61	.1244
7	61,883	17.40	31.00	6.50	17.81	0.00	72.71	.1175
Average	85,566	23.29	34.34	12.54	22.07	0.00	92.33	
Ave. per 100 lbs. milk		.0272	.0401	.0147	.0258	0.00	.1078	.1078

Summary

1. The average total actual cost of cooling 100 pounds of milk with electricity in the wet storage type of cooling tanks on seven farms was 15.07 cents. When power is rated at three cents per kilowatt hour, the cost of cooling 100 pounds of milk was 10.78 cents.

2. The average investment in the cooling unit and wet tank was $343.57 and $125.41 respectively.

3. Manual control of the cooling unit does not decrease the amount of power necessary to cool each 100 pounds of milk. Under manual

control 1.106 kilowatt hours of power were needed to cool 100 pounds of milk as compared to 1.096 kilowatt hours of power when the compressor was automatically operated.

4. The average number of kilowatt hours of power needed to cool 100 pounds of milk was 1.103.

Discussion

The farmers whose electrical refrigeration units were under observation would not return to the old method of cooling milk with ice. This was true even in the case of Farm No. 5 where the actual cost of cooling 100 pounds of milk was 20.12 cents. The figures on ice cooling on this same farm were 24 cents for each 100 pounds of milk. The high cost of cooling on this farm was due to the fact that all the power used was utilized in cooling milk.

TABLE 5. *Distribution of Costs When Power Is Charged at Three Cents per Kilowatt Hour*

Cost Item	Average Annual Costs	Average cost for each 100 lbs. Milk produced	Percent of Total
Power	$23.29	$.0272	25
Depreciation, Unit	34.34	.0401	37
Depreciation, Tank	12.54	.0147	14
Interest	22.07	.0258	24
Repairs	00.00	.0000	00
Total	$92.33	$.1078	100

The convenience of cooling milk by electricity is difficult to estimate in dollars. After having experienced the benefits of its convenience and its prompt and constant cooling to a low temperature, the farmers have stated that they would not return to the ice method even though the electrical system had cost more to operate. Cooling of the milk to a uniformly low temperature with little or no attention is not only a convenience but insures a high quality product.

TABLE 6. *Current Consumption per Month for Automatic Versus Manual and Automatic Control*

	Jan. KWH	Feb. KWH	March KWH	April KWH	May KWH	June KWH	July KWH	Aug. KWH	Sept. KWH	Oct. KWH	Nov. KWH	Dec. KWH	Total KWH
Average of all	13.86	14.14	18.71	55.71	89.28	118.28	149.14	110.14	83.14	69.57	41.85	13.14	5432
Average number of kilowatts per 100 lbs. milk, 1.103													
Average of Manual-Automatic	5.50	4.00	8.00	53.75	98.50	134.50	184.25	140.00	102.50	85.50	48.25	4.25	3476
Average number of kilowatts per 100 lbs. milk, 1.106													
Average of Automatic	25.00	27.66	33.00	58.33	77.00	96.66	102.33	70.33	55.00	48.33	33.33	25.00	1956
Average number of kilowatts per 100 lbs. milk, 1.096													

The data indicate that automatically operated units require about the same amount or less of power to cool a given quantity of milk than manually controlled units. Hence, it seems to the writer, that an expenditure of 2.59 to 3.61 cents for each 100 pounds of milk during the winter months is cheap insurance for the delivery of a good quality of milk. When producing milk, we should always have the consumer in mind because in the last analysis the consumer is the judge as to how much milk he will consume. It is an accepted fact that consumers will drink more high quality milk than poor quality milk.

No mention has been made of the relative costs of ice and mechanical devices. Is the cost of cooling milk with electricity less than with ice? We are making a comparative study of the two methods which will be published later. However, judging from the results secured by workers in other states, the indications are that it is cheaper to cool milk with electricity.

From Corbett's (1) survey in Rhode Island made in 1929, the average cost of cooling 100 pounds of milk with ice was 10 cents. When cooling milk with electricity using wet boxes the cost was 12 2/3 cents for each 100 pounds of milk, and with dry boxes the cost was 14 1/4 cents for each 100 pounds of milk.

Bucknam (2) in New York found that if electricity could be purchased at four cents per kilowatt hour, the total cost of cooling milk was 11.4 cents per 40 quart can or 13.2 cents per 100 pounds of milk. On the other hand, when milk was cooled by means of ice, Bucknam reports that the cost varied from 7 to 39 cents, with an average of 13.7 cents for each 40 quart can of milk. For each 100 pounds of milk this would be 15.9 cents. The study in New York showed that it was cheaper by 2.7 cents to cool 100 pounds of milk with electricity.

Ellenberger (3) in Vermont found that it cost 22.1 cents per 100 pounds of milk to cool milk with ice as compared to 16.7 cents to cool with electricity. The ice was valued at $3 to $4 per ton.

Ackerman (4) in New Hampshire found that the average cost of cooling 100 quarts of milk was 30 cents when ice was used and 15 cents when cooled by electricity. For each 100 pounds of milk this would be 13.9 cents when ice was used, as compared to 6.9 cents when electricity was used. The equipment used on the farms studied by Ackerman was of the dry room type, consisting of an insulated room large enough to admit a person and chilled through the medium of cold dry air.

TABLE 7. *Monthly Average Cost of Electricity per 100 Pounds of Milk Cooled*

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	$	$	$	$	$	$	$	$	$	$	$	$
Average of all	.0276	.0360	.0289	.0698	.1139	.0983	.1292	.0977	.1016	.0911	.0597	.0300
Average of Farms Nos. 1, 3, and 6*	.0259	.0309	.0361	.0722	.0863	.0853	.1125	.0985	.0982	.0852	.0452	.0321

*Note—These farms used electricity for cooling milk the year around.

BIBLIOGRAPHY

1. CORBETT, ROGER B., Bulletin 223, May 1930. Rhode Island Agricultural Experiment Station.

2. BUCKNAM, R. F., Farm Economics, Cornell University, No. 66, June 1930, p. 1311, 1312.

3. ELLENBERGER, H. B., Bulletin 300, July 1929. Vermont Agricultural Experiment Station.

4. ACKERMAN, W. T., Bulletin 233, March 1928, New Hampshire Agricultural Experiment Station.

The complete data for each farm are appended as Tables 8 to 14 inclusive.

TABLE 8. *Details of Charges and Costs on Farm No. 1*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk Actual	Cost of cooling 100 lbs. milk At 3c per KWH
1929	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
April	185	10.35	1.80	2.00	14.15	.0765	140	10.7100	12900.00	.0830	.032
May	211	11.13	1.80	2.00	14.93	.0708	200	14.1600	13222.50	.1079	.046
June	348	12.24	1.80	2.00	16.04	.0461	267	12.3087	12631.25	.0974	.063
July	310	14.10	1.80	2.00	17.90	.0577	259	14.9443	9675.00	.1544	.080
Aug.	330	14.70	1.80	2.00	18.50	.0560	223	12.4880	9782.50	.1276	.068
Sept.	369	15.87	1.80	2.00	19.67	.0533	167	8.9011	9567.50	.0941	.052
Oct.	287	13.41	1.80	2.00	17.21	.0600	135	8.1000	10320.00	.0785	.039
Nov.	317	14.31	1.80	2.00	18.11	.0571	69	3.9399	10642.50	.0370	.019
Dec.	233	11.79	1.80	2.00	15.59	.0669	17	1.1373	10750.00	.0106	.005
1930											
Jan.	281	13.23	1.80	2.00	17.03	.0606	22	1.3332	11717.50	.0114	.005
Feb.	301	13.83	1.80	2.00	17.63	.0585	6	.3510	13975.00	.0025	.001
March	275	13.05	1.80	2.00	16.85	.0613	32	1.9616	14512.50	.0135	.006

*Minimum, 120 kilowatt hours, @ 7c; excess @ 3c.

TABLE 9. *Details of Charges and Costs on Farm No. 2*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk Actual	Cost of cooling 100 lbs. milk At 3c per KWH
1929	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
March	55	3.85	1.28	2.00	7.13	.1296	...	.....	7740	....	...
April	39	2.73	1.28	2.00	6.17	.1582	...	.....	8546	....	...
May	59	4.13	1.28	2.00	7.41	.1256	49	6.1534	9137	.0673	.016
June	141	7.11	1.28	2.00	10.39	.0736	99	7.2864	8976	.0812	.033
July	234	9.90	1.28	2.00	13.18	.1563	199	11.2037	8707	.1287	.068
Aug.	287	11.49	1.28	2.00	14.27	.0497	157	7.8029	8514	.0916	.055
Sept.	230	9.78	1.28	2.00	13.06	.0567	106	6.0102	8256	.0728	.038
Oct.	181	8.31	1.28	2.00	11.59	.0640	86	5.5040	7699	.0715	.033
Nov.	219	9.45	1.28	2.00	12.73	.0581	64	3.7184	8707	.0427	.022
Dec.	118	6.42	1.28	2.00	9.70	.0822	...	.....	9072	....	...
1930											
Jan.	134	6.90	1.28	2.00	10.18	.0760	...	.....	9075	....	...
Feb.	133	6.87	1.28	2.00	10.15	.0763	...	.....	7841	....	...

*Minimum, 72 kilowatt hours, @ 7c; excess @ 3c.

TABLE 10. *Details of Charges and Costs on Farm No. 3*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk Actual	Cost of cooling 100 lbs. milk At 3c per KWH
1929	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
March	65	4.35	.90	2.00	7.25	.1115	48	5.3520	7226	.0741	.019
April	71	4.53	.90	2.00	7.43	.1046	66	6.9036	7307	.0945	.027
May	81	4.83	.90	2.00	7.73	.0954	75	7.1550	8167	.0876	.027
June	119	5.97	.90	2.00	8.87	.0745	94	7.0030	7716	.0907	.036
July	110	5.70	.90	2.00	8.60	.0782	99	7.7418	7445	.1039	.039
Aug.	115	5.85	.90	2.00	8.75	.0760	71	5.3960	5845	.0923	.036
Sept.	85	4.95	.90	2.00	7.85	.0923	57	5.2611	4919	.1069	.035
Oct.	76	4.68	.90	2.00	7.58	.0997	59	5.8823	5639	.1043	.031
Nov.	105	5.55	.90	2.00	8.45	.0805	45	3.6225	7052	.0513	.019
Dec.	70	4.50	.90	2.00	7.40	.1057	39	4.1223	7574	.0544	.015
1930											
Jan.	86	4.98	.90	2.00	7.88	.0916	44	4.0304	8238	.0489	.016
Feb.	82	4.86	.90	2.00	7.76	.0946	44	4.1624	7215	.0577	.018

*Minimum, 60 kilowatt hours, @ 7c; excess @ 3c.

TABLE 11. *Details of Charges and Costs on Farm No. 4*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk	
										Actual	At 3c per KWH
1929	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
March	53	3.71	1.20	2.00	6.91	.1304	...	.....	5998	....	...
April	58	4.06	1.20	2.00	7.26	.1252	30	3.7560	5934	.0633	.015
May	34	2.38	1.20	2.00	6.17	.1815	63	11.4345	5923	.1930	.032
June	166	8.18	1.20	2.00	11.38	.0686	83	5.6938	6172	.0922	.040
July	335	13.25	1.20	2.00	16.45	.0491	176	8.6416	6723	.1285	.078
Aug.	406	15.38	1.20	2.00	18.58	.0457	94	4.1958	9647	.0435	.029
Sept.	304	12.32	1.20	2.00	15.52	.0510	68	3.4680	6514	.0532	.031
Oct.	283	11.69	1.20	2.00	14.89	.0526	60	3.1560	6806	.0462	.026
Nov.	325	12.95	1.20	2.00	16.15	.0497	25	1.2425	7159	.0173	.010
Dec.	116	6.68	1.20	2.00	9.88	.0851	...	.....	5998	....	...
1930											
Jan.	139	7.37	1.20	2.00	10.57	.0760	...	.....	7426	....	...
Feb.	136	7.28	1.20	2.00	10.48	.0771	...	.....	6316	....	...

*Minimum, 80 kilowatt hours, @ 7c; excess @ 3c.

TABLE 12. *Details of Charges and Costs on Farm No. 5*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk	
										Actual	At 3c per KWH
1928	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
April	65	4.55	...	2.00	6.55	.1007	65	6.55	6234	.1051	.0313
May	73	5.11	...	2.00	7.11	.0974	73	7.11	6301	.1128	.0348
June	97	6.79	...	2.00	8.79	.0906	97	8.79	6387	.1376	.0456
July	107	7.49	...	2.00	9.49	.0887	107	9.49	5742	.1652	.0590
Aug.	59	4.17	...	2.00	6.17	.1046	59	6.17	4788	.1289	.0370
Sept.	31	4.17	...	2.00	6.17	.1990	31	6.17	3831	.1610	.0242
Oct.	29	4.17	...	2.00	6.17	.2127	29	6.17	4732	.1304	.0184
Nov.	23	4.17	...	2.00	6.17	.2682	23	6.17	4942	.1248	.0139
Dec.	18	4.17	...	2.00	6.17	.3417	18	6.17	5398	.1143	.0100
1929											
Jan.	15	4.17	...	2.00	6.17	.4113	15	6.17	5323	.1159	.0085
Feb.	9	4.17	...	2.00	6.17	.6955	9	6.17	5110	.1207	.0053
March	24	4.17	...	2.00	6.17	.2571	24	6.17	6551	.0942	.0099

*7c straight per kilowatt hour.

TABLE 13. *Details of Charges and Costs on Farm No. 6*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk	
										Actual	At 3c per KWH
1929	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
April	260	11.48	1.38	2.00	14.86	.0572	44	2.5168	6413	.0392	.021
May	280	12.08	1.38	2.00	15.46	.0552	83	4.5816	7202	.0636	.034
June	416	16.16	1.38	2.00	19.54	.0470	99	4.6530	6856	.0678	.043
July	369	14.75	1.38	2.00	18.13	.0491	101	4.9591	4689	.0794	.064
Aug.	442	16.94	1.38	2.00	20.32	.0460	81	3.7260	4927	.0756	.049
Sept.	321	13.31	1.38	2.00	16.69	.0519	77	3.9963	4269	.0936	.054
Oct.	190	9.38	1.38	2.00	12.76	.0671	57	3.8247	5246	.0729	.032
Nov.	198	9.62	1.38	2.00	13.00	.0656	32	2.0992	4429	.0474	.021
Dec.	139	7.85	1.38	2.00	11.23	.0808	18	1.4544	4637	.0313	.011
1930											
Jan.	241	10.91	1.38	2.00	14.29	.0593	16	.9488	5411	.0175	.009
Feb.	269	11.75	1.38	2.00	15.13	.0562	30	1.6860	5157	.0327	.017
March	532	19.64	1.38	2.00	23.02	.0432	27	1.1664	5555	.0209	.015

*Minimum, 92 kilowatt hours, @ 7c; excess @ 3c.

TABLE 14. *Details of Charges and Costs on Farm No. 7*

Month	Total Power Used	Charge for Current*	Flat Rate	Line Charge	Total	Actual cost per KWH	Power for cooling milk	Total Cost	Milk Produced	Cost of cooling 100 lbs. milk	
										Actual	At 3c per KWH
1929	KWH	$	$	$	$	$	KWH	$	Pounds	$	$
March	45	3.15	1.14	2.00	6.29	.1398	...	.....	5835	....	...
April	69	4.83	1.14	2.00	7.97	.1155	45	5.1975	5020	.1035	.027
May	79	5.47	1.14	2.00	8.61	.1090	82	8.9380	5415	.1654	.045
June	117	6.55	1.14	2.00	9.69	.0828	89	7.3692	6073	.1213	.044
July	103	6.13	1.14	2.00	9.27	.0900	103	9.2700	6424	.1443	.048
Aug.	108	6.28	1.14	2.00	9.42	.0872	86	7.4992	6000	.1249	.043
Sept.	90	5.74	1.14	2.00	8.88	.0987	69	6.8103	5239	.1301	.039
Oct.	78	5.38	1.14	2.00	8.52	.1092	61	6.6612	4962	.1342	.038
Nov.	80	5.44	1.14	2.00	8.58	.1072	35	3.7520	3863	.0971	.027
Dec.	32	2.24	1.14	2.00	6.17	.1928	...	.....	3861	....	...
1930											
Jan.	33	2.31	1.14	2.00	6.17	.1870	...	.....	5310	....	...
Feb.	41	2.87	1.14	2.00	6.17	.1505	10	1.5050	3876	.0388	.007

*Minimum, 76 kilowatt hours, @ 7c; excess @ 3c.