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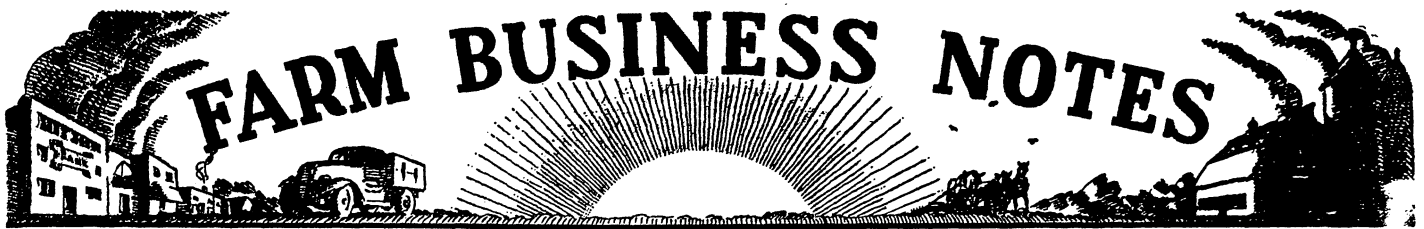
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Prepared by the Divisions of Agricultural Economics and Agricultural Extension
Paul E. Miller, Director Agricultural Extension

NO. 262

UNIVERSITY FARM, ST. PAUL

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Saving Labor in Milking

S. A. ENGENE

The Minnesota Agricultural Experiment Station is studying methods of reducing the time and effort needed in dairy farming. Detailed labor records, showing operations performed, time spent, and distance traveled, are being obtained on 10 Nicollet County farms. Each step in the chore work is then studied to determine if it is possible to (1) eliminate it, (2) use a better method, (3) mechanize the work, (4) combine two or more jobs, (5) perform the work in a more effective order, (6) arrange the buildings and equipment for greater convenience, or (7) use both hands more effectively.

Although the study has not been completed, a preliminary analysis of machine milking on six of the farms shows possible savings from systematic analysis and illustrates some of the methods used in job analysis. A summary of the operations performed and the time required on each of these farms is presented in table 1. This is a record of the milking operation as performed before any improvement was attempted. This summary covers only milking, carrying the milk to the milk house, and straining.

There was a big difference in the time spent per cow. Farmer B spent only 2 minutes 30 seconds, while Farmer D spent 5 minutes 59 seconds, or more than twice as long.

Table 1. Summary of Time Used per Cow for Machine Milking
(First date observed)

Farm	A	B	C	D	E	F
Number of cows milked.....	19	9	16	9	12	10
	(Time per cow in minutes and seconds)					
Wash udder	:30	:19	:12	.....	:18	.....
Put milker on cow.....	:24	:22	:34	:44	:28	:51
Machine strip and remove milker	1:31	:42	:48	:17	:35	1:23
Empty milker to carry pail.....	:10	:07	:19	:36	.....	:09
Carry to milk house.....	:36	:10	:10	:22	:13	:08
Hand strip .....	.....	:36	1:02	1:59	1:03	.....
Tie and untie claw.....	.....	.....	.....	:36	:15	.....
Idle	1:07	.....	:42	:25	:39	:14
Miscellaneous	:16	:14	:18	1:00	:28	:13
Total	4:34	2:30	4:05	5:59	3:59	2:58
Average time milker on cow.....	4:10	4:14	5:12	6:10	5:19	4:00
Per cent of cows from which milker was removed in less than 5 minutes.....	71	67	53	28	50	95

University Farm Radio Programs

HOMEMAKERS' HOUR—10:45 a.m.

UNIVERSITY FARM HOUR—12:30 p.m.

THE FRIENDLY ROAD—1:00 p.m.

Station WLB—770 on the dial

This seemingly small difference of 3½ minutes per cow when applied to nine cows totals to 31 minutes per milking, or 377 hours per year. At 9 hours per day Farmer D worked 42 days, or almost a month and a half extra, each year at the job of milking.

Part of the variation in time among these farmers was due to differences in methods of doing the

work. Although all men used two single units of relatively new, double-action milkers, the organization of the work differed.

The total man time per cow was shortest on farms B, E, and F, where one man did all the work. On the other farms, with two men working, considerable time was spent in waiting and in duplication of steps.

Farmers A and B washed the cows' udders 1 to 3 minutes before putting on the milkers in order to obtain cleaner milk and stimulate the letting down of the milk. This required some extra time but it made possible an earlier removal of the milker with a tendency to reduce udder injuries. The other farmers washed the udders immediately before putting on the milker or not at all.

Careful Machine Stripping Cuts Hand Stripping Time

Farmers A, B, and F did a careful job of machine stripping; that is, when the cows were partially milked, the teat cups were pulled part way down on the teats to offset the crawling action that frequently shuts off the milk flow. This made it possible to eliminate or reduce the time for hand stripping.

Part of the variation in time per cow was due to differences in the time required for doing a specific task. The worker on Farm B moved very rapidly, more rapidly than can reasonably be expected, and possibly more rapidly than would be desirable for the maintenance of health if continued for long periods.

The variations in the length of time the men worked with the cows affected the length of time the milkers were left on the cows. The time varied from 4 minutes to more than 6. On Farm D the milkers were removed in less than 5 minutes for only 28 per cent of the cows; on Farm F the

milker was removed in less than 5 minutes for 95 per cent of the cows. According to recent research in dairy production early removal of the machine will tend to reduce the frequency of udder trouble.

Careful analysis of the operations on the individual farms and use of the more recent developments in the techniques of machine milking made it possible to reduce considerably the time required for milking on several of these farms. The biggest saving was made on Farm D.

How Milking Time Was Cut on Farm D

The operations performed and the time used for each on Farm D for four different dates are shown in table 2. As the first step in changing the procedure, the farmer began to wash the udder a minute or more before putting on the milkers. This gave time for the cow to let down the milk before the milker was put on. Although this increased slightly the amount of time required, it seemed worth while in order to help to reduce the length of time the milker was left on the cows and to improve the cleanliness of the milk.

He also began to machine strip the cows. Experience was necessary for effective performance of the job, but by the time of the last observation he had become quite skillful. This extended the time for machine stripping and removing the milker by 45 seconds, but the time required for hand stripping was reduced by more than one minute. Since only about a quart of strippings was obtained from all cows on the last day, hand stripping could probably have been omitted.

By postponing feeding until after milking, the cows stood more quietly, and it was possible to eliminate the task of tying up the claw and teat cups. This had previously been done to prevent the cows from kicking the teat cups into the bedding. On the first three dates two men did the milking. On the last date one man worked alone.

2¼ Minutes Saved per Cow Means 27 Days per Year

As a result of these changes, it was possible to reduce the length of time the milkers were left on the cows as well as the amount of man time used. The man time required for milking was reduced by 2¼ minutes per cow. With an average of nine cows milked throughout the year, this represents a saving of 40 minutes per day or 27 nine-hour days per year.

Table 2. Change in Method and Time for Milking on Farm D

Date	Jan. 27	Feb. 16	Mar. 1	May 11
Number of cows milked.....	9	9	9	8
	(Minutes and seconds)			
Wash udder		:35	:33	:22
Put milker on cow.....	:44	:40	:37	:31
Machine strip and remove milker.....	:17	:38	1:20	1:02
Empty milker to carry pail.....	:36	:23	:19	:19
Carry to milk house.....	:22	:26	:14	:15
Hand strip	1:59	1:21	1:29	:43
Tie and untie claw.....	:36			
Idle	:25	:12	:20	:06
Miscellaneous	1:00	:55	:45	:28
Total	5:59	5:10	5:37	3:46
Average time milker on cow.....	6:10	3:54	4:14	4:06
Per cent of cows from which milker was removed in less than 5 minutes	28	89	78	69

Table 3. Summary of Time Used per Cow for Machine Milking (Last date observed)

Farm	A	B	C	D	E	F
Number of cows milked.....	17	10	15	8	12	13
	(Minutes and seconds)					
Wash udder	:39	:17	:30	:22	:23	:02
Put milker on cow.....	:23	:21	:32	:31	:43	:39
Machine strip and remove milker.....	1:21	1:06	:38	1:02	:52	1:24
Empty milker to carry pail.....	:12	:04	:14	:19		:09
Carry to milk house.....	:11	:10	:24	:15	:11	:07
Hand strip		:15	:06	:43	:25	
Tie and untie claw.....						:21
Idle	:09		:11	:06		:02
Miscellaneous	:13	:22	:19	:28	:24	:14
Total	3:08	2:35	2:54	3:46	3:19	2:37
Average time milker on cow.....	5:08	4:14	4:16	4:06	4:13	4:29
Per cent of cows from which milker was removed in less than 5 minutes.....	53	75	83	69	75	69

Savings in time were also made on some of the other farms. A summary of the operations performed and time required on each of the six farms after they had been carefully studied and changes made is shown in table 3.

Some conclusions formed while working with these farms are: (1) The time required for milking, as well as other farm jobs, can frequently be reduced by reviewing all operations involved in the job and questioning each carefully. (2) On some farms the savings can be very large. (3) For herds of moderate size, with the milk house near the barn, and the milk not weighed, one man with two single units can do the milking effectively. With two men working, considerable time is wasted. (4) The milking can be done with 2½ to 3 minutes of man time per cow and with the milkers left on the cows an average of about 4 minutes. If the operation requires much more time than that while moving at a reasonable speed the milking should be studied carefully to locate opportunities for improvement.

The Farmer's 1944 Declaration Of Estimated Income Tax

G. E. TOBEN

Federal income tax regulations provide that a farmer¹ whose tax returns are prepared on a calendar year basis must either (1) file a complete and final return by January 15, 1945, or (2) file a Declaration of Estimated Income Tax by the same date and then submit a complete and final return by March 15, 1945. If the income tax report is on a March 1 basis rather than the calendar year, the corresponding filing dates are March 15 and May 15.

Preparing the final return within the first 15 days has the obvious advantage of eliminating the estimated return. On the other hand, it may be necessary to prepare both returns because of difficulty in closing the year's accounts soon after the end of the year. It may also be difficult to get assistance, since tax consultants will be rushed just prior to the dates when returns are due.

¹ If less than 66⅔ per cent of the gross income is from farming, it will be necessary to comply with regulations pertaining to a nonfarm business.

The most satisfactory way to prepare the Declaration, as well as the final return, is to calculate it from an account book. If records have not been kept currently, secure an account book immediately for assembling the needed facts. The sooner this is done, the fewer the errors and omissions are likely to be.

Preparation of the estimated return and the final return can be done accurately and in less time by using the special forms and instructions that are available from your county agent. These forms are designed so that they can be prepared in triplicate, one copy for the federal return, one for the state return, and one personal copy for future reference.

Two Steps in Preparing Final Return

There are two distinct steps in the preparation of either the estimated or the final return. The first is the calculation of the taxable income from farming and the second is determining the tax due. With both of these steps, certain calculations may be eliminated in preparing the estimated return that cannot be followed in the case of the final return. In summarizing estimated taxable income, two details can be eliminated without serious effect on the accuracy.

(1) For the depreciation, the amount reported on the 1943 return may be used if this amount was calculated separately for each item. (2) Except for farmers selling large numbers of livestock for breeding, it is generally satisfactory to disregard the distinction between ordinary sales and capital sales. Both may be considered as ordinary sales, that is, as net income subject to tax. Disregarding this distinction may raise the tax somewhat, but it is safer to overestimate than underestimate the tax. Penalties are assessed when the estimated tax is more than $33\frac{1}{3}$ per cent below the actual tax as calculated on the final return; whereas, no penalty is assessed for overestimates.

After the taxable income has been calculated, complete the estimate on federal Form 1040-ES, which is obtainable from the Collector of Internal Revenue. Any farmer with less than \$10,000 income can save considerable time by completing pages 1 and 2 but not page 3 of this form, according to the instructions on the form.

Payment for the amount of the estimated tax should accompany the return. Any adjustments in the estimate will be corrected when the final return is submitted. If, instead of both an estimated and final return, the final return is prepared within the 15 days after the close of the tax year, full payment of the tax must accompany this return.

Marketing Margins on Minnesota Farm Products

W. C. WAITE and R. W. COX

The monthly retail value of a representative basket of Minnesota farm-produced foods averaged \$26.70 in 1943, or about 34 per cent larger than in 1940. This basket is composed of various foods in the proportions usually pur-

Table 1. Retail and Farm Values of Representative Basket of Minnesota Farm-Produced Foods, 1935-1944

	Average 1935-39	1940	1941	1942	1943	1944*
Retail value of food.....	\$20.52	\$19.88	\$21.69	\$24.78	\$26.70	\$25.96
Farm value	9.77	8.60	10.85	13.89	16.66	16.14
Margin	10.75	11.28	10.84	10.89	10.04	9.82
Subsidy payments .....					.51	1.10
Total margin	10.75	11.28	10.84	10.89	10.55	10.92
Percentage margin	52.4	56.7	50.0	43.9	39.5	42.1

* Monthly average for period, January to June, inclusive.

chased by city families during the month. The foods included are beef and pork; chickens and eggs; milk, butter, and cheese; flour and bread; and potatoes. During the same period the farm value of these foods increased from \$8.60 to \$16.66, or about 94 per cent. Both the retail value and the farm value declined somewhat during the first six months of 1944 (table 1).

The margin, excluding subsidy payments, taken by processing and distributing agencies has actually declined since 1940. The average margin of \$9.82 in the first six months of 1944 was 13 per cent less than in 1940. The difference between the retail and farm values does not accurately indicate the actual operating margins in 1943 and 1944, because of subsidy payments made to the processors of beef, pork, butter, and flour. The subsidy payments for the first three of these products were started in June, 1943, at the beginning of the program to roll back the price of these products to consumers through the downward revisions of wholesale and retail price ceilings. The payments have been 1.1 cents per pound for cattle and calves, 1.3 cents per pound for hogs, and 5 cents per pound of butter. The payments on flour began in December, 1943, and have varied from 11 cents per bushel of wheat in September, 1944, to 25.5 cents in April and May, 1944. The total subsidy payments amounted to 51 cents in 1943 with the result that the margin actually secured in this year on the basket of foods was \$10.55. The payments in 1944 totaled \$1.10, thereby increasing the margin to \$10.92.

If the subsidy payments including the payments to dairy farmers to offset rising feed costs are assumed to have held down retail prices by their full amount, the saving to consumers in their food costs for this bill of goods was 55 cents in 1942 and \$1.35 in 1944.

The percentage margin shows that the processors' and distributors' share accounted for 56.7 per cent of the retail value in 1940 but only 39.5 per cent in 1943. The proportion has been somewhat higher in 1944, mainly because of the larger subsidy payments. The percentage margins for individual items in the food basket vary greatly because of the differences in the costs of processing and distribution. For example, the percentage margin on eggs averaged 34 per cent in 1940-43 and that on potatoes, 59 per cent.

The trends in the respective margins for the various items have also shown large differences. Although the subsidy payments have been included in the calculations, the margins for beef and pork have shown large declines. The margins for chickens, eggs, and potatoes have steadily increased. Those for milk, milk products, and wheat products have shown much less variation.

Minnesota Farm Prices for September, 1944

Prepared by W. C. WAITE and R. W. COX

The index number of Minnesota farm prices for September, 1944, is 164. This index expresses the average of the increases and decreases in farm product prices in September, 1944, over the average of September, 1935-39, weighted according to their relative importance.

Average Farm Prices Used in Computing the Minnesota Farm Price Index, September, 1944, with Comparisons*

	Sept. 15, 1944	Aug. 15, 1944	Sept. 15, 1943		Sept. 15, 1944	Aug. 15, 1944	Sept. 15, 1943
Wheat	\$ 1.34	\$ 1.38	\$ 1.27	Hogs	\$13.60	\$13.30	\$13.80
Corn	1.02	1.02	.96	Cattle	11.00	11.50	11.00
Oats	.55	.64	.65	Calves	13.10	13.10	13.00
Barley	.92	1.05	.98	Lambs-Sheep	11.68	11.95	12.38
Rye	.84	.98	.88	Chickens	.21	.21	.22
Flax	2.91	2.89	2.86	Eggs	.32	.31	.39
Potatoes	1.25	1.25	1.10	Butterfat	.53	.53	.53
Hay	9.30	8.60	6.50	Milk	2.75	2.75	2.80
				Wool†	.42	.43	.43

* These are the average prices for Minnesota as reported by the United States Department of Agriculture.

† Not included in the price index number.

The prices of small grains declined from August to September, with barley and rye prices showing the largest changes. The price of corn continues at the ceiling level. Hog prices have advanced for the second consecutive month, but this has been more than offset by declines in prices of other meat animals. Prices of livestock products have changed but slightly in recent months. The Minnesota farm price index is three points lower than in September, 1943. The decline in the livestock products price index of about seven points is due mainly to the lower price of eggs.

The feed ratios with the exception of the butterfat-farm-grain ratio are lower than one year ago. The producers of butterfat received a feed payment of 10 cents per pound in September. If this is added to the reported price of this product, the butterfat-farm-grain ratio would be raised to 34.7.

Indexes and Ratios for Minnesota Agriculture*

	Sept. 15, 1944	Sept. 15, 1943	Sept. 15, 1942	Average Sept. 1935-39
U. S. farm price index	179.1	180.0	152.0	100
Minnesota farm price index	164.0	167.0	135.8	100
Minn. crop price index	172.8	173.5	119.1	100
Minn. livestock price index	150.0	151.7	143.4	100
Minn. livestock product price index	170.3	177.5	147.4	100
U. S. purchasing power of farm products	127.2	133.1	123.4	100
Minn. purchasing power of farm products	116.5	123.5	110.2	100
Minn. farmers' share of consumers' food dollar	61.5†	64.4	57.3	48.6
U. S. hog-corn ratio	11.7	12.9	16.4	12.6
Minnesota hog-corn ratio	13.3	14.4	19.0	14.9
Minnesota beef-corn ratio	10.8	11.5	13.9	11.9
Minnesota egg-grain ratio	16.1	19.8	22.3	17.3
Minnesota butterfat-farm-grain ratio	29.5	27.1	37.8	32.4

* Explanation of the computation of these data may be had upon request.

† Figure for June, 1944.

Sales of Butterfat and Milk Solids Not Fat from U. S. Farms

The quantities of butterfat and milk solids not fat contained in the dairy products sold from the farms of the United States are shown for selected years in the table.

Sales of Butterfat and Milk Solids Not Fat from U. S. Farms

	Total milk equivalent of all sales	Estimated butterfat in products sold	Estimated milk solids not fat in products sold	Estimated milk solids not fat retained in skim milk on farms
	Million pounds			
1924	65,095	2,604	2,627	2,711
1929	76,771	3,071	3,295	3,000
1934	77,040	3,082	3,358	2,959
1939	84,556	3,382	4,102	2,832
1940	87,755	3,510	4,367	2,829
1941	93,746	3,750	4,768	2,919
1942	97,956	3,918	5,324	2,708
1943	97,478	3,899	5,490	2,503

Between 1924 and 1943 there was an increase of 50 per cent in the milk equivalent of farm sales of dairy products and a corresponding increase in the quantity of butterfat in these sales. In the same period the quantity of milk solids not fat in the products sold more than doubled. In 1924 the quantity of butterfat and milk solids not fat in the products sold were about equal, as was likewise the quantity of milk solids not fat in the skim milk retained on the farm, but arising from the sale of dairy products. Between 1924 and 1941 the increase in the milk equivalent of farm sales resulted almost entirely from the sale of whole milk with sales from the farm in the form of cream remaining substantially unchanged. The last two years have witnessed a considerable shift to the farm sales of milk by farmers formerly selling cream, as is evidenced by the decline in milk solids retained on the farm. In 1943 the pounds of milk solids not fat sold from the farms was 40 per cent greater than the pounds of butterfat sold and more than twice the amount of milk solids not fat retained in the skim milk on the farm.

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