

SUGGESTIONS FOR TEACHING DAIRYING
IN THE WYANDOTTE HIGH SCHOOL

By

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CHAPTER I

INTRODUCTION

More than 80 per cent of all the farmers in the United States are interested in the feeding, care and management of dairy cattle. There are approximately 25 million dairy cows in this country producing milk for human consumption or for the manufacture of dairy products. There is a daily demand for milk or some of its products by every family, throughout the year. There are no substitutes for milk. Children must have it for growth; adults require it for health; and invalids as well as elderly people must turn to it as a means of prolonging their lives.¹

The Census Bureau estimates that the population of the United States is increasing at the astounding rate of six thousand persons per day. This increase is due mainly to the increased birth rate and increased life expectancy. Each year more babies and elderly people use milk as compared to the preceding year. These two age groups are large consumers of milk and milk products.

Dr. Olson stresses the importance of milk and its products in his book, Elements of Dairying, when he quotes Dr. McCollum as follows:

The people who have achieved, who have become large, strong, vigorous people, who have reduced their infant mortality, who have the best trades in the world, who have an appreciation of art, literature, and music, who are progressive in science and in every activity of the human intellect are the people who have used liberal amounts of milk and its products.²

¹Henderson, H. O., Carl W. Larson, and Fred S. Putney, Dairy Cattle Feeding and Management, John Wiley and Sons, Inc., New York, April 1949, p. 1.

²Olson, T. M., Elements of Dairying, The MacMillan Co., New York, 1939, p. 7.

REASON FOR STUDY:

The writer feels that each year dairying in northeastern Oklahoma will increase in importance. It is for this reason that he particularly desires to make a study pertaining to some of the dairying problems encountered in that section, especially in his home community. All dairy farmers are concerned with certain problems. The aim of the author of this study is to present some of the problems of 50 dairy farmers in the Wyandotte community and outline a suitable course of study for that high school.

STATEMENT OF PURPOSES:

The purposes of this study are (1) to determine how closely the farmers in the Wyandotte service area follow the recommended dairy procedures; (2) to determine what should be taught relative to the dairy enterprise in the Wyandotte High School by the Vocational Agriculture Instructor; and (3) to suggest an educational program in dairying for the adult farmers in the Wyandotte service area.

DESCRIPTION OF AREA:

According to the 1940 census, as shown in Table I, 6,538 cows were milked in Ottawa County, while in 1945 there were 7,676 cows milked. This increase was rather trivial. The Wyandotte Township reported 884 cows milked in 1940 while 1,262 cows were milked in 1945. This was better than a 42 per cent increase. The writer feels that this increase is of great significance. There must be a factor or group of factors which would cause this increase. The value of dairy products sold in Ottawa County increased from \$208,732 in 1940 to \$667,892 in 1945. This 172 per cent increase in value of dairy products sold compares with a 17.4 per cent increase in number of cows milked during the same period of time. This was due, no doubt, to the increased demand for milk and government subsidizing during World War II.

In 1950, there were 7,815 cows milked in Ottawa County. This was an increase of 139 cows over 1945. The value of dairy products sold by the farmers in Ottawa County decreased \$12,752 during this five-year period following the war.

TABLE I
NUMBER OF COWS AND VALUE OF DAIRY PRODUCTS
IN OTTAWA COUNTY

Information	Year		
	1940	1945	1950
No. cows milked in Ottawa County	6,538	7,676	7,815
No. cows milked in Wyandotte Twp.	884	1,262	
Value of Dairy Products in Ottawa County	\$208,732	\$667,892	\$655,140

Ten years ago there were only one Grade A milk market, two Grade B markets, and one Grade C market, while today there are four Grade A milk markets, two Grade B markets, and four Grade C markets in Ottawa County. Most of these markets are available to the farmers in the Wyandotte service area.

One dairy manufacturing concern built a new one million dollar plant four years ago. This year (1952), due to inability to get sufficient milk, this dairy manufacturing concern bought seven farms, and is making them into dairy farms under the supervision of a farm management agency. These farms range in size from 160 acres to 240 acres each. The above-mentioned plant is the chief market for milk produced in the Wyandotte area.

During the past ten years there has been an extensive county, state and Federal road improvement program completed in this area. During this period the Rural Electrification Administration has extended its lines to

practically every farm in the county. These added facilities assist in the mechanization of dairy production.

One of the dairymen included in this study was acclaimed the (1952) Master Dairyman for Northeastern Oklahoma, which included ten counties. The runner-up in the contest is also included in this study.

The writer is fully aware of the fact that the 50 farmers surveyed for this study are above the average for the area in most phases of dairying. He felt he could learn more about dairying from this group and still be able to find sufficient weaknesses in the dairying enterprises for the study. He feels that he found more weaknesses than are justifiable and that any recommendations which he may present are in order.

CHAPTER II

METHODS USED IN SECURING DATA

The author realizes the increasingly important role that dairying is playing in helping the farmers of northeastern Oklahoma realize a higher standard of living. In collaborating with his major advisors, he chose to make a study of the Wyandotte, Oklahoma, service area to determine the needs for a better dairying program there. The Wyandotte High School has had a vocational agriculture department for a period of fifteen years, while general agriculture has been taught continuously in the school since it was consolidated in 1927.

Mimeographed questionnaires and personal interviews were used in obtaining the desired information. The questionnaires were mimeographed by the Ottawa County Agent's force. A sample questionnaire is included at the end of Chapter II.

When deciding where to draw the line as to who would be contacted the author visited the milk plant where most of the milk from the area is sold. The head fieldman furnished him with daily milk receipt records. A map on the wall showed all routes of the trucks plying the area. Four milk trucks were getting most of the milk in the area covered in this study. The four trucks were picking up the milk of 211 farmers in this area.

The author assumed that a farmer should be producing at least two cans of milk per day in order to be considered a dairyman and be included in this study. Ninety-nine of the 211 farmers were selling two or more

cans of milk each day. Farmers milking less than six cows are not included in this study.

The author, being familiar with the area, had little trouble in finding those to be interviewed. While interviewing the farmers selling milk to the milk plant formerly mentioned, twelve Grade A and three Grade B producers selling to other milk plants were interviewed. Fifty farmers were contacted for this study, all by personal interviews.

All the farmers interviewed were most cooperative in supplying information. Each interview required approximately forty-five minutes for the actual filling out of the questionnaire. In most cases, however, more time was spent with the farmer. The author found that just visiting with the farmers (most of whom he knew quite well) was very educational. Typical unsolicited comments are included in this study.

After the fifty farmers were surveyed, the data were compiled and summarized in tabular form and appropriate analysis made.

DAIRYING PROBLEMS IN THE WYANDOTTE COMMUNITY

1. Name _____ Location from Wyandotte _____
2. Size of Dairy Herd: Mature Cows _____ Heifers 1-2 yrs. _____
Calves 6-12 mos. _____ Calves under 6 mos. _____
3. Number cows now being milked _____ Breed Predominating _____
4. Do you sell milk? Yes _____ No _____ What Grade? _____
5. Do you sell cream? Yes _____ No _____ Use made of Skimmilk _____
6. Month of highest price for milk _____ Month of lowest price _____
7. Approximately what per cent of herd is purebred? _____
8. Do you have "Grade A" facilities? Yes _____ No _____
9. Do you milk in the same building hay is stored? Yes _____ No _____
10. What is your approximate investment in Barns _____ Sheds _____
Milk house _____ Lots, feeders, etc. _____
11. What is your approximate investment in Milking Machine _____
Cooler _____ Utensils, Strainers, etc. _____
12. Do you own a herd Bull? _____ Purebred? Yes _____ No _____
13. Do you use Artificial insemination? Yes _____ No _____
If so, what breed? _____
14. Do you use Artificial Insemination for highest producers, and a beef-type
bull for lowest producers? Yes _____ No _____
15. Do you keep records of breeding dates? Yes _____ No _____
16. Are Individual Production Records kept? Yes _____ No _____
17. Are you a member of DHIA? Yes _____ No _____
18. Month most cows in herd freshen _____
19. Cows given 2 wks. _____ 4 wks. _____ 6 wks. _____ 8 wks. _____ rest
before freshening.
20. Do you feed cows grain during dry period? Yes _____ No _____
21. Do you feed laxative feeds before and after calving? Yes _____ No _____
22. Do you wash cows' udder prior to calves' first milk? Yes _____ No _____
23. Frequency of calf scours: Seldom _____ Often _____ Always _____

24. Treatment generally used _____
25. Cows not milked dry until 4th _____ 6th _____ 8th _____ milking after calving. Other _____
26. Heifer calves weaned at 1-4 days _____ 6-8 wks. _____ Older _____
27. Are calves raised on a milk substitute? Yes _____ No _____
28. Bull calves sold at 1-10 days old _____ as Veals _____
29. Do you buy any herd replacements? Yes _____ No _____. If so, what per cent generally? 25% _____ 50% _____ 75% _____ All % _____
30. Cows in herd generally replaced at age 4 _____ 6 _____ 8 _____ 10 _____ Older _____
31. Do you raise any heifers to sell to others for herd replacements? Yes _____ No _____. Bulls? Yes _____ No _____
32. Do you have a silo? Yes _____ No _____. Type? _____. Is it used? _____
33. Crop or crops generally ensiled _____. Tons _____
34. Is all the hay fed a legume hay? Yes _____ No _____. If no, what per cent of the hay fed is a legume _____?
35. Amount of mixed concentrate-feed bought: All _____ Part _____ None _____
36. If part or all of concentrate mix is bought, what per cent protein content preferred? _____
37. If none is purchased, do you grind & mix your own rations? Yes ___ No ___
38. If grinding & mixing own rations, please check grains used & lbs. of each used in one mixing or batch of feed.

(Concentrate or Supplement)	(Pounds)
Corn & Cob Meal - - - - -	-----
Corn Gluten Feed - - - - -	-----
Corn - - - - -	-----
Oats - - - - -	-----
Rye - - - - -	-----
Barley - - - - -	-----
Wheat Bran - - - - -	-----
Grain Sorghums (threshed) - - - - -	-----
Soybean Meal - - - - -	-----
Cottonseed Meal - - - - -	-----
Linseed Meal - - - - -	-----
Salt - - - - -	-----
Other - - - - -	-----

39. Are cows fed grain according to production when on pasture? Yes ___ No ___
When not on pasture? Yes ___ No ___. Example: 1/3 concentrates/3 lbs. milk.

40. Do you feed roughage according to body weight of cow? Yes _____ No _____
41. Approximate acres of each of the following used for winter pasture:
Rye _____ Winter Oats _____ Wheat _____ Barley _____ Vetch _____
42. Please check any of the above if planted with vetch.
43. Do you plant a temporary summer-pasture for herd? Yes _____ No _____
If yes, the crop generally planted _____. Acres per head _____
44. Are cows fed grain when on pasture? (It is assumed that pasture is fairly good) Yes _____ No _____ Amount _____ lbs. per day.
45. Are cows fed hay when on pasture? (It is assumed that pasture is fairly good) Yes _____ No _____ Amount _____
46. Are cows fed silage when on pasture? (It is assumed that pasture is fairly good) Yes _____ No _____ Amount _____
47. Number of months good pasture available _____. Weeds controlled? _____
48. Is herd provided with loafing sheds? Yes _____ No _____
49. Is chill removed from drinking water in winter? Yes _____ No _____
50. Source of drinking water? Deep-well _____ Spring or Creek _____ Pond _____
51. What mineral(s) is (are) fed free choice? _____
52. What hours do you milk? A.M. _____ P.M. _____
53. Do you practice calf-hood vaccination for Bangs? Yes _____ No _____
54. Do you test & dispose of all mature cows that re-act positive to Bangs test? Yes _____ No _____ Frequency of testing: 2 mo. ___ 6 mo. ___ 12 mo. ___
55. Frequency of Mastitis in herd: Seldom _____ Often _____ Always _____
56. Is strip cup used before each milking? Yes _____ No _____
57. Frequency of milk fever: Seldom _____ Often _____. Do you treat for it yourself _____ Call Vet. _____ Voc. teacher _____
58. Frequency of Blackleg _____ Bloat _____
59. Do you wash cows' udder before milking? Yes _____ No _____. Clip udders and flanks? Yes _____ No _____ Frequency _____
60. Do you use a milking machine? Yes _____ No _____
61. Milking equipment is cleaned & sterilized with hot water _____ Steam _____ Chlorine _____ Cold water only _____
62. Frequency of cleaning milking machine _____ Separator _____

- 63. Number of gallons of milk rejected during year_____
- 64. Average annual pounds of milk per cow_____ Butter-fat_____
- 65. Average number of days that each cow produces milk in the year_____
- 66. What do you consider to be your biggest problem with the Dairy Herd?

- 67. Do you think that dairying should be encouraged in this Community?
Yes _____ No _____

RE PARCHEMENT

CHAPTER III

PRESENTATION AND ANALYSIS OF DATA

The information presented on the following pages was obtained by personally interviewing 50 dairy farmers in the Wyandotte service area.

The numbers and/or percentages shown in the tables represent the conditions or extent of participation found in that particular phase of the survey.

1. Herd Characteristics

As shown in Table II, farmers in this survey had an average of 31.36 dairy animals per herd. This included all age groups. There was an average of 16.38 mature dairy cows on each farm. The 50 farms studied had an average of 6.74 heifers in the one-year to two-year age group, and an average of 4.02 heifers in the six- to twelve- month age group. There were more heifers in this group under six months old than there were in the six- to twelve-month age group.

The 50 farmers averaged milking 12.68 cows each. The most common sized herd being milked was nearer eight cows. The largest number of cows milked by any one farmer in the survey was 43. The smallest number was six.

Sixty-six per cent of the farmers had one or more purebred dairy animals in their herds as shown in Table III. Twelve per cent of the farms surveyed had herds which were all purebred. This included animals both with and without registration papers.

Approximately 25.38 per cent of all the cattle included in this study were purebred, being either registered or non-registered individuals.

TABLE II
CHARACTERISTICS OF 50 DAIRY HERDS INCLUDED IN THIS STUDY

Herd Characteristic	Range	Average Number
Animals per Herd (all ages)	9-189	31.36
Mature Cows per Herd	6-75	16.38
Heifers (1 to 2 years old) per Herd	0-50	6.74
Heifers (6 to 12 months old) per Herd	0-25	4.02
Heifers (under 6 months old) per Herd	0-24	4.22
Cows milked per Herd	6-43	12.68
Largest herd being milked	—	43
Smallest herd being milked	—	6
Most common sized herd being milked	—	8

This would tend to show that many of the farmers reporting one or more purebred individuals in their herd had only one, and this in most cases was the herd bull.

TABLE III
EXTENT OF PUREBRED DAIRY CATTLE FOUND ON THE FARMS

Description	Number	Per cent
Farms with no purebred dairy animals	17	34.00
Farms with one or more purebred animals	33	66.00
Total	50	100.00
Farms with 100% purebred herds (including registered and non-registered animals)	6	12.00
Animals on all farms being purebred	398	25.38

It appears that more emphasis should be placed on maintaining purebred dairy herds as opposed to maintaining grade herds. A comparison of 29,397 purebred dairy animals and 71,745 grade dairy animals of four breeds at the same age levels showed that the "purebreds excelled the grades 10.6

per cent in yearly milk production. The purebreds also excelled by 9.7 per cent in income over cost of feed."³ Purebred herds tend to show more profit when disposing of surplus stock as well as being of more personal satisfaction to the owner.

The average production per cow in this study was 7,178 pounds of milk and 304.5 pounds of butterfat. This is probably higher than one would find if all the cows in the service area were included. Many of the lowest producing herds in the area were eliminated from this study when the author was deciding upon the ones to be interviewed. The lowest average annual production per cow for any herd was 4,835 pounds of milk and 227 pounds of butterfat.

One herd produced an annual average of 13,489 pounds of milk and 445 pounds of butterfat per cow. The owner of this herd was acclaimed the Master Dairyman of Northeastern Oklahoma in 1952. This was the highest producing herd in this study.

Generally, according to dairy authorities, small dairy enterprises of the one-and two-man size, as found in this study, can be profitably operated. It appears that more emphasis should be placed on trying to get higher production per cow. The highest producing herd in this study, which consisted of 35 cows, produced 77 pounds of butterfat less per cow per year than did a herd of 1,000 cows, as is shown on page 22. This condition tends to show that several of the farmers in this study need to do a lot of improving in their whole dairy operations.

³McDowell, J. C., "Comparison of Purebred and Grade Dairy Cows,"
USDA Circ. No. 26.

TABLE IV
MILK AND BUTTERFAT PRODUCTION OF THE COWS ON THE 50 FARMS

Production of Milk and Butterfat	Pounds
Lowest Average Annual Pounds Milk per cow for any herd	4,835
Highest Average Annual Pounds Milk per cow for any herd	13,489
Average Annual Pounds Milk per cow for all cows in the study	7,178
Lowest Average Annual Pounds Butterfat per cow for any herd	227
Highest Average Annual Pounds Butterfat per cow for any herd	445
Average Annual Pounds Butterfat per cow for all cows in the study	304.5

2. Producing and Marketing of Milk

Table V indicates that 24 per cent of the farmers in this study sell Grade A milk while six per cent sell Grade B milk. Seventy per cent of the farmers sell Grade C milk. The Grade A milk market is limited and many farmers, too, are not willing to go to the expense involved in the production of Grade A milk.

TABLE V
GRADE OF MILK MARKETED ON THE 50 FARMS
INCLUDED IN THIS STUDY

Grade of milk marketed	Farmers Reporting	
	Number	Per cent
A	12	24.00
B	3	6.00
C	35	70.00
Totals	50	100.00

One farmer, or two per cent of those interviewed, had Grade A facilities, but was not using them. This farmer had disposed of a milking herd and was

raising a new herd of "Wisconsin Heifers," which will use the facilities in the near future.

Fifty-six per cent of the farmers in this study use milking machines, as is shown in Table VI. It also shows that 70 per cent of the farmers use hot water and chlorine to sterilize their milking equipment. Twenty per cent of the farmers sterilize with hot water only. Two per cent of the farmers use some kind of sterilization for their milking equipment while the remaining six per cent use cold water only.

TABLE VI
SANITATION PRACTICES USED ON THE FARMS STUDIED

Practice Used	Farmers Using the Practice	
	Number	Per cent
Wash udders before milking	27	54.00
Clip hairs from udders	11	22.00
Use a milking machine	28	56.00
Sterilize equipment with steam	1	2.00
Sterilize equipment with hot water only	10	20.00
Sterilize with hot water and chlorine	35	70.00
Sterilize with cold water and chlorine	2	4.00
Sterilize with cold water only	3	6.00

Fifty-four per cent of the farmers practice the washing of the cows' udders before milking, but only 22 per cent practice the clipping of hairs on the cows' udders.

It appears that there should be more emphasis placed on the preparing of the cow for being milked. More thorough cleaning of the milking equipment is also needed. Possibly the use of milking machines by more farmers would make for a more efficient operation in many cases.

Forty-four per cent of the farmers had milk rejected at the market during the year as is shown in Table VII. This would mean that only 56

per cent did not lose any milk. One farmer had 346 gallons of unmarketable milk. This was the largest amount reported by any one farmer. The 22 farmers reporting the rejection of milk each averaged having 43.5 gallons rejected.

TABLE VII
EXTENT TO WHICH MILK WAS REJECTED DURING THE YEAR
DUE TO SOURING OR OTHERWISE

Extent of Rejected Milk during year	Gallons Rejected	Farmers Reporting	
		Number	Per cent
Milk rejected during the year (all grades)	957	22	44.00
Average loss per farmer reporting	43.5	—	—
Greatest loss by any one farmer reporting	346	—	—

More emphasis needs to be placed on the use of better milking procedures, care of milking equipment, and care of the milk after it is milked.

Not all farmers know the months of the year that milk sells for the lowest or highest prices. This survey shows that four per cent of the farmers admitted that they do not know the time of the year when milk brings the highest or lowest prices. Six per cent realize that milk brings its lowest prices in the summer season, as shown in Table VIII. Fifty-four per cent of the farmers report that milk prices are highest in December, while 16 per cent report highest prices in October. September and November were both reported as being periods of highest prices by six per cent of the farmers responding. Four per cent report January as the month of highest prices, while August and February were both reported by two per cent each.

TABLE VIII

PERIODS REPORTED BY FARMERS THAT MILK BROUGHT HIGHEST AND
LOWEST PRICES PER HUNDRED POUNDS

HIGHEST MILK PRICES/CWT.			LOWEST MILK PRICES/CWT.		
Month	Farmers Reporting		Month	Farmers Reporting	
	Number	Per cent		Number	Per cent
August	1	2.00	March	1	2.00
September	3	6.00	June	41	82.00
October	8	16.00	July	2	4.00
November	3	6.00	August	1	2.00
December	27	54.00	November	1	2.00
January	2	4.00	Summer	2	4.00
February	1	2.00	Didn't Know	2	4.00
Winter	3	6.00		50	100.00
Didn't Know	2	4.00			
	50	100.00			

Table IX shows that the farmers in this study vary their morning milkings from 4:00 A.M. to 8:00 A.M., with the greatest number milking their cows at 6:00 A.M. The farmers vary their evening milkings from 4:00 P.M. to 8:00 P.M., with the greatest number milking their cows at 5:00 P.M.

TABLE IX

HOURS AT WHICH THE FIFTY FARMERS MILK

MORNING MILKING			EVENING MILKING		
Hour of Milking	Farmers Reporting		Hour of Milking	Farmers Reporting	
	Number	Per cent		Number	Per cent
4:00	2	4.00	4:00	2	4.00
4:30	-	---	4:30	1	2.00
5:00	7	14.00	5:00	20	40.00
5:30	6	12.00	5:30	7	14.00
6:00	19	38.00	6:00	15	30.00
6:30	5	10.00	6:30	2	4.00
7:00	10	20.00	7:00	2	4.00
7:30	-	---	7:30	-	---
8:00	1	2.00	8:00	1	2.00
	50	100.00		50	100.00

Table X indicates that 58 per cent of the farmers in this study milk their cows in the same building in which they store their hay. Ten per cent of the Grade A milk producers milk their cows in the same building in which they store their hay. It is becoming increasingly difficult, however, to get this type of set-up approved for the production of Grade A milk.

TABLE X
CHARACTERISTICS OF THE BUILDINGS USED AS A PLACE TO MILK

Characteristics	Farmers Reporting	
	Number	Per cent
Milk producers (Grades A, B, C) milking in same building in which hay is stored	29	58.00
Grade A milk producers milking in the same building in which hay is stored	5	10.00
Grade A milk producers milking in a different building to which hay is stored	8	16.00
Grade B and C milk producers milking in the same building in which hay is stored	24	48.00
Grade B and C milk producers milking in a different building to which hay is stored	13	26.00

Approximately 16 per cent of the Grade A milk producers milk their cows in a different building from that in which they store their hay. Twenty-six per cent of the Grade B and Grade C milk producers milk their cows in a different building from that in which they store their hay.

The approximate capital investments in buildings, milking equipment and feeding equipment are shown in Table XI. Ninety-four per cent of the farmers had barns. These barns ranged in value from a low of \$75 to a high of \$15,000. Sixty-four per cent of the farmers had loafing sheds for their cattle. These sheds were valued from a low of \$75 to a high of \$2,000.

TABLE XI

EXTENT OF CAPITAL INVESTMENTS IN BUILDINGS, MILKING EQUIPMENT,
AND FEEDING EQUIPMENT

Items in which money is invested	Farms Having		Investment (\$\$)		
	Number	Per cent	Highest	Lowest	Average
Barns with attached sheds	47	94	\$15,000.	\$75.	\$1,900.
Loafing sheds (Unattached to other bldgs.)	32	64	2,000.	75.	508.
Milk houses (Unattached to other bldgs.)	19	38	5,000.	50.	1,540.
Lots & Feeders	25	50	1,000.	10.	184.
Milking Machines	30	60	850.	65.	356.50
Milk Coolers	16	32	2,000.	75.	613.
Cans, utensils, strainers, etc.	50	100	325.	10.	\$1.75

Thirty-eight per cent of the farmers had milk houses which were separate from other buildings. These milk houses were strictly a place to milk. Four of the farmers, or eight per cent reported milk houses in the \$3,000 to \$5,000 value bracket, while the rest varied down to a low of \$50.

Fifty per cent of the farmers reported an investment in feeders and lots ranging in value from a low of \$10 to a high of \$1,000. Thirty-two per cent of the farmers reported capital investments in milk coolers ranging from a low of \$75 to a high of \$2,000. Sixty per cent of the farmers reported investments in milking machines ranging from a low of \$65 to a high of \$850. All the farmers reported investments in milk cans, utensils, strainers, etc. The investments ranged in value from a low of \$10 to a high of \$325 per farmer.

Investments in efficient and economical dairy equipment often prove very profitable. One of the most frequently used and greatest labor saving pieces of dairy equipment is the milking machine. Henderson, Larson and Putney makes the assertion,

That milking machines can be an asset to the dairy enterprise is hardly to be denied. It has the advantage that it saves labor and time and is easier on the milker. As far as quantity of milk is concerned, the milking machine seems to give just as good results as ordinary hand milking. It is the general practice for the hand milker to follow the machine in order to see that the milking has been done completely and to draw any milk that is left.

It has been claimed that the milking machine causes udder troubles. This, no doubt, was true with some of the older types of machines, but the newer machines are so constructed that when properly handled there is now little danger of such trouble.⁴

Some farmers are of the opinion that mechanical milkers do not do as thorough a job of milking as hand milking and that using a mechanical milker does not insure milk of low bacterial count. This may be true at times as Olson has pointed out. He says:

When mechanical milkers are properly operated as good a job of milking is done as by the average hand milker, but not as good as a good hand milker. Cows vary a great deal in the amount of milk left in the udder; hence trouble may result if they are not stripped.

Unless milking machines and all rubber parts are thoroughly cleansed and sterilized, the milk will be higher in bacteria than milk produced by hand milking.⁵

3. Records and Herd Management Practices

Table XII shows that 92 per cent of the farmers in this study keep breeding records, while only 20 per cent keep individual milk production records. Only eight per cent of the farmers keep official records of milk production.

⁴Henderson, H. O., Carl W. Larson, and Fred S. Putney, Dairy Cattle Feeding and Management, p. 248.

⁵Olson, T. M., Elements of Dairying, (New York, 1939), p. 43⁸.

TABLE XII

EXTENT TO WHICH PRODUCTION AND BREEDING RECORDS ARE KEPT

Records Kept	Farmers Reporting	
	Number	Per cent
Breeding Dates	46	92.00
Production Records on Individual Cows	10	20.00
D.H.I.A. or H.I.R. Records	4	8.00

Cornell University kept records on a dairy herd located on a farm near the University for one year. The herd was kept at the University Farm for the next two years, and the fourth year it was returned to the farm. With proper care and management, this herd produced a yearly average of 2695 pounds more milk and 132 pounds more fat at the University than it did on the farm. It was concluded that "the added effort was very profitable."⁶

When farmers question the possibility and practicability of raising the milk and butterfat production per cow for their herds they need to read some of the United States Department of Agriculture reports which Hervey so ably summarizes as follows:

Cows on Dairy Herd Improvement Association testing are now beating old milk and butterfat records. In 1948, cows on D.H.I.A. in the United States averaged producing 335 pounds of butterfat and 8,400 pounds of milk. In 1951, cows on D.H.I.A. in the United States averaged producing 370 pounds of butterfat and 9,195 pounds of milk. This was considerably above the 211 pounds of butterfat and 5,326 pounds of milk average production for all cows in the United States.⁷

Even though the production records are being raised the 1951 D.H.I.A. records for the United States are considerably lower than those of several

⁶Wing, H. H., and J. A. Ford, Cornell Exp. Sta. Bul. No. 222.

⁷Hervey, Cameron, "D.H.I.A. Cows Still Beating Old Records," Farm Journal, Jan., 1953, p. 42.

outstanding dairy farms. The Roger Jessup Certified Farms have three dairies in Southern California. One of these dairies, located at Glendale, had

1,000 milk cows which averaged 522 pounds of butter-fat and 14,000 pounds of milk per cow in 1951 on D.H.I.A. tests. California's high production records can be attributed to a ruthless test and slaughter program in which only the high producing cows are retained in the herd.⁸

The Bureau of Dairy Industry, which engineers the Dairy Herd Improvement Association program, points out that D.H.I.A. herds do better than most herds not on test because dairymen in the program: (a) "cull unprofitable cows from the herd; (b) feed the remaining cows according to their individual producing capacity; (c) and select the best animals in their herds as breeding stock."⁹

There are certain sections of the United States where dairy herds not on official testing may have records comparable to D.H.I.A. herds. This is due mainly to a long-time dairy program having been carried on there. In Michigan, "The cows on 499 dairy farms produced an average of 339 pounds of butterfat and 7,809 pounds of milk each during a one year period."¹⁰

The writer wishes to mention again that the farmers included in this study tend to use approved dairying practices* more than the average farmer in the area.**

⁸Combs, Wesley, "Dry Lot Dairying," The Farm Quarterly, Winter 1952, p. 56.

⁹Hervey, Cameron, "D.H.I.A. Cows Still Beating Old Records," Farm Journal, Jan., 1953, p. 44.

¹⁰Wright, K. T., and A. C. Baltzer, "Profitable Dairy Management," Michigan Special Bul., No. 297.

*Average Farmer—Is intended to mean, "any farmer included in the greatest number of farmers performing a task or practice in the same manner."

**Approved Practices—Is intended to mean, "those practices which are recommended by dairy specialists and those practices used by the dairymen who have gained recognition as being successful dairymen."

Table XIII shows that 22 per cent of the cows in this study freshen in September. Sixteen per cent of the cows freshen in February, 12 per cent in October, 10 per cent in January, and 10 per cent in March. Four per cent of the farmers report that they try to have the calving scattered throughout the year.

TABLE XIII

MONTH IN WHICH THE MAJORITY OF THE COWS IN THE HERD FRESHEN

Month	Farmers Reporting	
	Number	Per cent
January	5	10.00
February	8	16.00
March	5	10.00
April	4	8.00
May	2	4.00
June	3	6.00
July	-	-
August	2	4.00
September	11	22.00
October	6	12.00
November	-	-
December	2	4.00
Scattered Calving	2	4.00
Totals	50	100.00

It appears that most of the farmers in this study need to place more emphasis on having a greater majority of their cows freshening in the fall than they now have. According to Dr. Morrison, there are advantages in fall freshening of cows.

Fall fresh cows give a large flow of milk in the winter and then flush again with the stimulus of pasture in the spring. The difference in average annual yield of cows freshening in the fall and early winter and of those calving in the spring or summer has usually ranged from 11 per cent or more to only 2.5 per cent.¹¹

¹¹Morrison, Frank B., Feeds and Feeding, 21st Edition, (New York, 1950), p. 694.

Table XIV indicates that the cows in 50 herds averaged producing milk 303 days per year. Three hundred forty-seven days is the longest lactation period for any herd, while 275 days is the shortest.

TABLE XIV

PERIOD OF TIME GENERALLY ALLOWED PER LACTATION PERIOD
ON THE FARMS IN THIS STUDY

Lactation Period per Cow	Number of days reported
Longest	347
Shortest	275
Average	303

Sixty per cent of the farmers in this study, as shown in Table XV, allow their cows eight weeks of rest before freshening, while 24 per cent allow their cows six weeks of rest. Fourteen per cent have their cows dry four weeks, while two per cent have their cows dry only three weeks before freshening.

TABLE XV

AMOUNT OF REST GIVEN COWS BETWEEN LACTATIONS

Rest Period	Farmers Reporting	
	Number	Per cent
Three Weeks	1	2.00
Four Weeks	7	14.00
Six Weeks	12	24.00
Eight Weeks	30	60.00
Totals	50	100.00

Heavy milk production is a severe drain upon a dairy cow.

It is most important that a heavy producer, or a cow in poor flesh, be allowed two months to rest and store up materials

such as calcium and phosphorus which she may need in greater quantities than she can consume during the stress of heavy production. Very few cows need less than a six weeks dry period.¹²

Tables XVI and XVII show the practices generally followed during the freshening period. Seventy-two per cent of the farmers report that they feed grain during the period when the cows are dry. Only 48 per cent report that they feed laxative feeds prior to and just following calving.

TABLE XVI
CARE OF COW GENERALLY FOLLOWED PRIOR TO AND
JUST AFTER CALVING

Practice	Farmers Reporting	
	Number	Per cent
Feed grain during dry period	36	72.00
Feed laxative feeds prior to and just following calving	24	48.00
Wash cows' udders before calves suck	10	20.00

More emphasis needs to be placed on the proper feeding, care and management of the dry cows. The dry period is the only time that a milk cow has a chance to build up her body reserves.

About two weeks before the cow is due to freshen, the grain ration should be considerably reduced and at that time the cow should be fed a ration which will keep the bowels in a laxative condition. Corn should be removed from the ration and a mixture of equal parts of wheat bran and ground oats is often fed at this time with good results.¹³

Eighty per cent of the farmers do not bother to wash the cows' udders before letting the calves take their first milk. This may be one of the reasons why so many of the farmers report being bothered with calf scours.

¹²Henderson, H. O., Carl W. Larson, and Fred S. Putney, Dairy Cattle Feeding and Management, (New York, 1949), p. 131.

¹³Ibid., p. 131.

TABLE XVII
 TIME AT WHICH COWS ARE GENERALLY FIRST MILKED DRY
 AFTER CALVING

Cows Milked Dry	Farmers Reporting	
	Number	Per cent
Fourth Milking	13	26.00
Sixth Milking	10	20.00
Eighth Milking	23	46.00
According to condition of the udder	4	8.00
Totals	50	100.00

Forty-six per cent of the farmers report that generally the eighth milking is the first time their cows are milked dry after calving. Twenty-six per cent milk their cows dry at the fourth milking, while 20 per cent of the farmers milk their cows dry at the sixth milking after calving. Eight per cent report that it depends entirely upon the condition of the udder as to when the cow will first be milked dry.

4. Breeding

The breeding practices of a dairy farmer determine to a very large degree the success he will have with this enterprise. In Table XVIII it is shown that 76 per cent of the farmers have herd bulls. Of these herd bulls, approximately eighty-two per cent are purebred. This includes registered and non-registered individuals.

Thirty per cent of the farmers are using artificial insemination. One-third of the farmers who use artificial insemination use a beef type bull. Aberdeen Angus or Hereford is the breed generally used. The beef type bulls are used to breed the low producing individuals in the herd, while a dairy type bull is used to breed the higher producing individuals.

Forty per cent of the farmers who use artificial insemination breed to Guernsey bulls, 26 per cent breed to Holstein bulls, 20 per cent breed to Jersey bulls, while approximately 13.3 per cent breed to Aberdeen Angus or Hereford bulls.

TABLE XVIII
BREEDING PRACTICES ON THE 50 DAIRY FARMS
INCLUDED IN THIS STUDY

Practice	Per cent
Farmers owning a herd bull	76.00
Bulls which are purebred, of those reporting herd bulls (registered and non-registered)	81.58
Farmers using Artificial Insemination	30.00
Holstein semen used by those reporting	26.66
Guernsey semen used by those reporting	40.00
Jersey semen used by those reporting	20.00
Angus or Hereford semen used by those reporting	13.33
Of the farmers using Artificial Insemination who use beef-type bull for low producers and dairy-type bull for high producers	33.33

5. Calf Raising

The calf raising program is not to be slighted if one is to make a success of dairying. Table XIX shows that 38 per cent of the farmers in this study wean their heifer calves from the nurse cow at one to four days old. Generally, most of these heifers will receive whole milk or skim milk until about one month old and are then gradually worked on to grain, hay, and pasture.

Thirty-two per cent of the farmers report that they let their heifer calves nurse until six to eight weeks old before weaning them. Generally these calves receive skimmilk after being weaned from the nurse cows, and the ages at which they no longer receive milk will vary up to six months.

TABLE XIX

CALF RAISING PRACTICES EMPLOYED ON THE FIFTY FARMS STUDIED

Practice used by farmers	Farmers Reporting	
	Number	Per cent
Heifers weaned from nurse cow 1-4 days old	19	38.00
Heifers weaned from nurse cow 6-8 wks. old	16	32.00
Heifers given milk beyond 8 weeks old	15	30.00
	50	100.00
Use Milk substitutes to raise calves	10	20.00
Do not use milk substitutes to raise calves	39	78.00
Do not raise any calves	1	2.00
	50	100.00

Seventy-eight per cent of the farmers do not use commercial milk substitutes in their calf-raising programs. Twenty per cent of the farmers report that they use commercial milk substitutes in the raising of their calves. Only one farmer does not raise any calves. This farmer sells all his calves and buys all his herd replacements.

Most calves are affected with some form of scours during the early months of their lives. The extent of duration is a very important factor. Table XX shows that 20 per cent of the farmers in this study are often bothered with their calves having scours. Seventy-six per cent report that their calves are seldom bothered with scours, while two per cent report that their calves are always bothered, and two per cent report that they are never troubled with the disease.

The remedies generally used for calf scours by the farmers in this study are indicated in Table XXI. Forty per cent of the farmers use the sulfa drugs, while 32 per cent reduce feeds, 14 per cent vaccinate, ten per cent give vitamins, six per cent use raw eggs, and four per cent use epsom salt.

TABLE XX
 FREQUENCY OF CALF SCOURS REPORTED BY THE FARMERS
 INCLUDED IN THIS STUDY

Calf Scours Frequency	Farmers Reporting	
	Number	Per cent
Seldom	38	76.00
Often	10	20.00
Always	1	2.00
Never	1	2.00
Totals	50	100.00

TABLE XXI
 REMEDIES USED FOR CALF SCOURS
 (alone or in combination)

Remedy Practiced	Farmers Reporting	
	Number	Per cent
Reduce Feed	16	32.00
Sulfa Drugs	20	40.00
Vitamins	5	10.00
Raw Eggs	3	6.00
Vaccinate	7	14.00
Epsom Salts	2	4.00
Tanic Acid	1	2.00
Nutmeg	1	2.00
Soot and Salt	1	2.00
Bicarbonate of Soda	1	2.00
Native Pecan Tea	1	2.00
Castor Oil	1	2.00
B.K. disinfectant solution	1	2.00
Commercial Powder	1	2.00
Legear's Capsules	1	2.00
Vinegar and Water (50:50)	1	2.00

Several of the farmers use remedies other than those mentioned on the preceding page. Many have their own personal ideas about calf scours. Several of the farmers use one remedy and follow up with another remedy; for example, reduce feeds and give sulfa drugs.

According to Olson, ordinary scours, or that due to indigestion, is often caused by the following:

1. Feeding of milk which is too cold, slightly sour, or containing a large number of bacteria.
2. Dirty utensils.
3. Feeding too much milk, and not feeding regularly.
4. Dirty pens or quarters.
5. Allowing calves to suck each other after drinking their milk.
6. Feeding of spoiled or moldy feed, particularly silage.¹⁴

The outlets for bull calves are somewhat limited as compared to those for heifer calves. In this study 44 per cent of the farmers report that they sell their bull calves at from one to ten days old. Table XXII also shows that 44 per cent of the farmers "veal" their bull calves.

TABLE XXII
METHODS EMPLOYED FOR DISPOSING OF BULL CALVES

Bull Calves Sold	Farmers Reporting	
	Number	Per cent
One to 10 days old	22	44.00
As veals	22	44.00
Older than veals	5	10.00
Combination of the above	1	2.00
Totals	50	100.00

Ten per cent of the farmers report that they keep their bull calves and market them at older ages than for veals. Many of these bull calves are made into steers and sold as feeder steers, and some are even kept and sold as grass fat steers.

One farmer reports the use of a combination of the above-mentioned practices. He tries to keep his operations flexible enough to change anytime that he thinks will work to his advantage.

¹⁴Olson, T. M., Elements of Dairying, (New York, 1939), p. 418.

6. Herd Replacements

According to Table XXIII, 56 per cent of the farmers raise all of their female herd replacements. Only four per cent report buying all of their female herd replacements. Forty-four per cent of the farmers buy approximately 33.6 per cent of their replacements.

TABLE XXIII

PRACTICES EMPLOYED RELATIVE TO HERD REPLACEMENTS

Practice used	Farmers Reporting	
	Number	Per cent
Replace cows at 4 years average age	1	2.00
Replace cows at 6 years average age	11	22.00
Replace cows at 8 years average age	21	42.00
Replace cows at 10 years average age	9	18.00
Replace cows at 12 years average age	4	8.00
Haven't made any replacements	2	4.00
Replace cows "Just According"	2	4.00
	50	100.00
Raise all their replacements*	28	56.00
Buy all their replacements	2	4.00
Replace at least part by buying	22	44.00
Average extent of buying replacements by those reporting	--	33.60

*Disregarding the buying of bulls

Forty-two per cent of the farmers report that their cows average leaving the herd at eight years old. Twenty-two per cent of the farmers report that their cows average leaving the herd at six years old, while 18 per cent of the farmers report that their cows leave the herd at ten years old.

Four per cent of the farmers haven't been dairying long enough to have done any replacing. Four per cent of the farmers report that they replace their cows "according to their health and the way they produce."

Most cows are removed from the herd because of "udder trouble, failure to breed, or other causes before their yield is much reduced by old age. Usually there is no marked decline in yield until twelve years of age, if the cow is in good health."¹⁵

It appears that there is a relationship between the goal a farmer sets and the age at which cows leave the herd. It appears that the higher the goal the sooner the cows will be replaced; for example, A farmer striving to have a herd that produces 400 pounds of butter-fat per year will replace his cows at an earlier age, generally, than a farmer content with a 250 pound herd.

Thirty-two per cent of the farmers in this study practice the raising of bull calves to sell to other farmers as herd replacements, as is shown in Table XXIV. Twenty per cent of the farmers report the raising of heifers or cows to sell to other farmers for herd replacements.

TABLE XXIV
EXTENT TO WHICH BREEDING STOCK IS RAISED
AND SOLD AS BREEDING STOCK

Farmers who raise	Farmers Reporting	
	Number	Per cent
Heifers or cows to sell as replacements	10	20.00
Bulls to sell as replacements	16	32.00

7. Feeding the Herd

As feed costs constitute about one-half the expense of producing milk, it is important that serious thought be given to the feeding practices. Table XXV shows that only two per cent of the farmers in this study report twelve months of pasture for their herd. Eight per cent report ten months of pasture, and 16 per cent report having nine months. This means that

¹⁵Morrison, Frank B., Feeds and Feeding, 21st Edition, (New York, 1950), p. 694.

20 per cent of the farmers do not have as much as six months of pasture for their herds, while 80 per cent have more than six months of pasture.

It appears that not enough importance is placed on providing, as nearly as possible, a year around pasture.

TABLE XXV
ESTIMATED NUMBER OF MONTHS OF GOOD PASTURE
ON THE FIFTY FARMS STUDIED

Months of Pasture	Farmers Having	
	Number	Per cent
3	1	2.00
4	2	4.00
5	7	14.00
6	10	20.00
7	11	22.00
8	6	12.00
9	8	16.00
10	4	8.00
12	1	2.00
Totals	50	100.00

Table XXVI indicates that 20 per cent of the farmers in this study plant some kind of temporary summer pasture for their cattle. Twenty-four per cent of the farmers plant Sudan grass, while two per cent of the farmers plant a Sudan grass and soybean mixture for summer pasture. This would mean that 92.3 per cent of those who reported the planting of temporary summer pasture planted Sudan grass.

Sixteen per cent of the farmers try to plant a half acre of temporary pasture per head, while 10 per cent of the farmers try to plant one acre of temporary pasture per head. This means that 61.5 per cent of the farmers who plant temporary summer pasture try to plant a half acre per head, while the remaining 38.5 per cent plant one acre per head.

TABLE XXVI

EXTENT TO WHICH FARMERS PLANT TEMPORARY SUMMER PASTURE

Temporary Summer Pasture Planted	Farmers Reporting	
	Number	Per cent
Some kind of temporary summer pasture	13	26.00
Sudan grass for temporary pasture	12	24.00
Sudan grass and soybean mixture for pasture	1	2.00
One-half acre of temporary pasture per head	8	16.00
One acre of temporary pasture per head	5	10.00

It appears that temporary summer pastures are looked upon as of minor importance in this area. More emphasis needs to be placed on providing a temporary summer pasture for their dairy cattle.

Tables XXVII and XXVIII show that 76 per cent of the farmers in this study plant some kind of winter pasture. Fifty-two per cent of the farmers plant rye, 20 per cent plant winter oats, 32 per cent plant wheat, while 12 per cent plant barley for winter pasture. Over one-half of the farmers, or 58 per cent, plant vetch in their winter pastures. It appears that more emphasis needs to be placed on providing winter pastures for their dairy cattle.

TABLE XXVII

EXTENT TO WHICH FARMERS PLANT SMALL GRAINS FOR WINTER PASTURE

Farmers who plant	Number Farmers Planting	Largest Acreage Planted	Smallest Acreage Planted	Acres Per Cow* Planted
Some kind of winter pasture	38	190	5	1.31
Rye for pasture	20	100	4	0.82
Winter Oats for pasture	10	40	3	0.59
Barley for pasture	6	50	10	0.56
Wheat for pasture	16	100	4	1.26
Vetch** in winter pasture	29	100	5	1.03

* Mature cows and heifers over one year old.

** Vetch is not a small grain.

TABLE XXVIII

ACREAGE DISTRIBUTION OF DIFFERENT SMALL GRAIN WINTER PASTURES
ON THE 38 FARMS REPORTING

Farmer Number	Winter pastures and acreages planted			
	Rye	Winter Oats	Wheat	Barley
1	15*			
2	55*			
3	6*	3		
4	32*		40	
5	10*			
6		5*		
7	10		12	
8	10			
9			15	
10	20*		20*	
11	22*			
12				10*
13			100	
14	12*		20	
15			6*	
16	4	12		
17	30			
18		8*		
19			40*	
20	7*		15	
21	45*	40*	55*	50*
22	9		20	
23	12*	10	4	20
24	10*		28	
25		15*		35
26	11		7	
27	20*			
28		10*		
29	20*			
30			10	
31			20*	
32		25		
33	30*			
34	30*			
35	20*	20*	20*	20*
36	100*			
37	22*			
38	22*			11

* Planted in combination with vetch.

Acreages of any one crop for winter pasture per farmer range from a low of three acres to a high of 190 acres. Acreages of winter pastures planted range from a low of 0.56 acres to a high of 1.31 acres per head. This includes mature cows and heifers over one year old.

Table XXIX shows that 42 per cent of the farmers in this study have silos. It also shows that all the farmers are using their silos. Thirty per cent of the farmers report having trench silos, while 16 per cent have upright silos. This would mean that four per cent of the farmers have both trench and upright silos.

TABLE XXIX
KIND OF SILOS USED, AND KIND AND AMOUNT OF SILAGE MADE

Farmers that	Farmers Reporting		Tons Ensiled
	Number	Per cent	
Have silos (all types)	21	42.00	
Use their silos (those who have silos)	21	100.00	
Have trench type silos	15	30.00	
Have upright type silos	8	16.00	
Farmers that ensile corn only	9	18.00	
Farmers that ensile sorgo only	1	2.00	
Farmers that ensile both corn and sorgo	11	22.00	
Farmers that ensile other crops	—	—	
Ensile the greatest tonnage of silage			400 tons
Ensile the smallest tonnage of silage			35 tons
Average silage stored per farm reporting			167 tons

Eighteen per cent of the farmers ensile corn only, while two per cent ensile sorgo only, and 22 per cent ensile both corn and sorgo. This would mean that 52.4 per cent of those reporting silage operations make silage from both corn and sorgo, while the others practice the ensiling of one crop only.

The amount of silage stored ranges from a low of 35 tons to a high of 400 tons per farmer reporting the making of silage. The average amount of silage stored per farmer reporting was 167 tons.

It appears that more emphasis needs to be placed on storing more silage than is presently being stored. This would be a means of providing cheap, succulent feed and, to a certain extent, hedging against drouth periods.

Table XXX shows that 42 per cent of the farmers in this study feed all legume hay, while 8 per cent feed no legume hay. Fifty per cent of the farmers feed mixed hays. The mixed hays the farmers are feeding contain approximately 54.1 per cent legumes.

TABLE XXX
CHARACTERISTICS OF THE HAYS FED ON THE 50 FARMS
INCLUDED IN THIS STUDY

Hays Fed	Farmers feeding these hays	
	Number	Per cent
All legume hays	21	42.00
No legume hays	4	8.00
Mixed hays (legume and grass)	25	50.00
	50	100.00
Estimated average legumes in the mixed hays		54.10

Table XXXI shows that 48 per cent of the farmers buy all of their mixed feeds, while 46 per cent buy part of their mixed feeds. The six per cent of the farmers who buy no mixed feeds mix all the feeds they feed and produce most of the feeds going into these mixed feeds.

Fifty-eight per cent of the farmers who buy mixed feeds prefer those which contain 16 per cent protein. Thirty-four per cent prefer to buy the 18 per cent protein dairy feeds, as is shown in Table XXXII.

TABLE XXXI
 EXTENT TO WHICH FARMERS PURCHASED MIXED FEEDS
 ON THE 50 FARMS

Feed purchased	Farmers Reporting	
	Number	Per cent
Part	23	46.00
All	24	48.00
None	3	6.00
Totals	50	100.00

TABLE XXXII
 PROTEIN CONTENT OF MIXED FEEDS PURCHASED BY THE FARMERS
 INCLUDED IN THIS STUDY

Protein Content	Farmers Reporting	
	Number	Per cent
12 per cent	2	4.00
15 per cent	2	4.00
16 per cent	29	58.00
18 per cent	17	34.00
Totals	50	100.00

Dr. Morrison of Cornell University gives advice on buying mixed feeds when he says: "(1) Feeds with flexible formulas are usually the best buy. Be wary of the formula that never changes. (2) It pays to read that feed tag. (3) Learn the reputation of the different feed manufacturers."¹⁶

When one is deciding the percentage of protein the grain ration should contain while cows are on a limited to average pasture, Dr. Seath suggests that the following rules be followed:

¹⁶Morrison, Frank B., "How to Buy Mixed Feeds," Farm Journal, January, 1951, p. 89.

(1) Where only legume hay of good quality is fed free choice, the grain mixture needs to contain but 12 per cent total protein; (2) When a limited amount of good legume hay is fed along with other roughage, there should be around 15 or 16 per cent total protein in the grain ration; and (3) When there is no legume hay in the roughage allowance, the grain mixture should contain from 18 to 20 per cent total protein.¹⁷

One may expect many different effects from abnormal and unusual rations. The Illinois Experiment Station reports: "Cows fed low protein rations produced one-third less milk, had poorer health, had less fleshing, and future production was reduced."¹⁸

At the Cornell Experiment Station, the production of cows fed a 24 per cent protein grain mixture, a 20 per cent protein grain mixture, and a 16 per cent protein grain mixture were compared. All cows were fed mixed hay and corn silage. The 16 per cent ration furnished sufficient protein for maintenance and 127.8 per cent of the protein required for production of milk. All cows were fed one pound of concentrates to each three and one-half pounds of milk produced. The conclusion drawn from this study was that for economical milk production it is usually best to feed somewhat near the minimum requirements.¹⁹

The effects of good feeding is shown by a Maryland experiment where a herd of eight cows was kept under observation on a farm near the experiment station for one year. The following year the same animals were kept at the station, where a good feeding system was followed. There was an average increase of 10 to 51 per cent in the milk produced per cow per day.²⁰

¹⁷Seath, Dwight M., "Feeding with a Shortage of Feeds," The Kentucky Farmer, p. 15.

¹⁸Fraser, W. J., and C. C. Hayden, "Balanced vs Unbalanced Rations for Dairy Cows," Ill. Exp. Sta. Bul. No. 159.

¹⁹Harrison, E. S., and E. S. Savage, "The Effect of Different Planes of Protein Intake Upon Milk Production," Cornell Exp. Sta. Bul. No. 540.

²⁰Maryland Exper. Sta. Bul. No. 389.

Table XXXIII shows that 92 per cent of the farmers feed their cows grain when they are on fairly good pasture. Fifty-four per cent of the farmers feed grain according to the production of the cows when they are on pasture, while 62 per cent feed grain according to production when the cows are off pasture.

TABLE XXXIII

PRACTICES EMPLOYED IN THE FEEDING OF ROUGHAGES AND GRAIN WITH COWS
ON AND OFF PASTURE (Assumed pasture pretty good)

Feeding Practice	Farmers Using Practice	
	Number	Per cent
Grain when on pasture	46	92.00
Grain according to production when on pasture	27	54.00
Grain according to production when off pasture	31	62.00
Hay when on pasture	10	20.00
Hay according to body weight or production	12	24.00
Hay free-choice when on or off pasture	4	8.00
Silage when on pasture	1	2.00
Silage when not on pasture	21	42.00

Twenty per cent of the farmers feed hay when their cows are on fairly good pasture. Twenty-four per cent feed hay according to production, whether their cows are on or off pasture, while 8 per cent feed hay free-choice whether cows are on or off pasture. Only 2 per cent of the farmers feed silage when their cows are on pasture, while 42 per cent feed silage when their cows are not on pasture.

It appears from this study that more emphasis should be placed on feeding the grain, hay and silage in relation to the production of the cow and the value of the pasture. Pasture is not a concentrate and it is impossible for heavy milking cows to consume sufficient pasture to furnish the necessary nutrients for their milk production.

Even the best pastures will furnish only enough nutrients for cows producing from 20 to 30 pounds of milk per day. The amount of milk that is being produced, the test of the milk, and the size of the cows are the important factors which determine the amount of feed that a cow needs and will consume.²¹

Dr. Seath verifies the importance of feeding in relation to milk production when he says,

Liberal feeding of dairy cows capable of high production is always more profitable than when such cows receive scanty amounts of feed. For example, a 1,000 pound cow capable of producing 30 pounds of four per cent milk on a full ration, will only produce 15 pounds of milk on a three-fourth ration. This is a case of receiving 100 per cent more milk from feeding thirty-three and one-third per cent more feed; which is definitely an economical practice.

Where there is a shortage of feed, as is especially true during and following a drouth, it is advisable to first make sure that one culls the lower producing cows and then practices a liberal feeding schedule for those remaining in the herd.²²

Table XXXIV indicates that 24 per cent of the farmers provide salt alone free-choice as the mineral for their cattle. Twenty-two per cent of the farmers provide a one part bone meal, one part salt, and a one part calcium mineral mixture for their cattle; while 34 per cent provide Stockade free choice. Vit-A-Way commercial mineral mixture was provided free-choice by eight per cent of the farmers. Four per cent of the farmers provide other commercial mineral mixtures not mentioned, while eight per cent do not provide any minerals for their herd free-choice.

It appears that the farmers are not economizing on minerals as much as is possible. Possibly the one part bone meal, one part salt, and one part calcium mixture would be the most economical and practical for this area. Sufficient kinds and amount of mineral should definitely be provided free-choice.

²¹Henderson, H. O., Carl W. Larson, and Fred S. Putney, Dairy Cattle Feeding and Management, (New York, 1949), p. 221.

²²Seath, Dwight M., "Feeding With a Shortage of Feeds," The Kentucky Farmer, Vol. 88, No. 11, Dec. 1952, p. 15.

In regard to what minerals should be included in the mixture, Maynard says, "Practically all of the animal husbandmen in this country recommend simple mineral mixtures, instead of complex preparations."²³

TABLE XXXIV

KINDS AND PROPORTIONS OF MINERALS SUPPLIED FREE-CHOICE
ON THE FIFTY FARMS

Minerals fed free-choice	Farmers Reporting	
	Number	Per cent
Salt alone	12	24.00
Vit-A-Way commercial mixture*	4	8.00
1:1:1 Mineral Mixture**	11	22.00
Stockade Commercial Mixture***	17	34.00
Other Commercial Mixtures	2	4.00
None	4	8.00
Totals	50	100.00

* Closed Formula.

** 1 part Phosphorus, 1 part Calcium, 1 part Salt.

*** Calcium 25%; Phosphoric Acid 2.7%; Phosphorus 1.3%; Salt 20%; Protein 1.5%; Iodine .06%; (Potassium Iodine, Iron Oxide, Manganese Sulphate, Irradiated Yeast, Cane Black Strap Molasses, and Corn Oil Cake Meal 49.4%)

Table XXXV shows all the combinations of feeds mixed by the 27 farmers who mix their own feeds. Approximately 81.5 per cent of the farmers who mix their own feeds use corn and cob meal. Oats is found in 74.1 per cent of the home mixed rations. Forty-eight per cent of the farmers use soybean meal in their home-mixed rations, while 37 per cent use cotton seed meal.

Forty-eight per cent of the farmers in this study add salt when they are mixing their own grain rations. Only 3.7 per cent in each case reported the feeding of barley or ground soybean hay. Fourteen and eight-tenths

²³ Maynard, L. A., Animal Nutrition, 2nd Edition, (New York, 1937), p. 189.

TABLE XXXV

CHARACTERISTICS OF CONCENTRATE FEEDS GROUND AND MIXED BY THE 27 FARMERS REPORTING

Feed Constituent	Farmer Number													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Barley														
Corncob Meal		400	700			200	100	200	300		100	600	250	250
Corn				600	200									
Oats	300	200	320	200	200		100	300	200		100		250	250
Wheat Bran		200	300			100	100		200	100		250		
Grain Sorg.	300				200		100						250	
Soy. Meal		50	100	100		15		75	100					200
Cotton S. M.	50	100	100	100	100	15	25							
Linseed Meal			150			5								
Salt		10	25		10				10			6	10	10
Omolas & Min.		50	100									11		
Wheat			300											
Vit-A-Way			50											
Dairy Feed 32% Shorts										100				
Dairy Feed 18% Grd. Soy Hay										100	200			250
Per Cent														
Dig. Protein*	10.5	11.8	13.5	12.8	11.5	10.6	10.5	11.0	12.4	14.2	10.9	7.7	8.1	15.7
Per Cent														
T.D.N.*	74.7	70.4	65.1	76.9	75.8	71.5	72.5	70.9	71.6	72.2	73.3	71.2	68.1	73.6
Per Cent														
Total Pro.*	13.3	15.2	16.7	15.9	14.6	13.4	13.2	14.2	15.5	17.2	13.8	10.0	10.9	18.6

CHARACTERISTICS OF CONCENTRATE FEEDS GROUND AND MIXED BY THE 27 FARMERS REPORTING

Feed Constituent	Farmer Number												
	15	16	17	18	19	20	21	22	23	24	25	26	27
Barley			720										
Corn						600							
Corn Meal	250	400	700	700	300		400	700	100	610	250	750	500
Oats	250	200	480		200	600	300				250	750	500
Wheat Bran		200	200	200	200	600			50	225			500
Grain Sorg.							200						
Soy. Meal		50	100	200	100	300	200						
Cotton S. M.		100						100		78			
Linseed Meal										78			
Salt		10			10		11	8	12	10			
Omolas & Min.		50											
Wheat													
Vit-A-Way							22						
Dairy Feed 32% Shorts	100										100	500	500
Dairy Feed 18% Grd. Soy Hay													
Per Cent													
Dig. Protein*	10.5	11.4	9.7	12.6	14.9	13.8	12.7	8.7	8.1	11.3	10.5	12.0	12.9
T.D.N.*	72.2	70.4	73.2	73.1	71.6	73.3	74.5	72.9	71.2	71.9	72.2	72.5	71.4
Total Pro.*	13.4	15.2	12.5	15.8	15.5	17.0	15.8	11.6	10.5	14.2	13.4	15.2	17.1

* Using Morrison's Feeding Standards, all combinations of concentrate feeds mixed by the 27 farmers reporting were evaluated as to the percentages of Digestible Protein, Total Digestible Nutrients, and Total Protein.

per cent of the farmers use 32 per cent dairy feed as a part of their home-mixed ration, while 7.4 per cent of the farmers use 18 per cent dairy feed in their home-mixed rations.

One home-mixed ration contained only 7.7 per cent digestible protein and 10.0 per cent total protein. One ration had 15.7 per cent digestible protein and 18.6 per cent total protein. These were the extremes. The total digestible nutrient percentages varied from 65.1 to 76.9.

Several of the farmers in this study either mix rations which are too low or too high in per cent of digestible protein, total digestible nutrients, or total protein content. More emphasis needs to be placed on feeding more economically.

The importance of properly feeding dairy animals was shown in an experiment at the Wisconsin Experiment Station, where sixteen cows were fed heavy and normal rations to see if heavy feeding was profitable. The normal rations averaged 81.8 pounds of dry matter for each 100 pounds of milk. The heavy rations averaged 110 pounds of dry matter for each 100 pounds of milk. It was concluded that it was unprofitable to feed cows more than a medium amount of grain unless they were animals with marked dairy tendencies.²⁴

At the Illinois Experiment Station one group of ten cows was fed balanced rations. A second group of ten cows received rations low in protein. After nineteen weeks of this treatment, the cows receiving the balanced rations had produced approximately one-third more milk than those receiving the low protein rations. The cows that received the balanced rations were in better physical condition and had good flesh. The unbalanced ration group were poorer and their future production was reduced.²⁵

²⁴Woll, F. W., Wisconsin Experiment Sta. Bul. No. 116.

²⁵Fraser, W. J., and C. C. Hayden, "Balanced vs. Unbalanced Rations for Dairy Cows," Illinois Exp. Sta. Bul. No. 159.

8. Health and Sanitation

The health of a farmer's herd is very important. If he should neglect certain practices, he may be faced with large bills for a veterinarian or he may be wiped out of business. It may even mean endangering the health of his family.

The good herdsman is constantly on the lookout for such conditions as the cow off feed, showing a rough coat, failing in milk production, failing to settle, not chewing her cud, droppings of wrong consistency, bloated appearance, a hard quarter, irregular breathing, physical injuries, signs of aborting, just to name a few. Dairy animals are no different than other classes of livestock. They cannot produce to capacity or are they as efficient if in an unhealthy condition.

Table XXXVI shows 80 per cent of the farmers as never being bothered with blackleg disease in their herds. The remainder of the farmers said they were seldom bothered with blackleg.

Sixty per cent of the farmers are never bothered with bloat in their dairy herds, while 40 per cent are seldom bothered with bloat. Seventy-four per cent of the herds in this study are seldom bothered with milk-fever, while the remaining 20 per cent are never bothered with milk-fever.

Thirty-two and six-tenths per cent of the farmers in this study whose cows are bothered with milk fever treat the cases themselves, while 78.4 per cent call the veterinarian or vocational agriculture instructor in the community for assistance. Eight and one-tenth per cent rely on the services of both the veterinarian and agriculture instructor to treat their milk fever cases.

Table XXXVII indicates that 54 per cent of the farmers in this study test their cows regularly for Bang's Disease and dispose of the positive

reactors. Forty per cent of the farmers vaccinate their calves in an effort to minimize the losses due to Bang's Disease. From a financial standpoint, more emphasis needs to be placed on calfhood vaccination. Dr. Rich says, "Bang's Disease is probably the cause of a greater financial loss than any other disease in the United States. It is responsible for approximately 85 per cent of all abortions in cattle."²⁶

TABLE XXXVI

EXTENT OF MILK FEVER, BLACKLEG, AND BLOAT ON THE FIFTY FARMS
AND PERSONS WHO TREAT SICK ANIMALS

Ailments reported and persons treating animals	Farmers Reporting	
	Number	Per cent
Never bothered with Blackleg	43	86.00
Seldom bothered with Blackleg	7	14.00
	50	100.00
Never bothered with Bloat	30	60.00
Seldom bothered with Bloat	20	40.00
	50	100.00
Never bothered with Milk-Fever	13	26.00
Seldom bothered with Milk-Fever	37	74.00
	50	100.00
Farmers who treat milk fever themselves of those reporting cases	8	21.60
Farmers who call the Vet. or Voc. Ag. Instr. of those reporting cases	29	78.40
	37	100.00
Farmers who use services of both Vet. and Voc. Ag. Instr. to treat milk fever cases	3	8.10

Bang's Disease may be eradicated from the herd, according to Henderson, Larson and Putney, but using the following methods with the strictest care:

²⁶Rich, T. D., Cornell Veterinarian, Vol. 21, 1931, pp. 15-24.

1. Have the entire herd tested at frequent intervals to determine which animals carry the disease germ, and dispose of all reacting animals that are not of special value.
2. Three weeks before any reacting animal is due to freshen, or at the first sign of an abortion, remove the animal to a separate barn and keep her so isolated until all discharge has disappeared after freshening. This will be at least six weeks.
3. Destroy all dead calves and after-births by burning or burying deeply. If the cow has aborted in the barn, thoroughly disinfect the stall where she stood.
4. Have separate attendant for such cows, or have the attendant wear different clothes when caring for them, so that the infection will not be carried on the clothes or shoes from one barn to another.
5. Before returning the cow to the regular barn be sure that she has no discharge and give her a thorough washing with some disinfectant.
6. Take care that no manure or refuse from the stall of the isolated animals is placed where the other cows can have access to it.
7. If it is not possible to have the herd tested, treat all animals in an infected herd as if they had the infection.

No medicine has been found that has proved successful in the control of Bang's Disease. Control measures are confined entirely to herd management and sanitation.²⁷

TABLE XXXVII

SANITATION AND HEALTH PRACTICES USED RELATIVE TO
MASTITIS AND BANGS DISEASES

Practice Followed	Farmers Reporting	
	Number	Per cent
Test and dispose of positive "Bangs" reactors at regular intervals	27	54.00
Vaccinate calves for Bangs	20	40.00
Never have Mastitis	6	12.00
Seldom have Mastitis	41	82.00
Often have Mastitis	3	6.00
Use a Strip Cup	9	18.00

²⁷Henderson, H. O., C. W. Larson, and F. S. Putney, Dairy Cattle Feeding and Management, p. 417.

Eighty-two per cent of the farmers report that their cows seldom have mastitis while six per cent report that they are never bothered with mastitis and six per cent report that their cows often have mastitis. This study shows that 18 per cent of the farmers use a strip cup before milking.

It should be every farmers' objective to detect mastitis at an early stage. Too few of the farmers try to prevent mastitis and Bang's Disease as much as they should.

Petersen says that "most cases of mastitis are due to injuries to the udder or teats, cold damp stalls, exposure to cold, and other factors tending toward poor general health of the cows."²⁸

Morrison recommends that,

Care be taken not to spread mastitis by the use of a milking machine. The teat cups should be rinsed and then dipped in chlorine solution before being placed on the next cow. Cows having mastitis should always be milked last.²⁹

9. Miscellaneous

Many farmers will look after the large problems that need solving, neglecting the smaller ones. Often the seemingly unimportant problems are the most important. They may mean the difference in profit or loss for the enterprise.

In this study, as shown in Table XXXVIII, 84 per cent of the farmers mow their pastures to help control weeds. Sixty-eight per cent of the farmers provide loafing sheds for their cattle.

Experiments at the North Dakota Experiment Station show that, "the milk production of cows housed in a partially open shed, free from drafts, was as great as when they were housed in an ordinary stable."³⁰

²⁸Petersen, W. E., Dairy Science, (New York, 1939), p. 399.

²⁹Morrison, Frank B., Feeds and Feeding, p. 729.

³⁰Dice, James R., "Some Effects of Types of Shelter Upon Dairy Cattle," N. D. Exp. Sta. Bul. No. 344.

TABLE XXXVIII

MISCELLANEOUS PRACTICES PERTAINING TO THE DAIRY HERD

Practice	Farmers Reporting	
	Number	Per cent
Mow pastures to control weeds	42	84.00
Provide loafing sheds for cattle	34	68.00
Remove chill from water in winter	16	32.00

In a national survey of requirements for dairy barns, it was concluded that stable temperatures not lower than 35 degrees Fahrenheit to 45 degrees Fahrenheit were satisfactory in winter and the barn should be ventilated to hold the relative humidity below 75 per cent under average weather conditions and 85 to 90 per cent on extremely cold days.³¹

Thirty-two per cent of the farmers provide water for their dairy animals with the chill taken off during the winter season. The importance of having the chill removed was brought out in an experiment at the Iowa station where they found that,

Dairy cows watered by means of water bowls in the barn consumed approximately 18 per cent more water and yielded 3.5 per cent more milk than cows watered twice per day at outside tank. In very cold weather the cows will drink more water if it is slightly warmed. Except for very heavy producers, this will seldom pay. Ordinarily, if the water is given in the barn there will be no advantage in warming it.³²

Table XXXIX shows a few of the problems encountered by the 50 dairymen in this study. Forty-eight per cent report their greatest problem to be that of shortage of pastures. Forty per cent report feed costs, while 34 per cent report the problem of keeping good hired labor.

³¹Miller, Edick, Ashby, Dawson, and Woolard, U.S.D.A. Circ. No. 722.

³²Cannon, C. Y., E. N. Hansen and J. R. O'Neal, "The Use of Water Bowls in the Dairy Barn," Iowa Exp. Sta. Bul. No. 292.

TABLE XXXIX

PROBLEMS OF GREATEST IMPORTANCE MENTIONED BY THE 50 FARMERS
(either alone or in combination)

Problems Mentioned Most	Farmers Reporting	
	Number	Per cent
Shortage of Pastures	24	48.00
Feed Costs	20	40.00
Shortage and high costs of Roughages	17	34.00
Keeping good hired labor	8	16.00
Mastitis	3	6.00
Providing clean water	3	6.00
Breeding Troubles	3	6.00
Trying to increase efficiency of operation	2	4.00
Buying replacements	1	2.00
Calf Scours	1	2.00
Getting cattle to eat enough	1	2.00
Milk souring	1	2.00
Getting cows bred for fall freshening	1	2.00

Six per cent in each case report mastitis, providing clean water, and breeding troubles as their greatest problems with the dairy herd. Four per cent report that trying to increase the efficiency of the dairy enterprise is their greatest problem.

Two per cent of the farmers in each case report buying replacements, calf scours, getting cattle to eat enough, milk souring, and getting cows bred for fall freshening as the problems of greatest importance on their farms.

Many of the problems reported as rather serious by the farmers in this study might be overcome if more time was spent in analyzing the cause and then trying to eliminate this cause.

In answer to the question, "Do you think dairying should be encouraged (promoted) in this community?" all 50 farmers, or 100 per cent, say "yes." The majority became quite enthusiastic when answering this question.

There are several important factors which materially reduce the cost of milk production. Dr. Morrison summarizes them as follows:

1. Maintain large average yearly yields of milk.
2. Provide balanced rations.
3. Provide a liberal but not wasteful amount of feed.
4. Provide low-cost rations throughout the year.
5. Maintain a herd of sufficient size.
6. Maintain herd health and avoid heavy depreciation.
7. Practice efficient use of labor.³³

Regularity and kindness are even more important with dairy cows than with other farm animals. Haecker stresses the importance when he says,

If you so handle the cows that they are fond of you, you have learned one of the most important lessons that lead to profitable dairying..... A cow's affection for the calf prompts the desire to give it milk; if you gain her affection she will desire to give you milk.³⁴

³³Morrison, Frank B., Feeds and Feeding, p. 733.

³⁴Haecker, T. L., "Feeding Dairy Cows," Minn. Exp. Sta. Bul. No. 130.

CHAPTER IV

SUMMARY

Dairying is considered an important enterprise in the Wyandotte service area. The farmers in this area average milking 12.68 cows each. They average having 31.36 dairy animals in their herds. Twelve per cent of the herds are purebred, while 34 per cent of the herds possess no purebred blood animals.

The 304.5 average annual pounds of butter-fat and 7,178 average annual pounds of milk per cow, in this study, are well above the national average. Seventy-six per cent produce grades B or C milk, while the rest produce grade A. The majority of the farmers milk in the same building in which they store their hay.

Many of the farmers are not following the most desirable milking procedures insofar as concerns care of the milking equipment and care of the milk after it is milked. This is illustrated by the loss of 346 gallons of milk by one farmer during the previous year. Several of the farmers do not know the seasons of the year when milk prices are generally the highest.

Twenty per cent of the farmers keep individual milk production records of their cows, but only 8 per cent keep official milk production records. The majority keep a record of breeding dates.

The majority of the cows in this study freshen during the winter and early spring. Thirty per cent of the farmers are using artificial insemination. Thirty-eight per cent of the farmers wean their calves from the cows when one to four days old. Twenty per cent use commercial milk

substitutes in the raising of their calves. Twenty per cent of the farmers' calves are bothered with scours. The majority of the farmers use sulfa drugs and reduce feed for control of scours. The majority of the farmers sell their bull calves at least by the time they are of vealing age. Most of the farmers remove their cows from the herd before they are eight years old. Over one-half raise all their female herd replacements. Thirty-two per cent raise bull calves to sell to other farmers.

Twenty per cent of the farmers do not have as much as six months of pasture for their herds. Only 26 per cent plant temporary summer pastures, while 76 per cent plant winter pastures for their herds. Sudan grass is the most common temporary pasture planted. The acreage of sudan grass planted per head is a little over one-half acre. Rye is the most popular winter pasture. Fifty-eight per cent of the farmers plant vetch in their winter pastures.

Forty-two per cent of the farmers store silage for their herds. They average storing 167 tons each. The majority use corn or sorgo for silage. One-half of the farmers feed mixed hays, while 42 per cent feed all-legume, and eight per cent feed all-grass hays. Ninety-four per cent of the farmers purchase part or all of their mixed-feeds. The majority of the farmers prefer dairy feeds of 16 per cent protein content. Ninety-two per cent of the farmers feed their cows some grain while on pasture, but only 54 per cent feed according to production. Ninety-two per cent provide some form of mineral free-choice for their cattle. Stockade, a commercial mixture, was the one most commonly provided. One home-mixed ration contained only 7.7 per cent digestible protein and 10.0 per cent total protein. One ration had 15.7 per cent digestible protein and 18.6 per cent total protein. These were the extremes. The total digestible nutrient percentages varied

from 65.1 to 76.9. Corn and cob meal and oats were the most commonly used grains in the home-mixed rations. Soybean meal was the most commonly used protein supplement.

The majority of the herds have never been bothered with blackleg or bloat and are seldom bothered with milk-fever. Over three-fourths of the milk-fever cases are treated by the veterinarian or the vocational agriculture instructor. Fifty-four per cent of the farmers test regularly for "Bangs" reactors. Forty per cent practice calfhood vaccination. The majority of the farmers are seldom troubled with mastitis in their herds. Only 18 per cent use a strip cup.

The greater percentage of the farmers mow their pastures and provide loafing sheds for their cattle. The problems most commonly mentioned were shortage of pastures, high feed costs, shortage of feeds, and high costs of roughages. All the farmers were in accord in saying that they felt that dairying in the Wyandotte area should be encouraged.

CHAPTER V

GENERAL RECOMMENDATIONS (Based on the findings in the study)

Many of the dairy farmers in the Wyandotte Service Area need to:

1. increase their size of business.
2. put more stress on developing high producing herds.
3. increase the purebred blood within their herds.
4. study their available milk markets more thoroughly.
5. decide if grade A milk production is advantageous for them.
6. increase the milk production per cow.
7. practice better sanitation during the milking operations.
8. be more sanitary in caring for the milking equipment.
9. practice proper cooling and care of milk.
10. study the seasonal price trends of milk.
11. have more cows freshening in the fall months.
12. be more consistent as to the hours at which they milk each day.
13. analyze their operations to see if they are milking at the most suitable hours.
14. build any contemplated new milking accommodations away from where the hay is stored or where cows stay at night.
15. analyze the investments in their milk production enterprises.
16. keep more complete breeding records.
17. keep individual milk production records.
18. investigate the advantages of official cow testing.
19. use records as a basis for selecting breeding stock.
20. use artificial breeding when it seems advantageous.

21. select herd sires with desirable close-up ancestry or themselves already proved.
22. realize the importance of two months' rest for cows between lactations.
23. provide better care for the cow prior to and just following calving.
24. analyze the future milk producing potentialities before breeding to beef type bulls.
25. adopt better calf-raising practices.
26. analyze the market outlets for calves.
27. realize what it takes for a cow to have a long productive life.
28. put more emphasis on summer and winter pasture programs.
29. initiate or enlarge silage operations.
30. provide more legume hays for the herd.
31. let the protein content of the mixed-feeds be gauged by the kinds of other feeds supplied.
32. realize the importance of correct amounts and kinds of minerals to feed.
33. know the actual food nutrients in certain grains and the requirements of their cows when mixing their own dairy rations.
34. practice a more rigid disease control program.
35. provide better sheltering of cattle during the winter months.
36. use more fertilizers to improve pastures.
37. grow own grain to the extent that land is available.
38. feed suitable grain in proportion to the milk produced.
39. prevent summer slump by providing adequate feed.
40. expand the use of labor saving equipment.
41. grow more legume hay, pasturage and grain.
42. feed cows liberally during the dry period.
43. keep as many cows as feed and labor will permit.
44. market whole milk whenever possible.
45. breed for better herd replacements.

CHAPTER VI

A SUGGESTED OUTLINE FOR TEACHING THE DAIRY ENTERPRISE IN THE WYANDOTTE SERVICE AREA

I. Problems Pertaining to General Dairy farm organization.

Balanced Farming:

- Determine the most economical size of farm, for the combination of enterprises selected, for the area.
- Determine the most economical amount of cropland that will contribute to and balance the dairy enterprise.
- Choose a combination of enterprises that will pay best for the area in which the farm is located.
- Analyze, adjust, and reorganize the farm business to meet changing conditions.
- Read and understand outlook literature on market and economical conditions.
- Evaluate in terms of the future, the social, civic, and economical status of the area in which the home farm is located.
- Organize the dairy enterprise to provide a balanced combination of resources.
- Determine methods of providing sufficient flexibility of operations.
- Plan for best utilization of farmers training and experience.

Pasture, hay and silage:

- Determine the number of acres of pasture needed for economical feeding of the dairy unit.
- Plan programs to improve the pastures and increase the number of pasture days.
- Determine the number of acres of legume hay necessary for economical milk production.
- Determine the kind of legume hay best adapted for the farm.
- Determine the number of acres of silage necessary for economical milk production.
- Understand the importance of providing temporary summer pasture in the area.
- Understand the importance of providing winter pastures for economical milk production.

II. Problems Pertaining to Organization of the business setup of the Dairy Enterprise.

Size of Business:

Understand the importance of having a size of business above the average for the area in which the farm is located.

Know how to obtain the most efficient size of business.

Labor Efficiency:

Plan the dairy barn so as to save labor.

Plan the location of the buildings for most efficient use of labor.

Use up-to-date methods of milk production.

Plan for economical handling of manure, feed, hay, and silage.

Decide what wages different sized dairy units can actually afford to pay their hired labor.

Contributory Enterprises:

Realize the effect upon labor income of having crop yields above the average for the area where the farm is located.

Recognize the economical advantage of feeding alfalfa hay as compared to feeding other hay.

Size of Herd:

Determine the most economical size of dairy herd for the farm, market, and area.

Determine the size of herd that is in accord with the physical and mental capabilities of the operator and his available labor.

Production per Cow and Sales:

Obtain production per cow above the average for the area.

Obtain the highest amount of fluid milk sales per cow and per man consistent with economics of production.

Secure relatively high price per hundred pounds for milk sold.

Understand the seasonal fluctuations of milk prices.

Season of Freshening:

Organize the dairy enterprise so that most economical percentage of fall freshening may be secured.

Plan the freshening period to fit in with the rest of the operations on the farm.

III. Problems pertaining to Economical Housing of Dairy Herd.

General Considerations:

- Evaluate the essential features in building and remodeling the dairy barn.
- Plan the dairy barn so as to save labor.
- Decide what type of dairy barn is best suited to farm and the area.
- Plan the dairy barn so as to be economical in cost.

Essential Features:

- Plan the dairy barn so as to have adequate amount of light.
- Plan a system of ventilation that is economical and efficient.
- Plan a system of sanitation that is economical and efficient.
- Plan for adequate and labor-saving storage of silage, hay, straw, and concentrate feeds.

Equipment:

- Determine the most efficient and economical supply of water.
- Evaluate the necessary dairy equipment to determine the best buys.
- Plan interior arrangement of dairy barn for comfort and economy.
- Plan for economical handling of manure.
- Plan for economical equipment for handling of silage, hay, straw and concentrate feeds.

Lots and Pens:

- Plan for a safe bull pen and breeding stall.
- Plan for adequate housing of the herd bull.
- Determine adequate size and number of calf pens, holding pens, etc.

Silo:

- Determine the capacity of silo needed to store sufficient silage for the number of dairy animals on the farm.
- Determine the most economical materials to use in constructing a silo.
- Determine the type of silo which is the most desirable for the particular farm.
- Determine the location for the silo or silos.

Milk House:

- Determine the most economical materials to use in constructing the milk house.

Determine the type of milk house to build.
 Plan and locate the milk house to meet the sanitation requirements of the milk markets.

IV. Problems Pertaining to selection of Dairy Animals.

Type:

Understand the importance of dairy type.
 Understand clearly what dairy type means.
 Recognize the essential features of dairy type.
 Appreciate the relative importance of size, capacity and barrel, shape and body attachments of udder, leanness of withers, length of neck and width of muzzle to other features of dairy type.

Breed Characteristics:

Recognize the essential difference between the breeds of cattle kept for milk production.
 Evaluate for market purposes the strong and weak points of the different dairy breeds.
 Decide which breed is best suited to the home farm.
 Understand the importance and purpose of purebred dairy cattle.
 Understand the importance of community preference, markets available, climate and environment.
 Understand the importance of personal preference, changing trends and conditions.

Judging:

Judge dairy cattle for economical production.
 Study records of production, ancestors and progeny performance.

Selecting Individual Cows:

Know the value of ancestry, milk production records, soundness, age, general health, freedom from T.B., Bangs and Mastitis, date bred, date of last calving, guarantee that cow is a breeder, reputation of the breeder, and the price of cattle in general.

Selecting Herd Bull:

Know the value of breed, age, individuality, pedigree, value of proven sires, freedom from diseases, sources of sires, reputation of breeder, and the price of cattle in general.

Culling:

Study individual dairy animals in the herd as to whether to cull or retain.

Decide which animals to cull.

Decide which animals to keep.

V. Problems Pertaining to Feeding Dairy Cattle.

General:

Determine the amounts of grain, succulent roughage or dry roughage that are most economical to feed.

Determine the economy of using grain rations composed of home raised grains supplemented by purchasing high protein concentrates.

Determine the economy of home mixing the dairy ration compared to a ready-mixed commercial dairy ration.

Determine the feeding schedule that meets the requirements of the grade of milk produced.

Balancing the Dairy Ration:

Learn the definition of a ration, balanced ration, digestible protein, total crude protein, total digestible nutrients.

Learn what physiological effects certain feeds have on the animal.

Determine the percentage of protein needed in a grain ration to supplement the quality of hay and silage grown on the farm.

Compute mathematically the amount of grain ration and percentage of protein in that grain ration needed to supplement the total digestible nutrients and digestible protein in the hay and silage.

Balance mathematically and practically home-grown grains with purchased concentrates.

Purchase a grain ration that gives the greatest amount of total digestible nutrients per dollar spent.

Winter Feeding:

Feed according to the essentials of an ideal ration.

Feed the milking herd for economical winter milk production.

Select economical feeds for winter feeding.

Provide succulent feeds for winter feeding.

Feeding during the Pasture Season:

Understand the economical importance of good pastures.

Feed the milking herd for economical summer milk production.

Study the methods of feeding to supplement pasture.
 Adopt a method of feeding that will supplement pastures economically.
 Understand known methods of pasture improvement and adopt those that fit the home farm conditions.
 Use recommended practices in respect to pasturing different crops.

Feeding Dry Cows:

Understand the importance of feeding dry cows and heifers just previous to freshening for lactation.
 Select adequate and economical feeds for feeding dry cows and heifers just previous to the freshening period.
 Feed dry cows and heifers economically and efficiently just previous to freshening for lactation.

VI. Problems Pertaining to details of Economical Dairy Herd Management.

General:

Demonstrate effectively the manipulative activities essential in carrying on the dairy enterprise.
 Learn in terms of the home farm, standard community dairy barn practices.
 Understand the importance of maintaining June pasture conditions throughout the year.
 Develop a system of management that will approximate June pasture conditions.
 Arrange an efficient dairy barn program of work for winter and summer operations.

Milking Factors:

Select the factors that influence the quality and quantity of milk produced.
 Determine the economy of milking more than twice daily.
 Evaluate the economical significance of spring and fall freshening of cows to fit the home farm conditions.

Dry Cows and Dairy Bulls:

Feed and handle the dairy cows and dairy heifers efficiently just previous to calving, at parturition and just following the birth of the calf.
 Feed and manage a young bull.
 Feed and manage an older bull.
 Study the practices of more successful farmers in handling and managing herd bulls in terms of home farm conditions.

Sanitation and Disease Control:

- Determine the essentials in maintaining sanitary conditions in the dairy barn, milk house and barnyard.
- Study and understand related information regarding sanitary handling of milk and animals.
- Study specific information regarding common ailments of dairy animals and general care of sick animals.
- Understand the general principles and practices concerning disease prevention in the dairy herd.
- Appreciate the value of cooperation with state and Federal authorities in the control of infectious diseases, particularly T.B., Bang's disease, and Mastitis.

Milking Machine:

- Realize the efficiency and economy in the use of the milking machine in terms of home farm conditions.
- Understand what is involved in handling a milking machine economically.
- Operate a milking machine efficiently from the standpoint of the cow and the grade of milk produced.

Records:

- Understand the importance of keeping production records on the dairy enterprise.
- Decide the economical value of membership in a Dairy Herd Improvement Association.
- Perform standard practices in using the Babcock Test for determining the butterfat content of milk and cream.

VII. Problems Pertaining to replacements in the Dairy Herd.**Financial Consideration:**

- Analyze the future outlook for dairying in the home farm area.
- Decide what the status of the dairy enterprise is in the home farm business.
- Decide what the economical aspects and community practices are in terms of home farm conditions.
- Analyze the economic aspects of buying or raising replacements and the advantages of each method.
- Understand the importance of obtaining cows of the right age ready to freshen.
- Decide whether to buy calves, bred or unbred heifers, or aged cows for replacements.
- Decide whether to buy good blemished cows of advanced age ready to freshen.

Purchasing Replacements:

- Analyze the dairy cycle and prices of cattle in general in purchasing replacements.
- Realize the importance of extreme dairy type, age, and size when purchasing replacements for the dairy herd.
- Realize the importance of general health, soundness and freedom from disease, especially T. B., Bang's disease and Mastitis, when purchasing replacements.
- Realize the importance of breed characteristics and production records in purchasing replacements for the milking herd.

General Considerations in raising Replacements:

- Choose the cows from which heifer calves should be raised, and choose the heifer calves that can be raised most economically.
- Understand the nutrient requirements of dairy calves. Give the calf the proper care at birth.
- Prevent the growth of horns.
- Provide the necessary sanitation needed for efficient dairy calf raising.

Raising the Dairy Calf:

- Practice proper care of the calf at birth.
- Study the different methods of raising calves.
- Select the most economical method of feeding the heifer calf suitable for home farm conditions.
- Demonstrate methods of preventing horn growth.
- Select the most desirable method of identifying the dairy calf and decide age to apply.
- Decide the most desirable age to feed grain, hay, silage, consistent with economical growth.
- Decide the most desirable age to wean heifers from milk.
- Decide what is the most desirable feeding schedule before and after discontinuing liquid feeding.
- Decide the most economical age to turn heifer calf to pasture.

Feeding and Developing Dairy Heifers:

- Decide what is the most economical and efficient method of feeding and managing yearling dairy heifers.
- Understand the factors affecting economical growth and development of dairy heifers.
- Understand the significance in properly selecting, culling, breeding at right age, freshening at certain seasons, caring for at calving time and training to be a good milker.
- Decide what is the most efficient method of fitting and training heifer to enter the milking herd.

VIII. Problems Pertaining to Marketing Milk.

General:

- Select markets for fluid milk.
- Supply the chosen market with the quality of fluid milk demanded.
- Choose the most economical method of getting the milk from the dairy barn to the milk market.
- Understand the composition, uses, and importance of milk and its products.

Economical Considerations:

- Understand the factors that make the different dairy areas.
- Understand the relation of the dairy cycle to market conditions.
- Evaluate trends in the production of milk and its products in the area.

Prices at the Farm:

- Study the various factors determining prices received for milk at the farm.
- Realize the economic effects of consumer demand.
- Realize the economic influence of supply of milk.
- Realize some of the problems when there is a surplus of milk.
- Analyze the findings concerning dealers' spread and costs.

IX. Problems Pertaining to Improvement of Dairy Herd.

General:

- Decide upon a method of herd improvement that will maintain and increase the level of milk production per cow already attained on the home farm.
- Understand the economic importance of maintaining and increasing the average butterfat test per cow on the home farm.
- Decide upon an economical basis for culling the dairy herd.
- Sell surplus stock advantageously.

Breeding Methods:

- Understand the different breeding practices.
- Understand the basic genetic principles involved with dairy cattle breeding.
- Use the most desirable methods of breeding.
- Appreciate the relative importance of the sire and dam as a source of dairy qualities.

Evaluate breed characteristics and breed type in the selection of a purebred bull.
 Evaluate the advantages of a proved bull.
 Evaluate the importance of bull indices.
 Understand that grade bulls lack the genetic basis for improving a dairy herd.

X. Problems Pertaining Specifically to the Mixed Dairy Herd and the Grade Dairy Herd.

Problems Common to both:

Select an economical number of heifers to raise for replacement.
 Evaluate the advantage of size in raising replacements.
 Analyze the value of using a grade bull in herd improvement.

Grade Dairy Herd:

Practice care in purchasing the necessary replacements.
 Decide upon the size of herd best adapted for the highest labor efficiency for the home farm.
 Select a herd sire from the breed best adapted to the milk market.

Mixed Dairy Herd:

Evaluate grades and purebreds in terms of community and home farm conditions.
 Change from grades to purebreds in the most economical manner.
 Select the most suitable breed.
 Select a herd sire that will improve the purebred cows in the herd.
 Practice great care in the selection of purebred females for foundation stock.

XI. Problems Pertaining Specifically to the Economical Management of the Purebred Dairy Herd.

General:

Study the sources of income in the operation of a purebred breeding establishment.
 Identify by name and ancestry the different individuals in the purebred herd.
 Provide accurate registration and transfer applications.

Growing Animal:

Grow purebred heifers efficiently.
 Grow purebred bulls efficiently.

Improvement:

- Realize the value of culling undesirable individuals from a purebred breeding establishment.
- Analyze the characteristics of family blood lines in the selection of a bull.
- Decide upon whether to test for production under the rules of Advanced Registry, Herd Improvement Registry, or Dairy Herd Improvement Association.

Advertising and Selling:

- Dispose of bull calves and surplus stock at a profit.
- Evaluate the use of public sales for selling stock.
- Realize the value of continuous advertising.
- Realize the importance of being capable of writing a sales letter.
- Realize the importance of reputation as a business asset.

Fitting and Showing:

- Evaluate the economical advantage of the show ring.
- Realize the economical advantage of fitting purebred animals for sale or exhibition.
- Realize the importance of proper handling and showing.

A SUGGESTED GUIDE FOR TEACHING THE VARIOUS PROBLEMS
RELATED TO THE DAIRY ENTERPRISE

Problem No.	PROBLEMS PERTAINING TO:	Recommended Age Groups To Receive Instruction
1.	General Dairy Farm Organization	Juniors, Seniors, Adults
2.	Organization of the business set-up of the Dairy Enterprise	Juniors, Seniors, Adults
3.	Economical Housing of the Dairy Herd	Freshmen, Sophomores, Adults
4.	Selection of Dairy Animals	Freshmen, Sophomores, Adults
5.	Feeding Dairy Cattle	Freshmen, Sophomores, Adults
6.	Details of Economical Dairy Herd Management	Freshmen, Sophomores, Adults
7.	Replacements in the Dairy Herd	Juniors, Seniors, Adults
8.	Marketing Milk	Freshmen, Seniors, Adults
9.	Improvement of Dairy Herd	Juniors, Seniors, Adults
10.	Economical Management of the Mixed Dairy Herd and the Grade Dairy Herd	Sophomores, Juniors, Adults
11.	Economical Management of the Purebred Dairy Herd	Sophomores, Seniors, Adults

MINISTRY OF DEFENSE
GENERAL STAFF

WASHINGTON, D.C.

APPENDIX

SECRET

UNSOLICITED COMMENTS

"I sure believe the fellow who is not producing Grade A milk is just missing the boat."

"I sure don't see where any farmer in this section of Oklahoma can beat dairying."

"You know, ten years ago there weren't any Holstein herds east of the river, but now I can count twelve good herds very easily."

"I tried beef ten years, but I just couldn't get as much for my labor as I can with milk cows."

"Tried sweet clover and Balbo rye combination in my rotation, but gave it up for vetch and rye. My land isn't tied up near as much of the time with vetch and it seems to hold the fertility up just as well."

"I don't see why some of my neighbors with just the plain kind of cows don't go to Wisconsin and buy a herd of heifers and bring them down here and raise them."

"I've used upright silos for years, but had a trench silo built this fall in order to be able to store all of my silage. Trench silos remind me of someone who has gone barefooted and then gets a pair of cheap shoes. He thinks he is really getting places. He is certainly bettering himself, but I sure do prefer to use an upright silo. One thing sure, it doesn't cost much to build a trench silo."

"I sure don't see why more farmers don't milk more cows."

"We bought a six thousand dollar bull three years ago and we figure he has more than paid for himself already and only two of his calves are in production. He has certainly done wonders for our future milking herd."

"This drouth this fall has helped the dairy farmer as much as it has hurt him, I believe. He is more conscious of the need for temporary pastures and silage. Sort of a blessing in disguise, maybe."

"I have been pretty fortunate. I have a fellow milking for me that has been with me for four years. He is a good hand. I sure believe it pays to make it as easy as possible on your hired help and still get the work done. One can, I believe, if he tries hard enough."

"I think dairying in this section is just getting started."

"Dairying is a very confining job, but if I use my head I can have about all of my cows dry about August first and I can take a two week's vacation. I won't need to hire much help this way and I'll be back in time to plant fall pasture and get ready for the freshening period when I'll be back to milking again. I have done this the last two years, so I know it will work."

"I wish that everyone would take more interest in the kind of bull they are using."

"I have a feeling that a lot of farmers around here who are not keeping records ought to cull out about one-half of their herd."

"I have Holstein cows. I have been making steers out of my bull calves. They make just pretty good steers, too. I try to have most of my cows freshen in October and sell the steers the next fall."

"I'm milking a herd of mixed, high-grade cows. I think I'll sell them and get a bunch of heifers up north and start in again. Either purebred Holsteins or Guernseys."

"I can't see why some of these guys around here are so high on sudan grass as a summer pasture."

"This road improving they have been doing around here the last three years sure is a boon to the dairy business in this section."

"I went to a dairy meeting last night. Mr. Stinnet from the Extension Service was there. He told about making silage out of a rye, barley and vetch mixture. He said the vetch really helps to keep the silage. I sure plan to try it. No doubt this mixture would be worth lots more as silage than after it matures."

"I would rather be sure of a fair crop of silage with sorgo than half sure with a crop of corn."

"I dairied in Iowa and Illinois and I see no reason why we can't have twelve months of pasture here. In fact I have the two years I've been here. This drouth is bad, but I've got real good bermuda grass right now, and my Balbo rye is up and looking good."

"I have sold grade C, grade B, and grade A milk. With markets and marketing accommodations as they are I figure I make more money selling grade A milk."

"I sure don't know what I would do if I wasn't dairying. I sure do like those regular checks."

"I've been reading a lot about grass silage and I sure plan to make some next spring. I think I'll start clipping my pastures and making silage out of it like they say they do up north, too."

"I paid eighty-five dollars for my trench silo and my neighbor paid sixty-five for his. They are small, but we don't see how we got along without them."

"I bought quite a number of cows to get started, but I can say from experience that it is better to raise your own replacements. I don't plan to buy any more replacements."

"I think I'll try what I have read about. I've got a good purebred bull, but his heifers are old enough to breed now. I think I'll try and sell this bull with the privilege of buying him back in a couple years or when the guy wants to get rid of him. I think I have a real good bull, but of course I'll know more about it after these heifers all get into production."

"A bunch of us Guernsey breeders are pushing 'Golden Guernsey Milk.' The breed association says, 'the consumer will be getting one-fifth more value from this milk while only paying one-tenth more money for it.' Looks like a good deal for both the consumer and us Guernsey breeders."

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