

AN EDUCATIONAL PROGRAM FOR ADULT FARMERS
IN THE PRODUCTION OF QUALITY MILK

By

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"

Bachelor of Science

Mississippi State College

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1941

Submitted to the Faculty of the Graduate School of
the Oklahoma Agricultural and Mechanical College
in Partial Fulfillment of the Requirements
for the Degree of
MASTER OF SCIENCE
May, 1953

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IN THE PRODUCTION OF QUALITY MILK

Thesis Approved:


Thesis Adviser


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300330

ACKNOWLEDGMENT

The writer wishes to express his appreciation and gratitude to the following persons for their assistance and encouragement in the completion of this thesis:

Mr. Don M. Orr and Mr. Chris White, Professors of Agricultural Education, under whose supervision this thesis was written.

Mr. C. L. Angerer, Head of the Department of Agricultural Education at the Oklahoma Agricultural and Mechanical College.

Members of the Pure Milk Producers Association, Tulsa, Oklahoma, for their cooperation and assistance.

This acknowledgment would be incomplete without giving credit to Claude, my wife, for her constant efforts to assist, encourage, and inspire me during the writing of this thesis.

Z. R. J.

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CHAPTER I

INTRODUCTION

Far-reaching changes and advancements have been made in American agriculture during recent years. In the past, some people have been of the opinion that anybody could farm. Today farming is thought of as a business, since it involves many scientific practices and has become highly organized, specialized, and mechanized. Production, management and marketing problems are more complex than formerly and competition is becoming keener each year. The farmer must be able to form judgments, carefully evaluate and arrive at proper conclusions and decisions in solving problems to meet his situation. Consequently, the present prospective farmers must be trained to solve their problems effectively.¹

At the present time many farm homes with their modern conveniences are just as attractive and livable as city homes. This has played an important part in developing a higher standard of living on the farm in many areas. Modern farm machinery and labor-saving devices have lightened the work and reduced man hours on the farm. These developments have created an increased need for training farm youth and

¹Cook, G. C., Handbook on Teaching Vocational Agriculture. Fifth Ed. 1947, Interstate Printing Co., Danville, Ill.

farmers in the operation and maintenance of home conveniences and farm equipment.

Farm youth and farmers need and want the kind of training which will help them become successfully established in farming, or to increase their proficiency if already established in farming. Consequently, farmers who are willing to spend one or two evenings each week during the winter to study some of the problems confronting the dairyman and to learn of the most recent developments in the dairy industry, can learn much that may mean a profit rather than a loss in their dairy business.

Every year the dairy farmers of the United States suffer financial losses because too large a proportion of the milk and cream they market is lower in quality than it should be. It is estimated conservatively that they could add millions of dollars annually to their income simply by giving attention to those factors that promote high quality of product.²

Milk is one of the most valuable foods because it is nourishing, economical, and easily digested. The consumer, however, will accept milk as a food only when he has confidence in its wholesomeness. Serious epidemics of typhoid fever, septic sore throat, and other diseases have been spread through milk that was not produced carefully or pasteurized properly. All people who handle milk should realize that they

²Clean Milk Production, Farmers Bulletin No. 2017, U. S. D. A., Aug. 1950.

have in their charge a food that is easily contaminated.

High quality products are the basis of prosperity for the dairy industry. Each milk producer must realize his responsibility for selling clean milk and cream.

The writer is the Vocational Agriculture teacher in the Claremore High School and is interested in aiding the farmers in producing high quality milk.

PURPOSES

To determine the practices used by the dairymen in the production of quality milk, as well as the difficulties encountered in producing quality milk.

To secure information that may help develop an educational program for adult farmers in the production of quality milk in the Claremore Service Area.

After contacting the Tulsa City Health Department, the writer prepared a questionnaire to cover the practices and difficulties of the dairymen in the production of quality milk. This questionnaire was presented to the Agricultural Education Department at Oklahoma A. and M. College for approval.

The questionnaire was used as a guide for interviewing 50 Grade "A" milk producers in the service area of Claremore High School.

A copy of the questionnaire used in this study is presented on the following pages.

QUALITY MILK PRODUCTION

QUESTIONNAIRE

Name _____ Address _____

GENERAL INFORMATION:

I. A. Farm:

1. Acres in farm _____ Owned _____ Rented _____ 2. Acres
in cultivation _____ Pasture _____ 3. Do you have
electricity? _____ 4. How many cows do you milk? _____
5. Percent of concentrates produced _____ percent of
roughages produced _____.

B. 1. Where is milk sold? _____ 2. Do you have a quota? _____
3. Do you have surplus milk? _____ 4. How many months each
year do you have surplus? _____ 5. Are you on all
weather road? _____ 6. How far is your milk hauled be-
fore it reaches market? _____ 7. Is covered truck
used for hauling? _____ 8. How often is milk deliver-
ed? _____.

II. CARE OF UTENSILS:

1. Do you use milking machine? _____ 2. What kind?
_____ 3. Is milking machine completely
disassembled and cleaned after each milking? _____
4. Which of the following are used for cleaning? Hot
water (110 to 120 degrees F.) _____ cleaning powder
_____ brush _____ disinfectant _____ 5. What
kind of disinfectant? _____ 6. Are
pails and cans checked for proper tinning? _____
7. Are utensils air dried? _____ 8. Dried with cloth?

9. Do you have a rack for storing utensils? _____
10. Use covered pail for milking or stripping? _____
11. Type of strainer used? _____

III. MILK ROOM:

1. What type of construction is the milk room? _____
2. Have ceiling ventilator? _____ 3. Type of ceiling
and walls, matched lumber? _____ rough lumber _____
sheet rock _____ other _____ 4. Are double
doors leading to milking parlor? _____ screen? _____
wood? _____ 5. Are all doors and windows screened?
_____ 6. Is milk room painted? _____ 7. Is first
aid kit available? _____ 8. Do you have a hot water
tank? _____ 9. Is milk room well lighted? _____
10. Is floor washed after each milking? _____ 11. Is
floor well drained? _____ 12. Do you have wash vats?
_____.

IV. MILKING AND MILK COOLING:

1. Do you milk with clean dry hands? _____ 2. Are
milker's hands rinsed in standard chlorine solution
before each milking? _____ 3. Are hand washing fa-
cilities available? _____ 4. Milkers wear clean outer
garments? _____ 5. Do all milk handlers have physical
examinations periodically? _____ 6. How is milk cooled?
_____ 7. To what temperature is it
cooled? _____ degrees F. 8. Is milk cooled within an
hour after milking? _____ 9. Do you mix milk with that
of previous milking? _____ 10. Is milk strained in milk

room? _____ 11. Is milk protected from dust? _____

V. YARD AND BARN:

1. Is yard well graded and drained? _____ 2. Do you have gravel or chat in holding pen? _____ 3. How often is manure hauled away? _____ 4. How is it stored at the barn? _____ 5. Do you have cement floor in milking parlor? _____ other type floor? _____ 6. How often do you spray barn for flies? _____ 9. Use fly trap or paper? _____ 10. Are floors washed after each milking? _____ 11. Do you use lime on floor? _____ 12. Is parlor ceiled? _____

VI. COWS:

1. Are cattle sprayed for flies regularly? _____ 2. Kind of spray used _____ 3. Do you wash each cow's udder before milking? _____ Chlorine solution used? _____ 4. Hair on udders and flanks clipped? _____ 5. Cows brushed? _____ 6. How long after calving before milk is saved? _____ days. 7. Do you save milk from cows with injured udders? _____.

VII. DISEASE CONTROL:

1. How often do you use strip cup before milking to detect mastitis? _____ Other means? _____ 2. Frequency of occurrence of mastitis, often? _____ seldom? _____ continually? _____ 3. Cows tested for T.B.? _____ How often? _____ Is herd T.B. free? _____ 4. Test for Bang's disease? _____ Herd free of Bang's _____ 5. Are diseased cows isolated from herd? _____.

VIII. WATER SUPPLY:

1. What is your source of water supply? Well _____
Spring _____ Pond _____. Is supply plentiful? _____
2. Location of well, ft. from privy, sewer, or septic tank _____ ft. from barn _____. Is it above drainage area _____ below _____
3. Open well? _____ pump? _____ pump sealed? _____
4. Automatic water supply in barn? _____
5. Is water supply tested by health department? _____
6. Indoor toilet? _____ W.P.A. Type? _____ Other? _____.

IX. FEEDING PRACTICES:

1. Is dusty feed fed while milking? _____
2. Is silage fed before milking? _____ after? _____
3. When cows are grazing plants that have an effect on the flavor of the milk, are they removed at least three hours before milking? _____
4. Are cows fed hay in the milking parlor? _____
5. List rations used _____
6. Are cows fed according to production? _____.

X. DIFFICULTIES OF THE DAIRYMAN:

1. What was your average bacteria count last 12 months? _____ High count? _____ Low count? _____
2. To what do you attribute the high count? _____
3. Do you feel that the health department inspections help you to produce higher quality milk? _____.

4. What are your greatest difficulties in producing
Grade A milk? 1. _____

2. _____

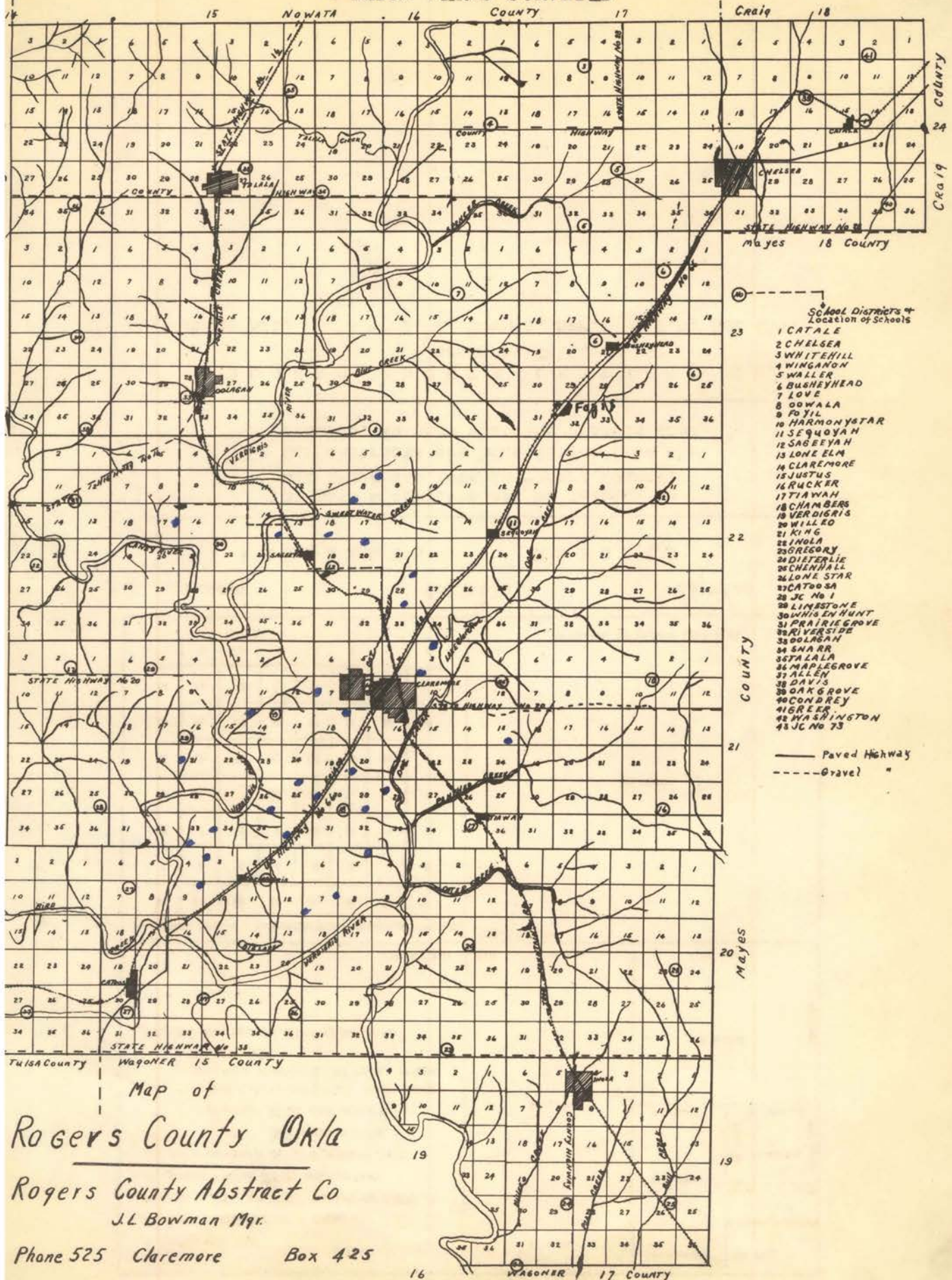
3. _____

The following is a list of Grade A milk producers in Rogers and Tulsa Counties that were included in the surveys:

- | | |
|-------------------------|---------------------------|
| 1. Pope, Jessie | 26. Mullinax, N. H. |
| 2. Smithy and Anderson | 27. Karp, C. W. |
| 3. Baughman, Rex | 28. Kunze, E. G. |
| 4. Ostrander, W. R. | 29. Collins, Jack |
| 5. Harvey, O. T. | 30. Rithman, Ben |
| 6. Voge, George | 31. Moore, Bob |
| 7. Faletti, Frank | 32. Stivers, R. W. |
| 8. Fox, Ray | 33. Benigal, Carl |
| 9. Hanes, A. C. | 34. Sleepy Valley |
| 10. Taylor, John | 35. Sheehan, Loran |
| 11. Cates, Dewey | 36. Gaylord, Floyd |
| 12. Butcher, T. D. | 37. Jordan and Cunningham |
| 13. Chambers, Sam | 38. Moore, Lynn |
| 14. Rumbaugh, Glen | 39. Bradley, Bob |
| 15. Franklin, O. H. | 40. Smith, E. C. |
| 16. Swan, Harley, Sr. | 41. Bowman, Sam |
| 17. Biswell, Jewel | 42. Smalygs, Millard |
| 18. Turner, Winford | 43. Wade, A. A. |
| 19. Fisher, E. E. | 44. Keith, L. H. |
| 20. Buchanan, Joe D. | 45. Keith, H. H. |
| 21. Sheats, Nick | 46. Theisen, W. T. |
| 22. Gorden and Anderson | 47. Cross, Kenneth |
| 23. Merkle, J. D. | 48. Ripple, Ted |
| 24. Smith, Troy | 49. Ruimer, S. E. |
| 25. Tacker, W. R. | 50. Vanderpool, Mayo |

DAIRY FARMS SURVEYED

10a



- School Districts & Location of Schools
- 1 CATALE
 - 2 CHELSEA
 - 3 WHITEHILL
 - 4 WINGANON
 - 5 WALLER
 - 6 BUSHEYHEAD
 - 7 LOVE
 - 8 OOWALA
 - 9 FOYL
 - 10 HARMONYSTAR
 - 11 SEQUOYAH
 - 12 SAGEEYAH
 - 13 LONE ELM
 - 14 CLAREMORE
 - 15 JUSTUS
 - 16 RUCKER
 - 17 TIWAH
 - 18 CHAMBERS
 - 19 VERDIGRIS
 - 20 WILLO
 - 21 KING
 - 22 INOLA
 - 23 GREGORY
 - 24 DIETERLIE
 - 25 CHENHALL
 - 26 LONE STAR
 - 27 CATOOSA
 - 28 JC No 1
 - 29 LIMESTONE
 - 30 WHISKEY HUNT
 - 31 PRAIRIE GROVE
 - 32 RIVERSIDE
 - 33 OOLAHAN
 - 34 SNARR
 - 35 TALALA
 - 36 MAPLEGROVE
 - 37 ALLEN
 - 38 DAVIS
 - 39 OAK GROVE
 - 40 CONDRY
 - 41 KLEES
 - 42 WASHINGTON
 - 43 JC No 73
- Paved Highway
 --- Grave? "

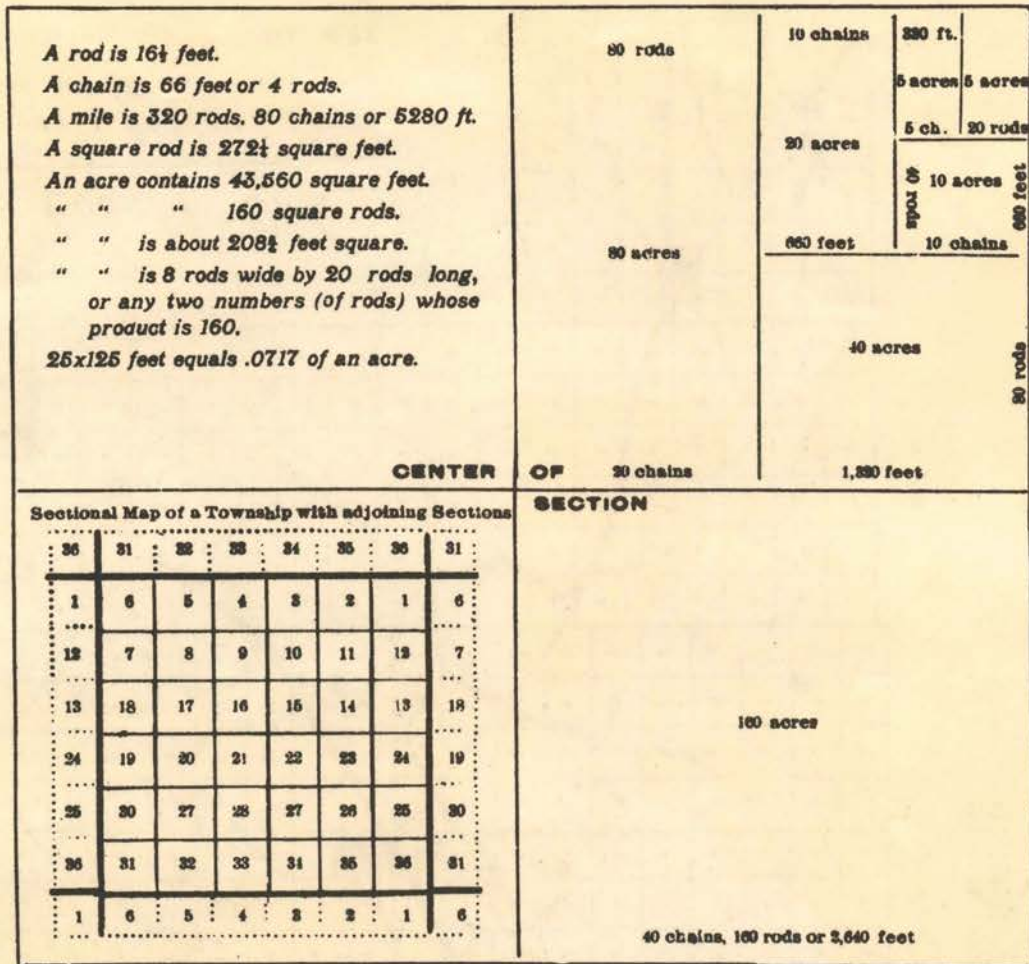
Map of
 Rogers County Okla

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GENERAL CHARACTERISTICS OF THE
FARMING AREA INCLUDED IN THIS STUDY

The area surrounding Tulsa, called the Tulsa Milk Shed, is excellent for dairying. The climate is favorable for producing feed and pasture necessary for dairy cattle, and the urban population in this area furnishes a good market for fluid milk.

This study includes Rogers County which is one of the 18 counties that make up the Tulsa Milk Shed. Dairying in Rogers County has shown a great increase since 1946. This increase is due mainly to the availability of a good market and favorable conditions for year-round pasture.

Information contained in the study, but not shown in the table, shows that the average size farm was 253.8 acres. These farms had an average of 83.2 acres in cultivation and 170.6 acres in pasture. The main reason for the low percentage of farmers producing concentrates is that much of the land in Rogers County has been worn out by cropping practices and is now being put to permanent pasture.

The census report shows that Rogers County had 9,700 dairy cows in 1940 and this number has increased to 14,300 in 1950. These figures include all dairy cows. Unprinted data shows that in April of 1952, 3,520 dairy cows were producing milk on Grade A farms. There is no data available to show the number for previous year. However, the number of Grade A farms in Rogers County increased from 87 in 1946 to 142 in 1952.

Milk handlers in Tulsa received 5,762,019 pounds of producers Grade A milk in April of 1946 compared to 10,069,750 pounds in April of 1952. Rogers County delivered 854,311 pounds of Grade A milk in April, 1946 and 1,661,518 pounds in April, 1952.

The Pure Milk Producers Association reports that the average income per farm per month was \$521.40 in June 1950 and \$732.76 in June 1952. Figures are not available prior to January 1950.

Of the 18 counties that make up the Tulsa Milk Shed, Rogers County produces 16.52 percent of all the milk sold in Tulsa.

Due to the increase in Grade A milk production in the Claremore Service Area and the demand for a high quality product, the writer made a study of the practices used by the dairymen and the difficulties encountered in producing Grade A milk. The information obtained in making this study will be used to promote a higher standard of Grade A milk production.

ORGANIZATION AND PRESENTATION
OF DATA SECURED FROM FARMERS INTERVIEWED

TABLE I
GENERAL INFORMATION ABOUT THE
FIFTY FARMS SURVEYED

Item	Characteristic	
	Number	Percent
Have electricity on the farm	50	100
Produce concentrates	24	48
Produce roughages	41	82
Market milk in Tulsa	48	96
Have milk quota	44	88
Have surplus milk	44	88
Live on all-weather road	49	98
Milk hauled in covered truck	47	94

Table I reveals that 100 percent of the farms have electricity which is important in the production of quality milk. Only 48 percent of the farmers produce concentrates while 82 percent produce roughages.

Eight-eight percent of the farmers reported that they have a milk production quota and the same percentage have surplus milk for an average of 3.7 months per year.

Ninety-eight percent of the farmers live on all-weather roads. This would indicate that delivery of milk is not a serious problem. The milk is hauled in covered trucks in 94 percent of the cases for an average distance of 27.6 miles, the greatest distance being 75 miles.

Major problems indicated in this study are production of concentrates, production of roughages and disposal of surplus milk.

TABLE II
CARE OF MILK UTENSILS

Practice	Using the Practices	
	Number	Percent
Use milking machine	47	94
Completely disassemble and clean milker after each milking	36	72
Use following for cleaning:		
Hot water (110° - 120° F.)	49	98
Cleaning powder	41	82
Brush	48	96
Disinfectant	45	90
Check pails and cans for proper tinning	49	98
Utensils air dried	50	100
Have rack for storing utensils	50	100
Use covered pail for milking or stripping	50	100

Table II shows that 94 percent of the farmers use milking machines and 72 percent completely disassemble and clean the machine after each milking.

Ninety-eight percent of the farmers reported that they used hot water (110° - 120° F.) for cleaning utensils;

eighty-two percent used a cleaning powder; ninety-six percent used brushes; and ninety percent used a disinfectant. Information secured in the survey, but not included in the table, shows that 54 percent of the farmers use B K powder for disinfecting; forty percent used diversol; and six percent used some other brand.

Ninety-eight percent of the farmers reported that they checked pails and cans for proper tinning. One hundred percent reported that they air dried the utensils and used a rack for storing. Table II also shows that 98 percent of the farmers reported that they used a covered pail for milking or stripping.

When the writer visited these farms it was observed that on several farms the thorough washing of the milking machine was not being practiced, also that many pails and cans were being used that showed signs of rust. These observations would indicate that the figures shown in Table II are misleading.

TABLE III
MILK ROOM AND EQUIPMENT

Item or Practice	Using the practice	
	Number	Percent
Have ceiling ventilator	42	84
Have two doors between milk parlor and milk room	48	96
All doors and windows screened	46	92
Milk room painted	50	100
First aid kit available	17	34
Have hot water tank	28	56
Have stove for heating water	21	42
Have no facilities for hot water	1	2
Milk room well lighted	45	90
Floor washed after each milking	45	90
Floor well drained	50	100
Have wash vats	50	100

Table III shows a high percentage of the farmers use all the important practices pertaining to the milk rooms. The survey shows that 96 percent of the milk is sold to milk plants in Tulsa and the milk ordinance specifies the barn and milk room conditions. The farmers must get the approval of the City health department inspector before a permit is issued.

The following information is taken from the milk ordinance

of the City of Tulsa, Oklahoma, Ordinance No. 4702, 1942,
Department of Health.

Item 8-r. Milk House or Room Construction.

There shall be provided a milk house or milk room in which the cooling, handling, and storing of milk and milk products and the washing, bactericidae treatment, and storage of milk containers and utensils shall be done. (a) The milk house or room shall be provided with a floor constructed of concrete or other approved impervious material and shall be smooth, of good repair, properly drained and provided with a trapped drain. (b) It shall have walls and ceilings of such construction as to permit easy cleaning, and shall be well painted or finished in an approved manner. (c) It shall be well lighted and ventilated. (d) It shall have all openings effectively screened, including outward-opening, self-closing doors, unless other effective means are provided to prevent the entrance of flies. (e) It shall be used for no other purpose than those specified above, except as may be approved by the Health Officer; shall not open directly into a stable or into any room used for domestic purposes; shall, unless the milk is to be pasteurized, have water piped into it; shall be provided with adequate facilities for the heating of water for the cleaning of utensils; shall be equipped with two-compartment stationary wash and rinse vats, except that, in the case of retail run milk, if chlorine is employed as the principle bactericidae treatment, the three-compartment type must be used; and shall, unless the milk is to be pasteurized, be partitioned to separate the handling of milk and storage of cleansed utensils from the cleaning and other operations, which shall be so located and conducted as to prevent any contamination of the milk or of cleaned equipment.

Item 9-r. Milk House or Room, Cleanliness, and Flies. The floors, walls, ceilings and equipment of the milk house or room shall be kept clean at all times. All means necessary for the elimination of flies shall be used.

Only one farmer, or two percent, did not have facilities for heating water to wash utensils. This farmer depended on chemicals to clean the equipment. This is not a good practice and does not meet the requirements of the health department.

Five farmers reported that they did not wash the milk

room floor after each milking. It is believed by the writer that no farmer can perform the milking operations without soiling the floor, therefore, it should be washed after each milking.

Four farmers reported that they did not have all windows and doors screened. Screens would help greatly in keeping flies out of the milk room.

TABLE IV
MILKING AND MILK COOLING

Practices	Using the practice	
	Number	Percent
Milk with clean, dry hands	48	96
Milkers rinse hands in chlorine solution	37	74
Facilities for washing hands available	48	96
Milk handlers wear clean outer garments	41	82
Milk handlers have physical examination	46	92
Milk cooled with electric box	50	100
Milk cooled within an hour after milking	50	100
Mix milk with that of previous milking	19	38
Strain milk in milk room	49	98
Protect milk from dust	49	98

The survey shows that 96 percent of the farmers reported milking with clean, dry hands. Seventy-four percent rinse hands in a chlorine solution and 96 per cent have facilities

available for washing the hands. Clean, dry hands are important in producing clean milk. Wetting the hands with milk is a filthy practice. It adds bacteria and sediment to the milk, and in winter it may cause the cow's teats to chap.³ Even though an attempt is made at dry milking, the hands may become moistened in milking cows with short teats. When this happens, it is the tendency of the milker to wipe his hands on his clothing. However, he should wash his hands before continuing milking.

Just before milking, each milker should put on a clean suit which is used for no other purpose. Enough suits should be provided so that a clean one is always available. They should be washed regularly and occasionally they should be steamed or boiled.⁴

Ninety-two percent of the milk handlers have physical examinations. Physical examination is a requirement of the health department and only one farm selling milk in Tulsa reported that all milk handlers do not have physical examinations.

Since the bacteria that cause most of the diseases spread by milk come from human beings, it is easy to see the great importance of making sure that everybody who

³Clean Milk Production, Farmers' Bulletin No. 2017, U. S. D. A., 1950, p. 17.

⁴Ibid., p. 17.

milks the cow or handles the milk or utensils is in good health. It must be remembered that most of the disease epidemics that have been traced to the milk supply have been of human origin. A dairyman may be a carrier of a disease such as typhoid fever, and not know that he is endangering human life unless he submits to a medical examination.⁵

This survey shows that 38 percent of the farmers mix milk with that from a previous milking that has already been cooled. Warm, fresh milk should never be mixed with cold milk, because it hastens bacteria growth by warming up the whole mass.⁶

⁵Judkins, Henry F. and Merrill I. Mack, The Principles of Dairying, John Wiley & Sons, Inc., N. Y., 1941.

⁶Clean Milk Production, Farmers' Bulletin No. 2017, U. S. D. A., 1950, p. 20.

TABLE V
CONDITION OF YARD AND BARN

Practice used by Dairymen	Using the Practice	
	Number	Percent
Yard well graded and drained	49	98
Gravel or chat in holding pen	32	64
Manure kept hauled away	46	92
Cement floor in milking parlor	50	100
Parlor well ventilated	50	100
Parlor well lighted	50	100
Spray barn for flies	49	98
Use fly trap or paper	4	8
Wash floors after each milking	15	30
Use lime on floor	48	96
Parlor has ceiling	23	46

Table V shows that 98 percent of the farms have the barn yard graded and well drained, and 64 percent have gravel or chat in the holding pen.

The importance of a well kept barn yard cannot be overlooked in producing quality milk. Poorly drained barn yards are muddy much of the time during the year, this creates a problem in keeping cows clean. The body of the cow, especially those parts of the belly, flanks, and udder that are immediately above the milk pail, may be a source of bacterial contamination, because manure, loose hairs, bedding, and other foreign

matter may fall into the pail.⁷ Five of the farms surveyed have a concrete slab covering the area where cows are held in readiness for milking. These farmers report that much time and labor is saved by the concrete slab, in addition to aiding in maintaining a lower bacteria count in the milk.

Table V also shows that 92 percent of the farmers kept manure hauled away. The following information was not shown in table form, but was gained through the survey. Manure was hauled away from the barn on an average of every three days with a range from one to thirty days. Sixty percent of the farmers stored the manure on a manure spreader. It was hauled to the field within ten days. Forty percent stored manure in an open pile and left it there from three to thirty days.

All farms reported having cement floor, good ventilation, and good lighting in the milking parlor. This is due to the requirements of the health department for making parlor for Grade A milk production.

Ninety-eight percent of the farmers reported that they sprayed the barn for flies an average of once every two weeks. Only eight percent used fly traps or paper. The writer observed that in those barns where trap or paper were used, a large number of flies were destroyed and there

⁷Grant, Fred M., Clean Milk Production, Farmers' Bulletin No. 2017, U. S. D. A., 1950, p. 11.

was a smaller number of flies present. This would indicate that the use of traps and paper would be a valuable practice for all dairymen.

The survey shows that 30 percent of the farmers washed the floors in the milking parlor after each milking and 96 percent use lime on the floor. The health department recommends cleaning the floor by scraping with a hoe or similar tool and spreading lime over it.

Only 46 percent of the farmers reported having the overhead of the milking parlor ceiled. This is not required by the health department, but does aid in keeping the parlor clean. The ceiling also helps to regulate the temperature of the milking parlor.

TABLE VI
PREPARING COWS FOR MILKING

Practices used by Dairymen	Using the practice	
	Number	Percent
Spray cows for flies	50	100
Wash cows udder before milking	33	66
Use chlorine solution	32	64
Clip hair on flanks and udder	11	22
Brush cows before milking	11	22
Wait at least 3 days after calving before saving milk	50	100

One hundred percent of the farmers surveyed reported that they sprayed their cattle regularly for flies. This is an indication that the farmers are aware of the value of controlling the flies around a dairy. It was observed by the writer, however, that several of the farms, even though they sprayed the premises regularly, had a large number of flies. Table VI shows that 44 percent of the farmers use DDT; thirty two percent use Lindane; and 24 percent used some other insecticide for the control of flies.

Flies are a nuisance around a dairy. They annoy the cows and attendants, and they are a source of contamination to the milk. They soil the walls and utensils with their excrement and are carriers of many diseases.

Table VI showed that 66 percent of the farmers wash the cow's udder before milking, and sixty-four percent use a chlorline solution in this operation. Twenty-two percent of the farmers surveyed clip the hairs on the flanks and udder of the cows. Also, twenty-two percent brush cows before milking.

The cow should be curried and brushed once a day if possible. Before milking the udder and flanks of the cow should be thoroughly brushed. Just before milking each cow, the udder should be wiped with a damp cloth. Clipping the flanks of the cow makes it easier to keep her clean. Washing the udder and wiping dry, although ideal, is not practical or necessary under ordinary conditions unless the

udder is covered with mud or otherwise badly soiled.⁸

Table VI also showed that 100 percent of the farmers wait at least three days after parturition before saving the cow's milk. One hundred percent stated that they did not save milk from cows with injured udders.

Judkins advises dairymen to exclude milk from diseased cows, from diseased udders, and from cows within 30 days before and five days after parturition. This safeguards health because the milk is abnormal.⁹ Some cows have chronic udder trouble and always give milk high in bacteria count. A cow of this type has no place in a dairy.

⁸Judkins, Henry F., and Merrill, J. Mack, The Principles of Dairying, Third Ed., John Wiley & Sons, Inc., New York, N. Y., p. 163.

⁹Sommer, H. H. Market Milk and Related Products, Olsen Publishing Co., Milwaukee, Wis., 1946.

TABLE VII
MAINTAINING HEALTH OF THE COWS

Practices used by Dairymen	Using the Practice	
	Number	Percent
Use strip cup to detect mastitis	15	30
Depend on visual inspection to detect mastitis	35	70
Have cows with mastitis:		
Often	10	20
Seldom	40	80
Continually	0	0
Cows tested for T. B.	50	100
Herd free of T. B.	50	100
Test cows for Bangs disease	29	58
Vaccinate for Bangs disease	44	88
Diseased cows isolated from herd	43	86

Table VII shows that only 30 percent of the farmers use a strip cup to detect mastitis, whereas, seventy percent depend on visual inspection of the cow. When asked how they could tell by visual inspection, most of the farmers stated that the milk would be ropy, lumpy, or bloody. This is a poor way of checking for mastitis because these conditions may be caused by other diseases or injuries or the condition of the cow. It also means that a cow may be diseased several days before it is detected by the attendant.

Of the fifty farmers surveyed, 20 percent reported mastitis occurring often in the dairy herd, 80 percent reported that they seldom had it, and none reported being continually troubled with mastitis. The general conditions of the dairy plant and equipment, on these farms reporting mastitis occurring often, indicated that much of the trouble was due to a lack of proper sanitary measures being practiced.

The health department requires that all cows, from farms selling Grade A milk, be tested once a year for tuberculosis, therefore, each of the fifty farmers reported using this practice.

Only 58 percent of the farmers test their cows for Bang's disease, however, 88 percent practice calfhood vaccination for Bang's disease.

Eighty-six percent isolate diseased cows from the herd. The information gained from this survey indicates that in reality very few farmers isolate diseased cows from the herd. Although a large percentage of the farmers reported that they practice isolation of diseased cows, the writer observed very few farms where facilities were available for this practice. After discussing disease control practices with the farmers, the writer concluded that in most cases the methods used in detecting diseases is too loosely practiced, therefore, cows may have a disease some time before the farmer decides to isolate her from the herd.

TABLE VIII
FARM WATER SUPPLY

Practice used by Dairymen	Using the Practice	
	Number	Percent
Source of water supply:		
Well	39	78
City	7	14
Other	4	8
Water supply plentiful	44	88
Well located above drainage area	41	82
Have sealed pump in well	45	90
Automatic water supply in barn	41	82
Water tested by Health Department	47	94
Indoor toilet	26	52
W. P. A. type toilet	17	34
Other type toilet	7	14

It may be noted in Table VIII that 78 percent of the farmers had a well as the source of water supply; fourteen percent used city water; and eight percent used other sources. Eighty-eight percent had a plentiful supply of water. Eighty-two percent of the wells were located above the drainage area and 90 percent of the farmers have a sealed pump to protect the water supply.

The Health Department requires that the water supply for the milk room and dairy barn be properly located, constructed,

and operated, and shall be easily accessible, adequate, and of a safe sanitary quality.

If the water supply is not protected, it can be a serious source of contamination. Run off water is probably the greatest problem in providing a safe, sanitary water supply. The well, or other source, should be located above the drainage area and a cement, or other suitable material, curb should be put down in the ground deep enough to seal off the seepage.

The following information was not included in table form but is related to water supply. Thirty-nine farmers reported having a well as the source of the water supply. These wells were located an average of 289 feet from a privy, sewer, or septic tank, the range being from 50 1500 feet. They were also located an average of 294 feet from the barn with a range of 15 to 1500 feet.

Table VIII shows that 82 percent of the farmers had an automatic water supply in the dairy barn and milk room. Ninety-four percent of the sources of water were tested by the Tulsa Health Department.

Electricity is playing an important role in the standard of living on the farm as well as aiding in the production of quality milk. This is further emphasized by the fact that 52 percent of the farmers surveyed have indoor toilets. Proper sewage disposal is an important factor in producing clean milk. If rats, birds, and other vermin are allowed to come in contact with sewage, they can contaminate the milk with bacteria that cause human disease. Thirty-four percent of

the farmers surveyed have a W. P. A. type toilet and fourteen percent have other types. The W. P. A. type toilet is an outdoor toilet so constructed as to prevent flies and other vermin coming on contact with the sewage. Those toilets reported as other type were generally a lean-to type construction with no means of disposal of sewage and no provision to prevent entrance of flies.

TABLE IX
FEEDING PRACTICES

Practices used by the Dairymen	Using the Practice	
	Number	Percent
Dusty feed fed while milking	9	18
Silage fed before milking	2	4
Silage fed after milking	22	44
Cows taken off pasture containing plants that effect the flavor of milk at least 3 hours before milking	26	52
Cows fed hay in milking parlor	1	2
Cows fed according to production	42	84

Table IV indicates that only 18 percent of the farmers fed dusty feed while milking. The writer is doubtful of the correctness of this percentage because the survey also shows that 84 percent of the dairymen use a commercial feed which is fed during milking and many of the commercially prepared feeds are dusty.

Four percent of the farmers feed silage before milking and 44 percent feed silage after milking. The survey also shows that only 52 percent of the farmers remove cows from pasture containing plants that effect the flavor of milk, at least three hours before milking.

To make sure that the milk is free from feed flavors, it is desirable that nothing be fed just before or during milking. The food flavor passes through the cow's system and into the milk in a very short time after the food is eaten. Dusty feeds should not be fed just before milking, as the air may thereby be filled with dust and bacteria. While not so much dust or so many bacteria get into the milk as was once supposed, some do get in, and they are likely to be gas-formers and hence very objectionable.¹⁰

Milk is often made unsalable by feed and weed flavors. Feed flavors in milk are most frequently caused by succulent feeds. When fed to dairy cows one hour before milking, silage, green alfalfa, cabbage, turnips, rape, and kale seriously affect the flavor and odor of milk. Green rye, green cow peas, potatoes, dried beet pulp, and carrots affect the flavor and odor of milk only slightly, and green corn, green oats, and peas, green soybeans, pumpkins, and sugar beets have practically no effect on the flavor and odor.

¹⁰ Judkins, Henry F., and Merrill J. Mock, The Principles of Dairying, 3rd Ed., John Wiley & Sons, Inc., New York, N. Y. 1949, p. 163.

Feeds affect the flavor of milk only a few hours after they are eaten. For this reason highly flavored feeds are fed immediately after milking and not just before. If pastures contain plants that cause objectionable flavors or odors in milk, cows should be taken off pasture as long as possible before milking. Some weeds, such as bitterweed, impart objectionable flavors to the milk as long as 24 hours after they are eaten. If such weeds are present, it may be necessary to keep the cows off the pasture until the weeds are eradicated.¹¹

TABLE X
CAUSE OF HIGH BACTERIA COUNT

Causes Reported	Farm Reporting	
	Number	Percent
Mastitis	16	32
Hot weather	6	12
Bad udder	12	24
Uncleanness	9	18
Other	<u>7</u>	<u>14</u>
Totals	50	100

The following information was secured by the writer from the fifty farmers included in this study, but it is not

¹¹Grant, Fred M., Clean Milk Production, Farmers' Bulletin No. 2017, U. S. D. A., 1950, pp. 22, 23.

presented in table form. The fifty farmers surveyed reported an average bacteria count of 11,782 per c. c. for the past twelve months. They reported an average high count of 605,340 bacteria per c. c., and a low count of 4,014 bacteria per c. c.

The writer is doubtful of the correctness of these figures. Many of the reported counts seem too low in view of the observations made while visiting the dairies. The milk ordinance requires that Grade A milk shall not have a bacteria count exceeding 50,000 per c. c. for four consecutive samples taken upon separate days, irrespective of the date of grading or regrading.

Table X lists the causes given by the farmers for the high bacteria counts. Thirty-two percent gave mastitis as the cause, twelve percent gave hot weather, twenty-four gave bad udder trouble, eighteen percent uncleanliness, and fourteen percent reported other causes.

The sources of the common milk bacteria are the cow's udder, the body of the cow, the air, the utensils, the milk-er, and flies. Any one of these sources or a combination of them can cause a high bacteria count, however, a large percentage of the bacteria in milk, when it reaches the milk plant, is the result of multiplication due to improper cooling and not to original contamination.

TABLE XI
DIFFICULTIES OF THE DAIRYMAN

Difficulties Reported	Having the difficulty Number	Percent
Disease	22	44
Labor	9	18
Surplus milk	13	26
Feed cost	25	50
Pasture	10	20
Sanitation	16	32
Herd Replacement	6	12

The fifty farmers surveyed were asked to give the major difficulties or problems they had as dairymen. Forty-four percent gave disease as a major problem. This problem cannot be over emphasized because, broadly speaking, healthy cows are important items on the dairy farm. They are the basis for the production of clean, wholesome milk.¹² The cow must not only look healthy, but they also must be proved free from disease by examinations and tests performed by a competent veterinarian.

Only eighteen percent of the fifty farmers listed labor as a difficulty. This is due to many of the dairy farms being a family business and no hired labor is needed.

Twenty-six percent of the farmers listed surplus milk as

¹²Grant, Clean Milk Production, p. 3.

a difficulty. This is due mainly to improper planning of production throughout the year. Many dairymen have low production during the winter months when the base is set to determine how much milk they can sell as Grade A and receive top prices. During the spring and summer their production is high, thus causing a surplus.

Fifty percent of the farmers surveyed reported feed cost as a difficulty. Although the cost of feed has no relation to the production of clean milk, it is a problem to the dairymen since the cows must be fed in order that milk may be obtained. Providing sufficient pasture is another difficulty listed by twenty percent of the fifty farmers. The quantity of pasture has no relation to clean milk production, but the quality of the pasture definitely effects the flavor and odor of the milk.

Thirty-two percent listed sanitation as a difficulty. Cleanliness should be the watchword on every dairy farm. Utensils are the most important source of contamination on the average dairy farm. Every precaution should be taken to prevent bacteria, yeast, molds, and dirt from getting into the milk. Milking should be done in a clean place. The use of seamless milk pails and cans which are easily cleaned is highly recommended. Use pails for milk and cream only. Wash and disinfect dairy equipment after each use.¹³

¹³Jacob, A. W., Improving the Market Value of Milk and Cream, Okla. Ext. Serv. Cir. No. 404, 1945, p. 4.

SUMMARY OF GOOD PRACTICES USED

1. One-hundred percent of the farmers have electricity.
2. One-hundred percent of the farmers use mechanical boxes to cool milk.
3. Ninety-four percent of the milk is hauled in covered trucks to protect it from the weather and dust.
4. One-hundred percent of the farmers air dry the utensils and store them on a rack specially made for this purpose.
5. All the farmers have well constructed barns and milk rooms.
6. All the farmers cool their milk within an hour after milking.
7. The farmers keep manure hauled away from the barn and spray the barn for flies regularly.
8. All cows are tested annually for tuberculosis.
9. Ninety percent of the farmers have a sealed pump in the well to protect the water supply from contamination.
10. Fifty-two percent of the farmers have modern sewage disposal and many others have plans for installation in the near future.

SUMMARY OF PRACTICES OR WEAKNESSES
THAT MAY BE IMPROVED

1. Milking machines are not kept clean.
2. Poor practices are used in washing and disinfecting utensils.
3. Pails and cans are being used that show signs of rust. This would indicate they are not checked for proper tinning.
4. Milk handlers are careless with personal hygiene.
5. Warm milk is often mixed with cold milk.
6. Although the farmers spray their cattle and barns regularly for flies, they are using insecticides that are not effective.
7. Only twenty-two percent of the farmers brush the cows and keep the hairs clipped on the flanks and udders of the cows.
8. Seventy percent of the farmers depend on visual inspection to detect udder trouble.
9. Poor feeding practices are used in regard to the effect that feed has on the flavor and odor of the milk.

PROBLEMS FOR STUDY AND PLANNING
WITH THE ADULT GROUP

1. Determining the problems of the dairyman in producing clean milk.
2. Controlling udder trouble in dairy cattle.
3. Controlling Bang's disease.
4. Health and cleanliness of attendants.
5. Cooling milk.
6. Controlling flies.
7. Dairy barn and milk room construction.
8. Controlling off-flavors and odors in milk.
9. Care of utensils.
10. Farm water supply and sewage disposal.

DETERMINING THE DIFFICULTIES OF THE DAIRYMAN IN PRODUCING QUALITY MILK

OBJECTIVE: To have the farmers list the problems encountered, and set up a course of study for producing quality milk.

THE SITUATION:

- A. Points for the teacher to bring out in an informal talk.
 - 1. What is quality milk? Quality milk is milk that comes from healthy cows, is of good flavor, is free from dirt, and contains a relatively small number of bacteria, none of which are harmful to human health.
 - 2. Dairy farmers suffer heavy losses each year because of low quality milk.
 - 3. Dairymen could add millions of dollars to their income annually simply by giving attention to factors promoting high quality milk.
 - 4. Practice does not make perfection if we continue to practice mistakes.
 - 5. Most problems are solved easier with assistance. The Agricultural teacher hopes to assist the dairyman in solving his problems.
- B. Things to get from the group.
 - 1. Why should we be interested in producing high quality milk?
 - 2. How does the quality of the milk affect the income of the dairyman?
 - 3. How much milk have the farmers had refused by the milk plant because of its quality?
 - 4. Why was this milk of low quality?

REFERENCES:

- 1. Clean milk production, Farmers' Bul., No. 2017, U. S. D. A.
- 2. Sommer, H. H., Market Milk and Related Products.

PROBLEM 1

WHAT ARE THE PROBLEMS OF THE DAIRYMAN? (FIRST OBJECTIVE)

1. What do you consider to be your greatest difficulties in producing quality milk?
2. How shall we arrange a course of study in order to discuss these problems?

REFERENCES:

Tulsa Health Department

Pure Milk Producers' Association

Practices to arrive at through discussion.

Point 1 of Problem 1

- a. Determine what constitutes a problem.
- b. List the problems given by the farmers.
- c. Problems that may be listed are; (1) udder diseases; (2) Bang's disease; (3) surplus milk; (4) sanitation; (5) health department rulings; (6) cooling milk; (7) dairy barn and milk room construction; (8) fly control; (9) water system and sewage disposal; (10) health and cleanliness of attendant.

Point 2 of Problem 1

- a. Arrange problems in order of importance.
- b. Set dates and hour for meetings.
- c. Assign number topics for discussion at next meeting.

PREVENTION AND CONTROL OF UDDER
DISEASES IN DAIRY CATTLE

OBJECTIVES:

1. To determine the cause of udder diseases.
2. To be able to detect udder diseases.
3. To determine how udder diseases are spread.
4. Make a plan for control of these diseases.

THE SITUATION:

- A. Points for the teacher to bring out in an informal talk.

1. Mastitis is the most common of all udder diseases. It is prevalent in nearly all dairy cattle districts. Not only does it cause milk to be low in quality, but causes great financial loss by lowering the productivity of the cow and, sometimes total loss of the cow.
2. Mastitis is an inflammation of the mammary glands and may affect the milk in several ways.
3. Blue milk, bloody milk, salty, and ropy milk also create a problem in milk production.
4. These diseases can be controlled by using good practices in caring for the cows.

- B. Things to get from the group.

1. How do the udder diseases affect the dairyman?
2. How much milk was lost during the past year by this group due to udder disease?
3. How many cows were sold due to udder diseases?
4. What was the difference in selling price due to disease?

PROBLEM 1

WHAT CAUSES MASTITIS OR UDDER DISEASES? (FIRST OBJECTIVE)

Practices to arrive at through discussion.

Points on Problem 1

- a. Mastitis is caused by bacteria entering the

udder and causing infection.

- b. An injury to the teat or udder tissue may cause mastitic conditions.
- c. Milking with wet hands may cause the teats to chap.
- d. Extending the lactation period longer than normal may cause salty milk.
- e. Sometimes a cow will just give blue milk and must be sold.

REFERENCES:

- 1. Keeping Livestock Healthy, U. S. D. A. Yearbook, 1942.
- 2. Veterinary Guide for Farmers, Vulcan Service.

PROBLEM 2

HOW CAN UDDER DISEASES BE DETECTED? (SECOND OBJECTIVE)

Points on Problem 2.

- a. Use a strip cup at least once each day. (Show strip cup to farmers.)
- b. Chemically treated cards are satisfactory in detecting mastitis, they should be used every day. (Show card and explain how to use it.)
- c. Visual inspection is not satisfactory because a cow may be diseased some time before it is detected.
- d. Visual inspection is the only way to detect injuries or chap conditions.
- e. Any time you are in doubt about an udder disease, the veterinarian should be contacted.

PROBLEM 3.

HOW DO UDDER DISEASES SPREAD? (THIRD OBJECTIVE)

Practices to arrive at through discussion.

Points on Problem 3

- a. Bacteria is present in pond water and marshes. If cows are permitted to enter these places,

they may be infected with bacteria causing mastitis.

- b. Cows that have an udder disease should be milked last and every precaution taken to sterilize utensils to prevent spreading to other animals. Milking with wet hands is an ideal way to spread udder diseases because the moisture permits the bacteria to be transmitted.
- c. Cows coming in contact with each other may transmit the disease.

REFERENCES:

Keeping Livestock Healthy, U. S. D. A. Yearbook, 1942.

Veterinary Guide for Farmers, Vulcan Service.

PROBLEM 4

A PLAN OF CONTROL FOR UDDER DISEASES. (FOURTH OBJECTIVE)

Practices to arrive at through discussion.

Points on Problem 4

- a. Use strip cup or chemically treated card daily to detect these diseases as soon as possible.
- b. Practice strict sanitation.
- c. Isolate diseased cows from the rest of the herd.
- d. Milk diseased cows last and sterilize all equipment before using on other cows.
- e. Prepare a watering place below the pond dam and fence the pond so that cows cannot enter.
- f. Keep medicinal preparations on hand at all times for treatment of disease as soon as it is detected. (Consult veterinarian for recommended preparations.)
- g. Closely observe cows in order to detect any injury or visible infection and give it prompt attention.

REFERENCES:

Veterinary Guide for Farmers, Vulcan Service.

Keeping Livestock Healthy, U. S. D. A. Year-
book, 1942.

DAIRY BARN AND MILK ROOM CONSTRUCTION

OBJECTIVES: To determine:

1. The need for and proper location of the dairy barn.
2. The materials to use and the type of building to erect.

THE SITUATION:

A. Points for the teacher to bring out in an informal talk.

1. To aid in keeping cows healthy and in keeping them clean with as little labor as possible, the barn should provide plenty of sunlight and good ventilation.
2. Good ventilation also helps to preserve the wood structure of the building.
3. Plenty of sunlight and good ventilation helps to prevent off-flavors and odors in milk.
4. The arrangement and construction of the milk room is very important in producing clean milk.

B. Things to get from the group.

1. Get some examples from the group of the type of construction used in the community.
2. What is a good location for a dairy barn?
3. Why are the materials used in constructing the barn important in producing quality milk?
4. What are the health department requirements for the milk room?

REFERENCES:

1. Tulsa Health Department Milk Ordinance, Tulsa Oklahoma.
2. Morrison, Feeds and Feeding.
3. Judkins, H. F., The Principles of Dairying.

PROBLEM 1

WHAT IS THE NEED FOR AND THE PROPER LOCATION OF A DAIRY BARN? (FIRST OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 1

- a. A good dairy barn or milking parlor aids in keeping the cows healthy.
- b. Makes it easier to prevent dust.
- c. Makes it easier to control flies.
- d. Aids in keeping cows clean.
- e. More comfortable for cows and attendants.
- f. The barn should be located on high ground which drains well.
- g. It should be located a safe distance from poultry houses, privies, hog sheds, and manure piles.

PROBLEM 2

MATERIALS AND CONSTRUCTION OF DAIRY BARN. (SECOND OBJECTIVE)

1. What kind of materials are used?
2. How may the barn be constructed in order to give satisfactory results?

REFERENCES:

Sommer, H. H., Market Milk and Related Products.
 Morrison, Feeds and Feeding.
 Judkins, H. F., The Principles of Dairying.
 Clean Milk Production, Farmers' Bul., No. 2017,
 U. S. D. A.

Points that may be developed in the discussion.

Point 1 of Problem 2. Kind of Material

- a. Materials used are; (1) cement; (2) wood; (3) tile; (4) sheet rock.
- b. Floors should be made of cement for easier cleaning.

- c. Cement block or tile brick construction with sheet rock interior is easier cleaned and it also prevents cracks.
- d. Wood or frame buildings are the least desirable because they are harder to keep clean.

Point 2 of Problem 2. Constructing the Barn

- a. Size of the milking parlor will depend on the desire of the individual who is building.
- b. There should be four square feet of glass per cow, properly spaced.
- c. Have 500 cubic feet of air space per cow.
- d. Proper ventilation may be obtained by using a flue system or tilting the windows.
- e. Construct the building in such a way to leave as few ledges and other places to collect dust as possible.
- f. The milk room must have a cement floor, well drained and equipped with a trapped drain.
- g. Walls and ceiling must be of such construction to permit easy cleaning.
- h. All windows and doors must be screened and it shall have self-closing, outward-opening doors at each end of the passageway leading to the barn.
- i. It shall be used for no other purpose except for the care of milk and bactericidal treatment and storage of milk utensils.

HEALTH AND CLEANLINESS OF ATTENDANTS

OBJECTIVES: To determine:

1. The human diseases that may be carried by milk.
2. The importance of attendants having physical examinations.
3. The effect personal hygiene has on the quality of milk.
4. Hygienic practices to be used by the attendant.

THE SITUATION:

A. Points for the teacher to bring out in an informal talk.

1. Some communicable diseases of man may be carried in milk.
2. The bacteria that cause these diseases may be carried by people who are apparently well.
3. The milk handler should always bear in mind that he is handling a human food which is easily contaminated. He should be clean at all times when handling milk.

B. Things to get from the group.

1. How often do you have physical examinations?
2. Do you have facilities in the milk room for washing hands?
3. Have any of you had experience with milk born diseases? (Discuss.)
4. Do you keep a suit of clothes at the barn to use for milking?

REFERENCES:

1. Clean Milk Production, Farmers' Bul., No. 2017, U. S. D. A.
2. Judkins, Henry J., The Principles of Dairying., John Wiley & Sons., Inc., N. Y.

PROBLEM 1

HUMAN DISEASES THAT MAY BE CARRIED IN MILK. (FIRST OBJECTIVE)

Points that may be developed in the discussion

Points on Problem 1

- a. Tuberculosis
- b. Typhoid Fever
- c. Diphtheria
- d. Scarlet Fever
- e. Septic Sore Throat
- f. Discuss these diseases and site some case histories. (Consult a local physician for case histories.)

PROBLEM 2

IMPORTANCE OF ATTENDANTS HAVING PHYSICAL EXAMINATIONS. (SECOND OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 2.

- a. Communicable diseases can be carried in milk.
- b. A person may have a communicable disease and not know it.
- c. Aids in promoting the milk industry.
- d. Builds up consumer faith in the product.
- e. Helps to safeguard the health of the family.

PROBLEM 3

EFFECT OF PERSONAL HYGIENE ON QUALITY OF THE MILK. (THIRD OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 3.

- a. He may add bacteria to the milk from unclean hands, dust from unclean clothes, or by coughing or sneezing over an open milk container.

- b. Uncleanliness may make the milk less appetizing.
- c. Dirty clothing may cause undesirable flavors or odors in the milk.

REFERENCES:

Clean Milk Production, Farmers' Bul., No. 2017,
U. S. D. A.

Sommer, H. H., Market Milk and Related Products.

PROBLEM 4

HYGIENIC PRACTICES TO BE USED BY THE ATTENDANT. (FOURTH OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 4.

- a. Just before milking, wash hands with soap and water.
- b. Put on a clean suit that is used for no other purpose.
- c. Wash and boil this suit regularly.
- d. Milk with dry hands.
- e. Never sneeze or cough over milk containers.
- f. Don't wipe dirt off udders with hands.
- g. Wash hands during milking process as often as necessary to keep them clean.

REFERENCES:

Clean Milk Production, Farmers' Bul., No. 2017,
U. S. D. A.

Sommer, H. H., Market Milk and Related Products.

BANG'S DISEASE

OBJECTIVE: To determine:

1. Losses to farmers in the community due to Bang's disease.
2. How Bang's disease is spread.
3. How Bang's disease may be controlled.

THE SITUATION:

A. Points for the teacher to bring out in an informal talk.

1. Brucellosis is cattle enemy number one. It causes losses to cattle owners through reduced milk production and abortion.
2. It sometimes leaves cows sterile.
3. On an average, the disease lowers milk production about 20 percent, and the value of the infected animal is reduced accordingly. The United States Livestock Sanitary Association estimates that brucellosis causes an animal loss of over \$85,000,000.
4. Brucellosis can be controlled if recommended practices are used.

B. Things to get from the group.

1. How many of you have your cows tested for Bang's disease? How many practice calfhood vaccination?
2. How many of you isolate diseased cows from the herd?
3. How many cows have you had infected with Bang's disease during the past year. How many cows aborted?

REFERENCES:

1. Keeping Livestock Healthy, U. S. D. A. Yearbook, 1942.
2. Veterinary Guide for Farmers, Vulcan Service.

PROBLEM 1

WHAT IS THE LOSS TO FARMERS IN THE COMMUNITY DUE TO BANG'S DISEASE? (FIRST OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 1.

- a. The value of cattle sold because of Bang's disease will be determined from figures given by the group.
- b. Loss due to decrease in milk production may also be ascertained if possible.
- c. Loss of calves due to abortion should be added in the total loss.

PROBLEM 2

HOW IS BANG'S DISEASE SPREAD? (SECOND OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 2.

- a. Bang's disease affects the reproductive organs of the animal, therefore any discharge from this region of the infected animal can spread the disease.
- b. The aborted fetus and afterbirth are laden with Brucella organisms and may be spread in many ways.
- c. Calves may spread the disease by drinking milk of infected cows and passing the germ through the droppings.
- d. Although bulls are not affected by Bang's disease, the infection may lodge in the sex organs of the bull, then he becomes a dangerous carrier.

PROBLEM 3

HOW CAN BANG'S DISEASE BE CONTROLLED? (THIRD OBJECTIVE)

Points that may be brought out in the discussion.

Points on Problem 3.

- a. Blood tests of cattle is the only way to properly diagnose Bang's disease.

- b. The reactors should be sold. (See Veterinarian for State Plans for Control).
- c. Strict sanitation measures should be practiced to prevent spreading the disease.
- d. All calves under six months of age should be vaccinated with Strain 19.

CONTROLLING FLIES

OBJECTIVES: To determine:

1. The effect flies have on the animal.
2. How to control flies.

THE SITUATION:

A. Points for the teacher to bring out in an informal talk.

1. The relation of flies and other insects to animals is one of considerable complexity.
2. Some insects are injurious to animals in many different ways.
3. Some carry disease germs on their beaks, hairy bodies, and transfer them mechanically; others serve as necessary hosts of disease germs or of higher forms of life such as parasitic worms.
4. Some insects injure livestock by biting and by crawling and scratching.
5. Regardless of how they affect the animal, all harmful insects must be controlled in order to receive maximum efficiency from livestock.
6. Most farmers spray for flies often, but their efforts are fruitless because of the insecticides used.

B. Things to get from the group.

1. How often do you spray your cattle and barns for flies?
2. What insecticides do you use?
3. Does the insecticide you use control the flies? How long a period?
4. What kind of flies or insects are you bothered with?

REFERENCES:

1. Keeping Livestock Healthy, U. S. D. A. Yearbook, 1942.

2. The Farm Quarterly, Summer 1952.
3. Veterinary Guide for Farmers, Vulcan Service.

PROBLEM 1

WHAT EFFECT DO FLIES AND INSECTS HAVE ON THE ANIMAL?
(FIRST OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 1.

- a. Some flies and insects bite the animal and suck blood. Blood-sucking insects may take as much as one quart of blood from an animal in one day.
- b. Some flies lay eggs that hatch into worms that cause damage. (Grubs, screw worms, etc.)
- c. Some flies and insects are carriers of diseases and spread these diseases by going from animal to animal.
- d. The sucking of blood and general irritation of insects cause lower vitality of the animal. This reduces the productivity of the animal.

PROBLEM 2

HOW CAN FLIES AND INSECTS BE CONTROLLED? (SECOND OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 2.

- a. The first step to take in controlling flies is to clean up all possible breeding places.
- b. Manure is an excellent breeding place for flies, therefore, manure should be kept hauled away from the barn and spread on the fields.
- c. Piles of vegetable matter and other rubbish should be scattered.
- d. Sanitary practices should be used in all operations of the dairy because any insanitary conditions attract flies.
- e. It is impossible to completely prevent flies from breeding, therefore, insecticides must be used.

- f. The insecticides recommended for fly control are; (1) D D T; (2) Methoxychlor; (3) Chlordane; (4) Toxaphene; (5) Lindane; (6) Pyrethrum. (See Farm Quarterly, Summer 1952 for methods of application and residual effect of each.)
- g. Every farmer should make a spray calendar to fit the insecticide he uses.

REFERENCES:

Keeping Livestock Healthy, U. S. D. A. Yearbook, 1942.

The Farm Quarterly, Summer 1952.

COOLING MILK

OBJECTIVES: To determine:

1. The importance of properly cooling milk.
2. The methods of cooling milk.
3. Care of milk while cooling.

THE SITUATION:

A. Points for the teacher to bring out in an informal discussion.

1. The presence of large numbers of bacteria in milk when it reaches the milk plant is due to improper cooling and keeping the milk at too high a temperature during storage, transportation, and delivery.
2. Properly cooling milk may be the answer to the problem of high bacteria count for some of you.

B. Things to get from the group.

1. What method do you use to cool your milk?
2. How soon is it cooled after milking?
3. Do you mix warm milk with that of a previous milking?
4. To what degree do you cool your milk?

PROBLEM 1

THE IMPORTANCE OF PROPERLY COOLING MILK. (FIRST OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 1

- a. Milk should be cooled to 50 degrees F. or less within an hour after milking.
- b. When milk is cooled to 50 degrees or below, it retards or stops multiplication of the bacteria.
- c. Bacteria multiplies very rapidly as the temperature rises above 50 degrees. (Show experimental data

relating the rate at which bacteria multiply at different degrees of temperature. U. S. D. A. Bul., 2017.)

PROBLEM 2

WHAT ARE THE METHODS USED IN COOLING MILK? (SECOND OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 2

- a. Rural electrification has made it possible for almost everyone to use mechanical refrigeration for cooling milk. (Discuss these machines.)
- b. Ice is a good cooling agent and is used in many cases when electricity is not available.
- c. Cold water from the well or spring may be used by running it through the milk cooler and out to stock tanks.

REFERENCES:

Judkins, H. F., The Principles of Dairying.

PROBLEM 3

CARE OF MILK WHILE COOLING. (THIRD OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 3

- a. Milk containers should be covered to prevent bacteria or water from the cooler entering the milk.
- b. Stirring the milk while cooling will cause it to cool faster, but the contamination caused by stirring is too great to justify this practice.
- c. Warm milk should never be mixed with cold because it hastens bacterial growth by warming up the whole mass.

REFERENCES:

Clean Milk Production, Farmers' Bul., No. 2017, U. S. D. A.

Sommer, H. H., Market Milk and Related Products.

CONTROLLING OFF-FLAVORS AND ODORS IN MILK

OBJECTIVES: To determine:

1. What causes off-flavors and odors in milk.
2. What practices to use in order to prevent off-flavors and odors in milk.

THE SITUATION:

A. Points for the teacher to bring out in an informal talk.

1. Milk is often made unsalable by feed and weed odors. Feed flavors in milk are most frequently caused by succulent feeds.
2. The flavor of the feed enters the milk through the blood stream of the cow and affects the milk within a short time after the feed is eaten.
3. Odors from feed or other articles are absorbed by the milk unless the building is well ventilated.

B. Things to get from the group.

1. How much milk have you had returned or sold for a lower price due to off-flavors or odors?
2. What causes off-flavors and odors in milk?
3. How may these conditions be prevented?

REFERENCES:

1. Morrison, Feeds and Feeding.
2. Clean Milk Production, Farmers' Bul., No. 2017, U. S. D. A.
3. Judkins, H. J., The Principles of Dairying.

PROBLEM 1

WHAT CAUSES OFF-FLAVOR AND ODORS IN MILK? (FIRST OBJECTIVE)

Points that may be developed by the discussion.

Points on Problem 1.

- a. The feeds that may cause off-flavors are;
 (1) silage; (2) green alfalfa; (3) cabbage;
 (4) turnips; (5) rape; (6) kale; (7) green
 rye; (8) green cowpeas; (9) potatoes; (10)
 dried beet pulp.
- b. Weeds that may cause off-flavors in milk are;
 (1) garlic; (2) onions; (3) bitter weed;
 (4) stink weed.
- c. Dust, especially from feed, may cause off-
 flavors or odors.
- d. The length of the lactation period, barn odors,
 and cow odors affect the odor and flavor of milk.

PROBLEM 2

WHAT PRACTICES SHOULD BE USED TO PREVENT OFF-FLAVORS AND
 ODORS IN MILK? (SECOND OBJECTIVE)

Points that may be developed in the discussion.

Points on Problem 2.

- a. Feeds that affect the flavor and odor of milk
 should be fed after, never just before, milk-
 ing.
- b. Weeds that affect the flavor or odor of the
 milk should be eradicated.
- c. When cows are grazing plants that affect the
 flavor and odor of the milk, they should be re-
 moved from the pasture at least three hours be-
 fore milking.
- d. Good ventilation in the barn is necessary to
 prevent barn odors, and cows should be kept
 clean to prevent cow odors.

FARM WATER SUPPLY AND SEWAGE DISPOSAL

OBJECTIVES: To determine:

1. How to safeguard the water supply.
2. The proper location of the sewage disposal area.

THE SITUATION:

A. Points for the teacher to bring out in an informal discussion.

1. All the water on the farm should be pure, even that to which only the cattle have access. If cows wade in polluted water, disease bacteria may adhere to them and later fall into the milk.
2. The disposal of sewage is another important factor in the production of clean milk. Many kinds of bacteria, at times disease-producing ones, are contained in the discharge from the human body. Pollution is carried by water flowing underground as well as by surface water. Flies, birds, and insects may also transmit bacteria from the sewage to the milk if permitted to come in contact with it.

B. Things to get from the group.

1. Where should the well be located?
2. Do you have a water-tight covering on the well?
3. What type of soil is in the area around the well?
4. Why is the location of the sewage disposal area so important?

REFERENCES:

1. Sewage and Garbage Disposal on the Farm, Farmers' Bul., 1950, U. S. D. A.
2. Water Systems for the Farm Home, Okla. Ext. Serv. Cir., No. 473.

PROBLEM 1

HOW CAN THE WATER SUPPLY BE SAFEGUARDED?

Points that may be developed in the discussion.

Points on Problem 1.

- a. The well should be located at least 50 feet (preferably 100 feet) from any source of pollution.
- b. The well should have a water-tight covering.
- c. A water-tight casing should be put in the well to a depth of at least 10 feet.
- d. The area around the well should be well drained.
- e. The water should be tested by the health department.

PROBLEM 2

WHAT IS THE PROPER LOCATION OF THE SEWAGE DISPOSAL AREA?
WHY IS IT IMPORTANT?

Points that may be developed in the discussion.

Points on Problem 2.

- a. Sewage should be disposed of in the top three-foot layer of the soil if the water table is several feet below this.
- b. The disposal area should be located at least 100 feet from the water supply.
- c. Sewage should be slowly dissipated through the soil.
- d. Sewage contains bacteria, many of which are harmful.
- e. Sewage does not become purified in running water.
- f. Overflow water or seepage may carry disease bacteria for a great distance.

CARE OF UTENSILS

OBJECTIVES: To determine:

1. The need for clean utensils.
2. The necessary practices to use in order to have clean utensils.

THE SITUATION:

A. Points for the teacher to bring out in an informal talk.

1. Under most conditions utensils are the biggest single source of contamination of market milk.
2. The number of bacteria contained in a utensil depends upon; (a) the thoroughness of washing; (b) sterilization; (c) time, temperature, and dryness of storage; (d) rinsing or sterilizing just prior to use.
3. Experimental data shows that milk cans washed with a mechanical washer at the milk plant contained 1.5 bacteria per c. c., but after these cans were returned to the producer and allowed to stand with lids on for 24 hours, the bacteria count was 13,360 per c. c. in new cans and 40,180 per c. c. in old cans.

B. Things to get from the group.

1. Why is it necessary to thoroughly wash utensils immediately after use?
2. Why is it necessary to keep utensils clean?
3. What items of equipment are necessary to properly clean utensils?
4. Why should utensils be dried quickly and thoroughly?
5. Do you rinse utensils just prior to use?

REFERENCES:

Sommer, H. H., Market Milk and Related Products.

Clean Milk Production, Farmers' Bul.,
No. 2017, U. S. D. A.

Judkins, H. F., The Principles of Dairy-
ing.

PROBLEM 1

WHY IS IT NECESSARY TO HAVE CLEAN UTENSILS? (FIRST
OBJECTIVE)

Points that may be developed by the discussion.

Points on Problem 1.

- a. Clean utensils prevents or greatly reduces bacteria that may be transmitted to the milk.
- b. Prevents off-flavors and odors caused by sour milk.
- c. Protects the health of the consumer.
- d. Promotes good relations between producer and consumer.

PROBLEM 2

WHAT ARE THE NECESSARY PRACTICES TO USE IN CLEANING
UTENSILS? (SECOND OBJECTIVE)

Points that may be developed by the discussion.

Points on Problem 2.

- a. Utensils should be washed immediately after use because there are less bacteria at this time. Milk forms a film on utensils which is excellent for bacterial growth.
- b. Treating utensils, that have a milk film, with a disinfectant will only kill the bacteria on the surface.
- c. Utensils should first be rinsed in cold or luke warm water. Do not use hot water because it will "set" the milk film and cause milk stone.
- d. Follow rinsing with a thorough scrubbing. Use hot water, a good stiff brush, and a good dairy cleansing powder. Never use rags, soap or soap

powder. Scrub all surfaces until they are absolutely clean.

- e. Give special attention to all corners, seams, joints, and cracks. These are the places where dirt accumulates.
- f. Rinse in clean hot water.
- g. Rinse in a chemical solution to kill the bacteria.
- h. Invert utensils on a rack and let them air dry. If utensils remain moist and in a temperature of 55 degrees F. or higher, bacteria multiply rapidly.
- i. The milking machine should be washed in the same manner as other utensils, then put in a chemical solution and allowed to remain there until the next milking. Rinse thoroughly with clean, pure water before using.

A LIST OF AUDIO-VISUAL AIDS THAT
MAY BE USED WITH THE TEACHING PLANS

1. John Martin and Son - 11 minutes. Scenes of dairy farms.
2. Quality Milk - $13\frac{1}{2}$ minutes.
Source: Audio-Visual Center,
Okla. A. & M. College, Rental
3. Dairy Products, Bip Goes to Town - 10 minutes.
4. More Milk - 11 minutes.
5. Modern Milk - 18 minutes.
6. Milky Way Out - 20 minutes.
Source: Castle Films Div., U. S. Films Inc.
Russ Building
San Francisco, California
7. Dairy Farm - 15 minutes.
Source: Coronet Instructional Films,
65 E. South Walker St.,
Chicago, Illinois
8. How to Get Our Milk - 15 minutes.
9. Story of Milk - 45 minutes.
Source: Bray Studios, Inc.,
729 7th Ave.,
New York 19, New York
10. Producing Quality Milk - 27 minutes.
Source: Milk Industry Foundation,
1001 15th St., N. W.
Washington 5., D. C.
11. Milk - 8 minutes.
Source: Filmsets, Inc.,
1956 N. Seminary Ave.,
Chicago 14, Illinois

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THESIS TITLE: AN EDUCATIONAL PROGRAM FOR ADULT
FARMERS IN THE PRODUCTION OF
QUALITY MILK

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The content and form have been checked and approved by the author and thesis adviser. Changes or corrections in the thesis are not made by the Graduate School office or by any committee. The copies are sent to the bindery just as they are approved by the author and faculty adviser.

TYPIST: ROBERTA SHIRK