

August 9, 1966

To the Graduate Council:

I am submitting herewith a thesis written by Kenneth Gordon Keyes entitled "Production and Management Practices of Selected Beef Cattle Producers in Campbell County, Tennessee." I recommend that it be accepted for nine quarter hours of credit in partial fulfillment of the requirements for the degree of Master of Science, with a major in Agricultural Extension.

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PRODUCTION AND MANAGEMENT PRACTICES
OF SELECTED BEEF CATTLE PRODUCERS
IN CAMPBELL COUNTY, TENNESSEE

A Thesis
Presented to
the Graduate Council of
The University of Tennessee

In Partial Fulfillment
of the Requirements for the Degree
Master of Science

by
Kenneth Gordon Keyes

August 1966

ACKNOWLEDGMENTS

The author hereby expresses appreciation to the Campbell County beef cattlemen whose splendid cooperation made this study possible.

Gratitude is expressed to Dr. Lewis H. Dickson, chairman of the graduate committee, for his counseling and guidance in the designing and writing of this thesis. Appreciation is also extended to other members of the graduate committee, Dr. Robert S. Dotson and Dr. Harold Smith. Their suggestions and patience were sincerely appreciated.

He expressed his appreciation to Dr. Webster Pendergrass, Dean, College of Agriculture, The University of Tennessee, and Dr. Vernon W. Darter, Director, Agricultural Extension Service, The University of Tennessee, and also Agricultural Extension District Supervisors Jesse E. Francis and John B. Brower, Jr., for granting in-service training leave for the purpose of doing graduate study.

Also, the author is grateful to J. Horace Brown, County Agent in Campbell County, Tennessee, for his assistance in obtaining the data, and to county agents J. Hughes

Barnes, Robert Haston, Jr., W. Harold Julian, and E. F. Ivens of The University of Tennessee Extension Service, for their cooperation during this study.

The writer further wishes to express his appreciation to his wife, Laura, for her encouragement and assistance during the preparation of this study.

K. G. K.

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CHAPTER I

INTRODUCTION

I. THE PROBLEM AND NEED FOR THE STUDY

In the area of beef production and marketing, it is the recognized responsibility of the Tennessee Agricultural Extension Service to provide effective educational assistance to cattlemen interested in increasing their efficiency (6:8).*

Prior to the study, no previous formal attempts had been made to determine the Campbell County beef production and marketing situation in detail as it related to those who used the cow-calf system.

Campbell County, located in the northwestern corner of East Tennessee, traditionally has depended principally on livestock and tobacco for its agricultural income. By 1961, there was a total of 7,000 cows and calves in the county (5:9); and by 1964, 458 acres of tobacco were being

*Numbers in parentheses refer to numbered references in the bibliography; those after the colon are page numbers.

grown (4:1). In the early 1960's, beef production and tobacco interchangeably ranked first and second in total agricultural income from year to year (5:9).

In May, 1966, the Tennessee Extension Animal Husbandman was asked what percent of the Tennessee beef producers were using the cow-calf system in 1965. His estimate was 95 percent. Likewise, the County Agent of Campbell County, in June, 1966, estimated that approximately 90 percent of the beef producers in Campbell County were using that system in 1965.

Prior to the present study, observations in Campbell County indicated that county beef producers were not using many of the recommended cow-calf practices. For example, among the problems noted were: (1) the amount of pasture and silage produced on beef cattle farms was seen to be inadequate in both quantity and quality; (2) beef producers were failing to apply recommended breeding practices; (3) beef cattle growers were marketing too many low quality lightweight calves; and (4) the feeding facilities were inadequate on many beef cattle farms (2:31). It was felt that additional information was needed by the Campbell County Extension staff if they were to plan for a more

effective educational program involving such beef cattle producers.

II. PURPOSES

The purposes of this study, then, were: (1) to determine the characteristics of cattlemen using the cow-calf system in high, medium, and low production categories; (2) to ascertain which of certain recommended practices they were and were not following; and (3) to discover some of the important factors influencing cattlemen to adopt or not adopt recommended practices.

CHAPTER II

REVIEW OF LITERATURE

At the time of the study, very little research had been done to determine the educational needs of cattlemen following the cow-calf system in Tennessee and neighboring states. Considerable research had been conducted by The University of Tennessee, College of Agriculture, verifying the worth of certain practices focused on in this study. Such recommended practices had been identified with regard to beef breeding, feeding, and management recognized to be the three most important phases of the cow-calf system.

I. CHARACTERISTICS OF BEEF PRODUCERS AND THEIR HERDS

In a 1964 Tennessee study of beef production and marketing in the Elk River Watershed conducted by Ranney (10:7), it was found that the average number of brood cows on 7,500 farms was seventeen. Fifty-seven percent of the farms had Hereford cows and 15 percent had Angus cows, while 70 percent had Hereford sires and 24 percent had Angus sires. The average value of calves sold and weaned was

\$82.00 per cow bred. Most of the calves were sold at weekly auctions, a considerable number sold at home, and a small number sold at organizational and special stocker sales.

In a Tennessee Project III statement for 1966-67 (2:31), a study of the beef cattle handling and feeding facilities indicated that they were inadequate on many farms. The inadequacies were reflected in inefficient use of labor and excessive waste of food.

II. PRODUCTION PRACTICES

A 1952 survey of 24 beef producers in a Georgia county, used by Boston (3:27) as a basis for developing a ten-meeting adult teaching unit, identified, among others, three main areas needing attention, namely: (1) provision of adequate forage; (2) feeding of protein supplement; and (3) control of diseases and parasites. Boston taught the cattlemen based on this information and was able to get a limited degree of improvement in practice usage.

According to Tyrrell (12:2), April 1 to about August 1 normally constitutes the recommended breeding season for commercial herds in Tennessee. The bull should be removed to a separate pasture lot after this time.

Merriman (7:2) noted that pregnancy checks can help the cattleman: (1) detect cows not pregnant so they can be culled; (2) identify a herd-wide sterility problem, and (3) have a basis for separation of pregnant cows into groups according to time of calving.

Tyrrell (14:13) stated that protein supplement should be produced to make up deficiencies in low quality farm grown or non-leguminous roughages, or adequate alfalfa or other legume hay should be grown. Four pounds of good legume hay has been found to equal about one pound of 40 percent protein supplement.

Morrison (8:783) noted that beef cattle should have salt and other minerals (dicalcium phosphate or steamed bone meal) regularly where they can take what they wish. Cattle prefer the softer kinds of block salt to that which is very hard. More loose salt is consumed by the cattle, but also is more expensive.

Tyrrell (13:38) states that the Tennessee Beef Performance Testing program offers breeders a practical measurement to determine differences in animals. It consists of: (1) obtaining performance information to weaning time; (2) recording and analyzing post-weaning performance;

and (3) testing of progeny. Tennessee data indicate that there are extreme differences in the ability of beef cattle in the same herd and same environment to gain, that type and rapid economical gains do not always go together, and that through selection, it is possible to combine in one animal the qualities of excellent conformation, regularity of production, heavy weaning weights, economical feed lot gains, and meatiness.

Powell (9:1) noted that performance testing was a tool or procedure by which beef cattle breeders can discover and measure differences in the inherited abilities of individual beef animals. The producer benefits both from the herd improvement and higher income. Better selection and culling, heavier calves at weaning time, higher grades, lower feed costs and more regular and consistent reproduction all follow recommended use of performance testing when it is compared with other systems.

Tyrell (13:28) found that castrated calves returned from \$3 to \$5 per hundred more than calves not castrated; and dehorned calves from \$2 to \$3 per hundred pounds more than horned calves for Tennessee cattlemen who participated in demonstrational feeder cattle sales.

Stanley, et al (11:5) noted that external parasites (lice, ticks, mites, and flies) attack livestock causing slow weight gains, low milk production, and severely damaged hides, resulting in an estimated annual loss of nearly \$15 million for the Tennessee farmers.

Ranney (10:1) noted in the Tennessee Elk River Watershed study that no one factor, or production or marketing practice, by itself, was the sole cause of high or low performance in beef cattle production; but, rather, that a combination of practices results in such performance.

III. FACTORS INFLUENCING THE ADOPTION OF PRACTICES

Studies (1:4) have shown that farmers adopt new ideas or practices at different times. They tend to be at different stages in the adoption process at different times as it may relate to a given recommended practice or bundle of practices.

Most authorities (1:7) agree that the stages in the adoption process include the following: (1) awareness, (2) interest, (3) evaluation, (4) trial, and (5) adoption. Research has indicated, in general terms, that as one proceeds from unawareness to adoption that more and more

intensive or personal contacts are required if adoption of a practice is to result.

At the "aware" and "interested" stages, mass media sources, such as farm magazines, newspapers, and radio, are most important. At the "evaluation" and "trial" stages, neighbors and friends are generally more important influences than mass media. When farmers move closer to the adoption stage, personal contacts with representatives of agricultural agencies are of more importance, but may still be secondary to neighbors and friends.

CHAPTER III

METHODS

All agricultural agencies in Campbell County were contacted and a complete list of beef cattle producers was obtained.

The study was limited to all beef cattle farmers using the cow-calf system who had fifteen or more cows in 1964. Thirty-six farmers were in this category, and the sample consisted of the total population.

An interview schedule was developed (see Appendix A) and used to obtain the data. In the process of developing the survey instrument, a study was made of relevant Extension publications and Experiment Station bulletins in an effort to identify the currently recommended beef production practices. Appropriate staff members in the department of Animal Husbandry-Veterinary Science reviewed the schedule and otherwise assisted in its development. The instrument was pretested by interviewing five beef cattle producers who had fewer than fifteen cows in their herd. Following the

pretesting, necessary adjustments were made both in the schedule and in the interview technique. Each beef cattleman was personally interviewed. In addition, six judgment questions were completed by the interviewer after each respondent was interviewed. The questions gave the interviewer's opinion of the respondent's interest, attitude, attention to management and how familiar the interviewer was with the respondent's herd.

The data were analyzed for all producers and for high, medium, and low production thirds in simple numbers and percents, and averages were computed where appropriate. Separation of the cattlemen into production thirds was based on the pounds of beef weaned per cow in 1964 (see Table I). Main comparisons in the study were made between high and low producers, since largest management differences would be expected between these two extreme groups.

Thirty-one items related to 15 recommended beef production practices (see Appendix B) were included in the interview schedule as a basis for determining the management levels of producers in the high, middle, and low thirds.

TABLE I

NUMBERS OF CAMPBELL COUNTY CATTLEMEN USING THE COW-CALF
SYSTEM ACCORDING TO BEEF WEANED IN 1964 PER COW BRED

Average per cow beef weaned production group	Number of producers in Campbell County	Range of beef weaned per cow within groups (pounds)
Low	12	306-400
Medium	12	401-442
High	12	443-657
Total	36	306-657

Each of the thirty-one items was rated on a scale running from zero to five points based on the degree to which the cattlemen appeared to have been following University recommendations in 1964. A rating of zero was given if the individual was unaware of the recommended nature of the item given and was not using it to any degree. Other points were assigned as follows: (1) one point for token use of the related practice (1 to 25 percent); (2) two points for a larger degree (25 to 50 percent) of application; (3) three points for a medium level (50 to 75 percent); (4) four points for having used the related practice to a substantial degree (75 to 100 percent); and (5) five points for complete (100 percent) use of the related practice.

CHAPTER IV

FINDINGS OF THE STUDY

I. CHARACTERISTICS

The Beef Producers

Table II shows that all thirty-six cattlemen were known by the interviewer. Ninety-two percent of the high producers were known very well or fairly well, while only 67 percent of the low producers were known this well.

Table III shows the interviewer's estimates of the attitudes of the cattlemen toward the survey. The interviewer found 92 percent of the cattlemen to be "friendly" and 8 percent to be only "somewhat friendly." These 8 percent (three cattlemen) were all in the low production group.

The major occupations of all beef cattlemen are shown in Table IV. Sixty-seven percent were full-time farmers, 28 percent were part-time farmers, while 5 percent were retired. More of the high producers (67 percent) were full-time farmers than was true for the low producers (50 percent).

TABLE II

DEGREE TO WHICH INTERVIEWER KNEW ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Degree to which interviewer knew respondent	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Very well	20	56	9	75	7	58	4	33
Fairly well	8	22	2	17	2	17	4	34
Not very well	8	22	1	8	3	25	4	33
Total	36	100	12	100	12	100	12	100

*Percents are rounded to the nearest whole number.

TABLE III

INTERVIEWER'S ESTIMATE OF THE ATTITUDES OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS TOWARD THE SURVEY
BY NUMBERS AND PERCENTS*

Attitude toward the survey	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Not answered	0	0	0	0	0	0	0	0
Friendly	33	92	12	100	12	100	9	75
Somewhat friendly	3	8	0	0	0	0	3	25
Indifferent	0	0	0	0	0	0	0	0
Antagonistic	0	0	0	0	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to the nearest whole number.

TABLE IV

MAJOR OCCUPATIONS OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Major occupation	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Full-time farmer	24	67	8	67	10	83	6	50
Part-time farmer	10	28	3	25	2	17	5	42
Business man	0	0	0	0	0	0	0	0
Wage earner	0	0	0	0	0	0	0	0
Retired	2	5	1	8	0	0	1	8
Other	0	0	0	0	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to the nearest whole number.

The average educational level for all beef cattle owners was grade 10.5. The average level for the high producers was about the eleventh grade (10.8), as compared with about the ninth grade (9.1) for the low producers, as shown in Table V. The largest percent in any single educational level for all owners was the 33 percent in the twelfth grade level. One person had one to three years in college, four had their B. S. degree, and two had done graduate work in college (20 percent having had some college training).

The data in Table VI show that the average age of the thirty-six beef cattlemen in the survey was 52 years. The high producers, averaging 55, tended to be the oldest group, the low averaging 53. At the same time, medium producers had an average age of 49 years, the youngest of the three groups considered.

It is shown in Table VII that the average number of years in total farming experience for all cattlemen was about 32. The high producers had an average of 29 years in farming experience, while the average of the low producers was about 33, which indicated that some relationship may exist between years of experience in farming and production. By referring back to Table VI (page 20) and comparing it

TABLE V

EDUCATIONAL LEVELS OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS;* AND AVERAGE EDUCATIONAL GRADE LEVELS

Educational Grade level	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1 - 4 (Elementary)	3	8	0	0	1	8	2	17
5 - 7	4	11	2	17	1	8	1	8
8	6	17	3	25	0	0	3	25
9 - 11	4	11	2	17	1	9	1	9
12	12	33	3	25	5	42	4	33
1 - 3 (College)	1	3	0	0	1	8	0	0
Bachelor's	4	11	1	8	3	25	0	0
Graduate work or Advanced degree	2	6	1	8	0	0	1	8
Total	36	100	12	100	12	100	12	100
Actual average educational level	10.5 grades		10.8 grades		11.6 grades		9.1 grades	

*Percents are rounded to the nearest whole number.

TABLE VI

AGE GROUPS OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS,* AND AVERAGE AGES

Age category	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
20 - 29	1	3	0	0	1	8	0	0
30 - 39	9	25	2	17	3	25	4	33
40 - 49	6	17	2	17	3	25	1	8
50 - 59	9	25	3	25	3	25	3	25
60 - 69	6	17	4	33	0	0	2	17
70 - 79	4	11	1	8	1	9	2	17
80 - 89	1	2	0	0	1	8	0	0
Total	36	100	12	100	12	100	12	100
Average age	52		55		49		53	

*Percents are rounded to the nearest whole number.

TABLE VII

TOTAL FARMING EXPERIENCES OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS,* AND AVERAGE EXPERIENCE

Experience in years	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1 - 9	2	6	1	8	1	8	0	0
10 - 19	4	11	0	0	3	25	1	9
20 - 29	11	30	3	25	4	33	4	33
30 - 39	9	25	4	34	1	9	4	33
40 - 49	6	17	3	25	1	9	2	17
50 - 59	2	6	0	0	1	8	1	8
60 - 69	2	5	1	8	1	8	0	0
Total	36	100	12	100	12	100	12	100
Average years	32		29		35		33	

*Percents are rounded to nearest whole number.

with Table VII, it may be seen that the high producers (average age of 55 years) started farming on their own (an average of 29 years prior to the study) at an average age (26 years) that was six years older than the low (who averaged 53 years in age, had started farming an average of 33 years prior the the study and, consequently, must have started farming at an average age of about 20 years).

A look at the number of years of experience in the beef enterprise, as shown in Table VIII, and on the cow-calf system, as seen in Table IX, discloses that all cattlemen had had an average of 26 years of experience with an average of 25 years on the cow-calf system. On the average, the high producers had completed fewer years both in the beef business and using the cow-calf system (23 years for each) than the low producers (27 and 26 years, respectively).

The Farms

Table X shows the median number of total farm acres per farmer to be 142. The high producers had a median of 133 farm acres, while the low producers had a median of 149.

TABLE VIII

BEEF EXPERIENCES OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS,* AND AVERAGE EXPERIENCE

Experience in years	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1 - 9	3	8	1	8	1	8	1	8
10 - 19	5	14	0	0	4	34	1	9
20 - 29	15	32	4	34	5	42	6	50
30 - 39	11	30	7	58	1	8	3	25
40 - 49	0	0	0	0	0	0	0	0
50 - 59	2	6	0	0	1	8	1	8
Total	36	100	12	100	12	100	12	100
Average years	26		23		28		27	

*Percents are rounded to nearest whole number.

TABLE IX

COW-CALF EXPERIENCES OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS,* AND AVERAGE EXPERIENCE

Experience in years	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1 - 9	4	11	1	8	2	17	1	8
10 - 19	4	11	0	0	3	25	1	9
20 - 29	16	44	5	42	5	42	6	50
30 - 39	10	28	6	50	1	8	3	25
40 - 49	1	3	0	0	1	8	0	0
50 - 59	1	3	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Average years	25		23		26		26	

*Percents are rounded to nearest whole number.

TABLE X

TOTAL FARM ACREAGE CATEGORIES OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS,* AND AVERAGE FARM ACRES

Total farm acreage interval	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 50	2	5	1	8	0	0	1	8
50 - 99	5	14	3	25	2	17	0	0
100 - 149	13	36	3	25	5	42	5	42
150 - 199	2	16	0	0	1	8	1	9
200 - 249	5	14	2	17	2	17	1	8
250 - 299	3	8	1	8	1	8	1	8
300 - 349	4	11	2	17	0	0	2	17
350 - 399	1	3	0	0	1	8	0	0
400 - 449	0	0	0	0	0	0	0	0
450 - 499	0	0	0	0	0	0	0	0
500 - 549	0	0	0	0	0	0	0	0
550 - 599	0	0	0	0	0	0	0	0
600 - 649	0	0	0	0	0	0	0	0
650 - 699	1	3	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Median acres in farm	142		133		140		149	

*Percents are rounded to nearest whole number.

It is shown in Table XI that all cattlemen had a median number of cropland acres of 113. The high producers had a median number of cropland acres of only 99, while the median number for the low producers was 133 acres.

The total average number of acres in all pasture and forage for the beef herd was approximately 103 acres as shown in Table XII. Fifty percent of the high producers appear in the 50 to 99 acre group, while 34 percent of the low producers appear in this group. High producers averaged nearly 95 total acres of pasture and forage land, while low producers averaged nearly 128 (33 acres difference).

The Herds

Table XIII shows the average size herd of all cattlemen to be 29. Those cattlemen in the high producing group had a lower average herd size (25 cows) than did the low producing group (35 cows).

It is shown in Table XIV that 72 percent of the cattlemen interviewed owned only Hereford cattle, while an additional 16 percent owned some. The breed of cows in the herd did not appear to be related to production.

TABLE XI

TOTAL CROPLAND ACREAGE CATEGORIES OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS,* AND AVERAGE ACRES

Total cropland Acreage Interval	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 50 (37)	2	17	1	8	0	0	1	8
50 - 99	13	36	5	42	4	33	4	33
100 - 149	14	39	4	33	7	58	3	25
150 - 199	1	3	0	0	0	0	1	9
200 - 249	3	8	1	9	1	9	1	9
250 - 299	1	3	1	8	0	0	0	0
300 - 349	1	2	0	0	0	0	1	8
350 - 399	0	0	0	0	0	0	0	0
400 - 449	0	0	0	0	0	0	0	0
450 - 499	0	0	0	0	0	0	0	0
500 - 549	1	2	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Median acres in cropland		133		99		114		133

*Percents are rounded to the nearest whole number.

TABLE XII

TOTAL ACREAGE FOR PASTURE AND FORAGE PRODUCTION FOR BEEF HERD BY ALL
CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM,
AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Average acreage used for pasture and forage	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Didn't know	3	8	1	8	2	17	0	0
1 - 49	2	6	1	8	0	0	1	8
50 - 99	17	47	6	50	7	58	4	34
100 - 149	9	25	3	25	2	17	4	34
150 - 199	2	6	0	0	1	8	1	8
200 - 249	2	6	1	9	0	0	1	8
250 - 299	0	0	0	0	0	0	0	0
300 - 349	0	0	0	0	0	0	0	0
350 - 399	0	0	0	0	0	0	0	0
400 - 449	1	2	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Average number of acres for those answering	103		95		83		128	

*Percents are rounded to nearest whole number.

TABLE XIII

TOTAL NUMBERS OF COWS BRED IN 1964 BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS,*
AND AVERAGE HERD SIZE

Herd size interval in number of cows	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
15 - 19	9	25	4	33	3	25	2	17
20 - 24	9	25	3	25	4	33	2	17
25 - 29	6	17	1	9	1	9	4	33
30 - 34	2	5	1	8	1	8	0	0
35 - 39	7	19	2	17	3	25	2	17
40 - 44	1	3	1	8	0	0	0	0
55 - 59	1	3	0	0	0	0	1	8
120 - 124	1	3	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Actual average herd size	29		25		25		35	

*Percents are rounded to the nearest whole number.

TABLE XIV

BREEDS OF COWS IN HERDS BELONGING TO ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Breed of herd	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Hereford	26	72	10	84	6	50	10	84
Angus	2	6	0	0	2	16	0	0
Shorthorn	0	0	0	0	0	0	0	0
Hereford and Angus	3	8	0	0	3	25	0	0
Hereford and Shorthorn	3	8	2	16	0	0	1	8
Shorthorn and Angus	2	6	0	0	1	9	1	8
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

As may be seen in Table XV a total of twelve different producers reported an average of 4 purebred cows. No purebred cows were reported by producers having a herd size of 30 or more cows. Only two of the high producers reported purebred herds, while three of the low producers had purebred cattle. High producers had an average of 2 purebred cows, as compared to 4 in the low production group.

It is shown in Table XVI that all cattlemen used an average of 1.4 bulls. Two-thirds (67 percent) of the high producers used a single bull, while a like portion (66 percent) of the low group used two or three.

When the average number of bulls used for all the different production groups are compared with the average number of cows bred (see Table XIII, page 29), it is found that, on the average, one bull was used for about every 19 or 20 cows--regardless of production group.

Table XVII reveals that, with regard to bulls kept by the cattlemen, 61 percent kept only one bull. When high and low producers are compared, it is noted that three-fourths (75 percent) of the former kept one bull, while 50 percent of the latter kept two or more.

TABLE XV

NUMBERS OF PUREBRED COWS IN HERDS OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Number of purebred cows	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	24	66	10	84	5	42	9	75
1 - 4	3	8	0	0	3	25	0	0
5 - 9	3	8	1	8	1	8	1	8
10 - 19	3	8	1	8	2	17	0	0
20 - 29	3	8	0	0	1	8	2	17
Total	36	100	12	100	12	100	12	100
Average	4		2		6		4	

*Percents are rounded to nearest whole number.

TABLE XVI

TOTAL NUMBER OF BULLS USED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS, BY NUMBERS AND PERCENTS*

Number of bulls used	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1 bull	22	61	9	75	9	75	4	34
2 bulls	12	33	2	17	3	25	7	58
3 bulls	2	6	1	8	0	0	1	8
Total	36	100	12	100	12	100	12	100
Average number used	1.4		1.3		1.3		1.8	

*Percents are rounded to nearest whole number.

TABLE XVII

TOTAL NUMBER OF BULLS KEPT BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Number of bulls kept	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	1	3	0	0	1	8	0	0
1 bull	22	61	9	75	7	59	6	50
2 bulls	9	25	1	8	3	25	5	42
3 bulls	4	11	2	17	1	8	1	8
Total	36	100	12	100	12	100	12	100
Average number kept	1.4 bulls		1.4 bulls		1.3 bulls		1.6 bulls	

*Percents are rounded to nearest whole number.

Table XVIII shows that 72 percent of the farmers interviewed kept Hereford bulls, 20 percent kept Angus, and 8 percent kept a combination of the two. The breed of bull kept did not appear to be related to production.

It is shown in Table XIX that twenty-two farmers, or 61 percent of the thirty-six cattlemen interviewed, used registered bulls. Forty-two percent or all of the high producers who used registered bulls averaged only one bull used. In the low production group, 42 percent of those who used registered bulls used about two (1.8). Again, it should be remembered that low producers had larger herds (average 35 cows) than the high producers (average 25 cows). (See Table XIII, page 29).

Calves Dropped

The average number of bull and heifer calves dropped in each herd was approximately fourteen and thirteen respectively. Though high producers averaged fewer calves dropped (twenty-five) than low (about thirty-one) due to smaller herd size, the calving percent (100 percent) for the former was somewhat higher than for the latter (89 percent).

TABLE XVIII

BREEDS OF BULLS USED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Breed of bulls	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Hereford	26	72	10	83	5	42	11	92
Angus	7	20	2	17	5	42	0	0
Hereford and Angus	3	8	0	0	2	16	1	8
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XIX

TOTAL NUMBER OF REGISTERED BULLS USED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS IN 1964 BY NUMBERS AND PERCENTS,*
AND AVERAGE NUMBERS

Number of bulls used	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	14	39	7	58	3	25	4	33
1 bull	14	39	5	42	6	50	3	25
2 bulls	7	19	0	0	3	25	4	33
3 bulls	1	3	0	0	0	0	1	9
Total	36	100	12	100	12	100	12	100
Average used by those who used registered bulls	1.4 bulls		1.0 bull		1.3 bulls		1.8 bulls	

*Percents are rounded to nearest whole number.

A small number of additional calves was purchased and sold by single producers in each of the three production groups. Consequently, the actual weaning percentage could not be tabulated--though indications are that high producers weaned a larger percent than low.

Calves Weaned

All producers weaned an average of 434 pounds of beef per cow, high producers an average of 520 pounds, medium producers an average of 424 pounds, and low producers an average of 359 pounds per cow.

Calves Sold

Table XX shows the total average number of calves sold by all cattlemen to be about 20.3 and the average percent of weaned calves sold to be 78.4. For the high producers, an average of 15.6 calves was sold and the average percent of all weaned calves sold was 66.1. The low producers, having larger herds than the high group (see Table XIII, page 29), sold more calves, 26.1 average, and marketed a higher percent, 83.1, of the 1964 calf crop.

TABLE XX

TOTAL NUMBER OF 1964 CALVES SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS,* AND AVERAGES

Number of calves sold	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
1 - 4	3	8	2	17	0	0	1	8
5 - 9	1	3	1	8	0	0	0	0
10 - 14	8	22	2	17	4	33	2	17
15 - 19	11	31	4	33	3	25	4	34
20 - 24	6	17	2	17	3	25	1	8
25 - 29	0	0	0	0	0	0	0	0
30 - 34	3	8	1	8	0	0	2	17
35 - 39	2	6	0	0	2	17	0	0
40 - 44	0	0	0	0	0	0	0	0
45 - 49	1	3	0	0	0	0	1	8
90 - 94	1	2	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Actual average	20.3		15.6		19.1		26.1	
Average percent of weaned calves sold	78.4		66.1		84.5		83.1	

*Percents are rounded to nearest whole number.

It is shown in Table XXI that the average estimated total weight of calves sold by all cattlemen was 8,834 pounds. High producers sold a total average of 8,419, while the low producers sold 9,418 pounds. Again it should be noted that high producers bred twenty-five cows and the low producers thirty-five cows (Table XIII, page 29).

Table XXII reveals that the average weight per calf sold was 443 pounds. The high producers sold an average of 544 pounds per calf compared to 363 pounds sold by the low producers.

The actual average price per head received for calves sold by all cattlemen was \$82.50, according to Table XXIII. The average price received by the high producers was \$98.41, while the low producers received an average of only \$68.00 per head.

Place of Sale

It is seen in Table XXIV that 78 percent of the cattlemen sold some calves at the stockyard, the most frequently mentioned place of sale. When high and low producers are compared, it may be noted that 50 percent of the former and only 25 percent of the latter also sold livestock

TABLE XXI

TOTAL ESTIMATED WEIGHT OF CALVES SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Total weight sold	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Under 2,000 lbs.	2	5	1	8	0	0	1	8
2,000 - 5,999	10	28	3	25	2	17	5	42
6,000 - 9,999	12	33	3	25	7	58	2	17
10,000 - 14,999	9	25	4	34	2	17	3	25
15,000 - 19,999	2	6	1	8	1	8	0	0
20,000 - 29,999	0	0	0	0	0	0	0	0
30,000 - 39,999	1	3	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100
Estimated average	8,834		8,419		8,666		9,418	

*Percents are rounded to nearest whole number.

TABLE XXII

AVERAGE WEIGHT PER CALF SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Average weight sold	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
250 - 299 pounds	2	5	0	0	0	0	2	17
300 - 349	2	5	0	0	0	0	2	17
350 - 399	3	8	0	0	1	8	2	17
400 - 449	11	31	0	0	7	59	4	33
450 - 499	9	25	4	33	4	33	1	8
500 - 549	4	11	3	25	0	0	1	8
550 - 599	2	6	2	17	0	0	0	0
600 - 649	0	0	0	0	0	0	0	0
650 - 699	1	3	1	8	0	0	0	0
700 - 749	2	6	2	17	0	0	0	0
Total	36	100	12	100	12	100	12	100
Estimated total average weight	443		544		422		363	

*Percents are rounded to nearest whole number.

TABLE XXIII

PRICE PER HEAD RECEIVED FOR CALVES SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS,* AND AVERAGE

Price per head received	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
\$ 25 - 49	1	3	0	0	0	0	1	8
\$ 50 - '74	7	19	0	0	3	25	4	33
\$ 75 - 99	22	61	7	59	8	67	7	59
\$100 - 124	5	14	4	33	1	8	0	0
\$125 - 149	1	3	1	8	0	0	0	0
Total	36	100	12	100	12	100	12	100
Actual average	\$82.50		\$98.41		\$81.08		\$68.00	

*Percents are rounded to nearest whole number.

TABLE XXIV

DIFFERENT PLACES WHERE CALVES WERE SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Place of sale**	All cattlemen (N=36)		High producers (N=12)		Medium producers (N=12)		Low producers (N=12)	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
At farm	13	36	6	50	4	33	3	25
At stockyard	28	78	9	75	8	67	11	92
Other	6	17	2	17	3	25	1	9

*Percents are rounded to nearest whole number.

**Numbers and percents do not add up to totals since some reported more than one place of sale.

at the farm. Those classified as "other" included some selling calves in organized feeder sales and some slaughtering calves for sale.

Calves Kept

The average number of calves not sold by the cattlemen was approximately 5.6, and the average percent of calves not sold was about 21.6 according to Table XXV. The high producers kept 2.7 more calves (8) than the low producers (5.3). The average percent of weaned calves not sold for the high producers being 33.9 as compared to 16.9 for the low producers.

A few calves were bought and sold by single producers in each category explains the fact that average numbers in Tables XX and XXV did not add up to the totals reported earlier. Death loss was not accounted for in this study.

The total average weight of calves sold at feeder sales by the three cattlemen who sold at organized sales was 5,667 pounds and the average weight per calf was 586 pounds. The total weight sold by the single high producer reporting such sales was 5,000 pounds and the average weight per calf was 625 pounds, while the low producers did not participate

TABLE XXV

TOTAL NUMBERS OF 1964 CALVES NOT SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS,* AND AVERAGES

Total number of calves not sold	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	9	25	2	17	4	33	3	25
1 - 5	12	33	4	33	5	42	3	25
6 - 10	7	19	0	0	3	25	4	33
11 - 15	7	19	5	42	0	0	2	17
16 - 20	1	9	1	8	0	0	0	0
Total	36	100	12	100	12	100	12	100
Average number	5.6		8.0		3.5		5.3	
Average percent of weaned calves not sold	21.6		33.9		15.5		16.9	

*Percents are rounded to nearest whole number.

in the organized sales at all. The total average weight sold by the two medium producers (average of 6,000 pounds) was slightly above that for the high. The high producer sold eight head, while one medium producer sold seven and the other fourteen calves.

Table XXVI shows the estimated weight of all calves kept by the cattlemen to be 537 pounds. The average weight of calves kept by the high producers was 580 pounds compared to 500 pounds for the low producers.

It may be seen in Table XXVII that all cattlemen kept an average of three replacement heifers. The high producers kept an average of 3.8 replacement heifers compared to only 2.0 kept by the low producers.

It should be noted that two-thirds (67 percent) of the high producers kept replacement heifers, while less than one-half (42 percent) of the low producers followed this practice.

Table XXVIII relates the estimated weight of the replacement heifers kept by the cattlemen.

TABLE XXVI

ESTIMATED AVERAGE WEIGHTS OF ALL CALVES KEPT BY ALL CAMPBELL COUNTY CATTLEMEN
INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS
BY NUMBERS AND PERCENTS*

Average weight of all calves kept (pounds)	<u>All Cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None kept	9	25	2	17	4	34	3	25
200 - 399	1	3	0	0	0	0	1	8
400 - 599	20	56	6	50	7	58	7	59
600 - 799	6	16	4	33	1	8	1	8
Total	36	100	12	100	12	100	12	100
Estimated total average for those keeping calves	537		580		525		500	

*Percents are rounded to nearest whole number.

TABLE XXVII

TOTAL NUMBER OF REPLACEMENT HEIFERS KEPT BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Number of replacement heifers kept	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	15	42	4	33	4	33	7	58
1 - 5	13	36	4	33	5	42	4	33
6 - 10	7	19	3	25	3	25	1	9
11 - 15	0	0	0	0	0	0	0	0
15 - 20	1	3	1	9	0	0	0	0
Total	36	100	12	100	12	100	12	100
Average number heifers kept	3.0		3.8		3.2		2.0	

*Percents are rounded to nearest whole number.

TABLE XXVIII

ESTIMATED WEIGHTS OF REPLACEMENT HEIFERS KEPT BY ALL CAMPBELL COUNTY CATTLEMEN
INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Weight per heifer kept (pounds)	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None kept	15	42	4	33	4	33	7	58
400 - 499	17	47	5	42	7	58	5	42
500 - 599	0	0	0	0	0	0	0	0
600 - 699	4	11	3	25	1	9	0	0
Total	36	100	12	100	12	100	12	100
Estimated total average for those keeping heifers	488		525		475		450	

*Percents are rounded to nearest whole number.

Cows Purchased

Sixty-five percent of the cattlemen did not buy cows during the 1964 year, while the average of those who did, bought about eight. Thirty-three percent of the high producers purchased from one to five cows, the average being two and one-half, compared to 17 percent of the low producers who purchased about three cows.

The average price paid per cow by all producers who bought cows in 1964 was \$207--more high producers (four) than low producers (two) buying cows, and the former paying more per cow (\$272) than the latter (\$150).

Cows Sold

The average number of cows sold by the 69 percent of all cattlemen who sold cows in 1964 was 7.5 according to Table XXIX. Seventy-five percent of the high producers sold an average of 5.4 cows, while 58 percent of the low producers sold 7.9 cows. It also should be remembered that herds of high producers were smaller (25 cow average) than those of low producers (35 cows).

TABLE XXIX

NUMBERS OF COWS SOLD BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS
AND PERCENTS*

Number of cows sold	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	11	31	3	25	3	25	5	42
1 - 5	16	44	7	58	5	42	4	33
6 - 10	5	14	1	9	2	17	2	17
11 - 15	0	0	0	0	0	0	0	0
16 - 20	1	3	1	8	0	0	0	0
21 - 25	2	6	0	0	1	8	1	8
26 - 30	0	0	0	0	0	0	0	0
31 - 35	1	2	0	0	1	8	0	0
Total	36	100	12	100	12	100	12	100
Actual average of those who sold	7.5		5.4		9.3		7.9	

*Percents are rounded to nearest whole number.

Facilities and Equipment

As may be seen in Table XXX, slightly more than one-half (56 percent) of all cattlemen reported that winter shelter was provided for their cattle. The remainder (44 percent) reported the provision of year-around shelter.

Eighty-three percent of the high producers reported the provision only of winter shelter, while barely 33 percent of the low producers so reported. On the other hand, only 17 percent of the high producers reported the provision of year-round shelter, whereas 67 percent of the low producers reported such shelter. This would seem to suggest that only winter shelter is normally advisable in Campbell County. Not a single cattleman reported having a pole-barn at the time of the study.

It is shown in Table XXXI that fewer than one-half (42 percent) of all producers had either a squeeze chute and/or a head gate for restraining cattle. Fewer high producers (42 percent) than low (67 percent) reported such equipment.

TABLE XXX

NATURE OF SHELTERS PROVIDED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Nature of shelter provided	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Winter shelter	20	56	10	83	6	50	4	33
Year-round shelter	16	44	2	17	6	50	8	67
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XXXI

TYPES OF RESTRAINING EQUIPMENT USED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Type of equipment available	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	21	58	7	58	10	83	4	33
Head gate	0	0	0	0	0	0	0	0
Squeeze chutes	11	31	4	34	2	17	5	42
Both	4	11	1	8	0	0	3	25
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

II. BEEF PRODUCTION PRACTICES

As shown in Table XXXII, when management levels were computed, it was found that, on the average, all producers were operating at a management level of about 2.10--which indicated that they were using the fifteen practices related to thirty-one interview schedule items to a degree somewhere between 25 and 50 percent (estimated at 27.5 percent) of their complete, recommended use.

It should be noted that the high producers were operating at an average management level of 2.33 (indicating that practices were being used to a degree representing about one-third of their recommended use), while low producers were operating at a level of 2.01 (suggesting that they were using the fifteen practices to a degree representing only about one-fourth of their complete recommended use).

Only one producer interviewed for the study, in the low production group, had a silo; and it proved to be a small and inadequate trench. Only 17 percent had back rubbers for insect control.

TABLE XXXII

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM,
AND LOW PRODUCERS BY AVERAGE MANAGEMENT LEVEL RATINGS,*
AND TOTAL AVERAGE RATINGS**

Management Level rating interval	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
0.90 - 1.49	3	8	0	0	2	16	1	8
1.50 - 2.49	27	75	9	75	9	76	9	75
2.50 - 3.49	6	17	3	25	1	8	2	17
3.50 - 4.49	0	0	0	0	0	0	0	0
4.50 - 5.00	0	0	0	0	0	0	0	0
Total	36	100	12	100	12	100	12	100
Total average rating		2.10		2.33		1.95		2.01

*Percents are rounded to nearest whole number.

**In the rating system used: one point was given for token use (1 to 25 percent) of each of the fifteen related practices; two points were given for a larger degree (25 to 50 percent) of application; three points were given for a medium use level (50 to 75 percent); four points were given for a substantial degree (75 to 100 percent) of use; and five points were given for complete (100 percent) use of the related practice.

With regard to an adequate supply of water, cattlemen in all categories had water readily available--mainly from ponds and streams. The average cattleman had about two sources of water for his herd regardless of the production group in which he was classified.

Ninety-one percent of the cattlemen did not have their cows pregnancy checked. The same was true for the beef producers regardless of production group.

Only two cattlemen, a medium producer and a low producer, had any scales for weighing livestock. The scales were stationary ones in both instances.

Practices Related to Breeding

Different methods of obtaining bulls are shown in Table XXXIII. Seventy-five percent of the cattlemen had purchased bulls, 6 percent used bulls raised on the farm, and 19 percent had used both methods. Eighty-three percent (10) of the high producers used only purchased bulls, compared to 75 percent (9) in the same category for the low producers.

It is seen in Table XXXIV that 19 percent (7) of the cattlemen practiced confinement of the bulls from July to

TABLE XXXIII

METHODS USED IN OBTAINING BULLS BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Method of obtaining bulls	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Purchased	27	75	10	83	8	67	9	75
Raised on farm	2	6	0	0	1	8	1	8
Both	7	19	2	17	3	25	2	17
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XXXIV

CONFINEMENT OF BULLS FROM JULY TO APRIL BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Confinement of bulls from July to April	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	7	19	3	25	2	17	2	17
No	29	81	9	75	10	83	10	83
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

April. Three (25 percent) of those in the high producing group confined bulls, and 17 percent of the low producers followed the same practice.

None of the cattlemen used performance tested or fertility tested bulls.

Table XXXV reveals that only thirteen cows were bred artificially by all cattlemen. Eleven of these were in the high producers group, while not any were in the low group.

As shown in Table XXXVI, 56 percent of all producers reported their most common calving period to be in the winter and spring. High producers favored this period also (75 percent reporting), while equal percents (42 percent) of the low producers reported spring calving as well as winter and spring.

Practices Related to Feeding

Data in Table XXXVII show the numbers of cattlemen who purchased feed. Thirteen, or 36 percent, of all cattlemen bought feed. Fifty percent of the high producers bought feed as compared to 17 percent by the low producers. This indicates some positive relationship between the purchased feed and production, possibly the percent of protein in the ration.

TABLE XXXV

USE OF ARTIFICIAL BREEDING ON COWS IN 1964 BY ALL CAMPBELL COUNTY CATTLEMEN
INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Use of artificial breeding	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Not used	33	91	10	84	11	92	12	100
Used for 2 cows	1	3	0	0	1	8	0	0
Used for 3 cows	1	3	1	8	0	0	0	0
Used for 8 cows	1	3	1	8	0	0	0	0
Total	36	100	12	100	12	100	12	100
Total number of cows bred artificially	13		11		2		0	

*Percents are rounded to nearest whole number.

TABLE XXXVI

MOST COMMON CALVING PERIOD REPORTED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Most common calving period reported	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Winter	3	8	0	0	1	8	2	16
Spring	11	30	2	17	4	34	5	42
Winter and Spring	20	56	9	75	6	50	5	42
Fall, Winter, and Spring	2	6	1	8	1	8	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XXXVII

THE PURCHASE OF FEED REPORTED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Feed purchased	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Feed was purchased	13	36	6	50	5	42	2	17
Feed was not purchased	23	64	6	50	7	58	10	83
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

It is shown in Table XXXVIII that only 19 percent of the cattlemen used the creep feeding method. Forty-two percent of the high producers creep fed, while none of the low producers used this method.

It is shown in Table XXXIX that 83 percent of all cattlemen interviewed used the free choice method of supplying salt. One hundred percent of the high producers used the free choice method, while only 67 percent of the low producers used this method.

Also, it should be noted that those who supplied salt weekly and occasionally were all in the low producing group.

Practices Related to Record Keeping and Use

Table XL reveals that 64 percent of the cattlemen reportedly kept records using their own system, while 36 percent did not keep records of any kind. Sixty-seven percent of the high producers kept some kind of records as opposed to 59 percent of the low producers.

Table XLI shows the number of cattlemen who used the Tennessee Farm Record Book. Eight cattlemen (22 percent) used the record book and five of these were in the high producing group. None of the low producers used the record book.

TABLE XXXVIII

CREEP FEEDING REPORTED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Calves creep fed	7	19	5	42	2	17	0	0
Creep fed calves								
Did not creep feed calves	29	81	7	58	10	83	12	100
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XXXIX

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH
MEDIUM, AND LOW PRODUCERS BY METHOD OF SUPPLYING SALT

Method of supplying salt	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
In ration	2	6	0	0	1	8	1	8
Free choice	30	83	12	100	10	84	8	67
Both	1	3	0	0	1	8	0	0
Weekly	1	3	0	0	0	0	1	8
Occasionally	2	5	0	0	0	0	2	17
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XL

PRODUCTION RECORDS KEPT IN 1964 BY ALL CAMPELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Records kept	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None kept	13	36	4	33	4	33	5	41
Tennessee Beef Cattle Improvement Program	0	0	0	0	0	0	0	0
Performance Registry International	0	0	0	0	0	0	0	0
Own system	23	64	8	67	8	67	7	59
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XLI

USE OF TENNESSEE FARM RECORD BOOK REPORTED BY ALL CAMPBELL COUNTY CATTLEMEN
INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Used Tennessee Farm Record Book	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Yes	8	22	5	42	3	25	0	0
No	28	78	7	58	9	75	12	100
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

None of the cattlemen kept either performance records or gain-tested records on male calves.

The establishment of profits and losses by the cattlemen is shown in Table XLII. It is noted that 97 percent of the cattlemen established profits and losses each year with 3 percent only occasionally. All of the high producers (100 percent) established profits and losses each year compared to 92 percent by the low producers.

Practices Related to Herd Management

Table XLIII reveals that 45 percent of all bull calves were castrated during their first month. Fifty-nine percent of the high producers castrated during this month, while only 25 percent of the low producers did so.

It is shown in Table XLIV that 92 percent of the cattlemen used some method of castrating their bull calves. Fifty percent of the high producers used a knife and 34 percent used an elastrator and knife, as opposed to the low production group which used a knife 67 percent of the time and an elastrator 33 percent.

TABLE XLII

FREQUENCY OF ESTABLISHMENT OF PROFITS AND LOSSES BY ALL CAMPBELL COUNTY
CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS
BY NUMBERS AND PERCENTS*

Profits and losses are established	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Every six months	0	0	0	0	0	0	0	0
Every year	35	97	12	100	12	100	11	92
Occasionally	1	3	0	0	0	0	1	8
Never	0	0	0	0	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XLIII

AGE AT WHICH BULL CALVES WERE CASTRATED BY ALL CAMPBELL COUNTY CATTLEMEN
INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS
BY NUMBERS AND PERCENTS*

Month after calving	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	3	8	1	8	2	17	0	0
1st	16	45	7	59	6	50	3	25
2nd	8	22	3	25	2	17	3	25
3rd	5	14	0	0	1	8	4	33
4th	4	11	1	8	1	8	2	17
Total	36	100	12	100	12	100	12	100

*percents are rounded to nearest whole number.

TABLE XLIV

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS USING DIFFERENT METHODS
OF CASTRATION OF BULL CALVES

Methods of castration	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	3	8	1	8	2	16	0	0
Knife	19	53	6	50	5	42	8	67
Elastrator	11	31	2	17	5	42	4	33
Emasculator	1	2	1	8	0	0	0	0
Elastrator and knife	2	6	2	17	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

Table XLV shows that sixteen cattlemen practiced dehorning in 1964, and nine of the sixteen used clippers. Five of the high producers (42 percent) used clippers as compared to three (25 percent) of the low producers.

Table XLVI shows that 50 percent of the cattlemen used a recommended material to control flies. Among the high producers, 59 percent used recommended fly control materials, while only 34 percent of the low producers did so.

It may be seen in Table XLVII that 47 percent of all cattlemen used recommended lice controlling materials. Fifty percent of the high producers used these materials, while 33 percent of the low producers did likewise.

It is seen in Table XLVIII that only 25 percent of the cattlemen used any phenothiazene to control worms. Thirty-three percent of the high producers used the worming material as opposed to 25 percent for the low producers.

Table XLIX shows that 23 percent of the cattlemen used recommended grub control materials. Twenty-five percent of both high and low producers used these materials.

TABLE XLV

METHOD OF DEHORNING OF CALVES BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED,
HIGH, MEDIUM, AND LOW PRODUCERS BY NUMBERS AND PERCENTS*

Method of dehorning	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	20	56	5	42	10	89	5	42
Clippers	9	25	5	42	1	8	3	25
Paste	3	8	1	8	0	0	2	17
Band	1	3	0	0	0	0	1	8
Saw	2	5	0	0	1	8	1	8
Caustic and clippers	1	3	1	8	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XLVI

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS USING DIFFERENT FLY CONTROL MATERIALS

Fly control materials	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None used	16	44	5	41	6	50	5	42
Recommended material used	18	50	7	59	6	50	5	42
DDT	7	19	4	34	1	8	2	17
Methoxychlor	6	17	2	17	2	17	2	17
Malathion	5	14	1	8	3	25	1	8
Non-recommended material used	2	6	0	0	0	0	2	16
Rotenone	1	3	0	0	0	0	1	8
Lindane	1	3	0	0	0	0	1	8
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XLVII

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS USING DIFFERENT LICE CONTROLLING METHODS

Lice controlling materials	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	19	53	6	50	5	42	8	67
DDT	4	11	3	25	1	8	0	0
Methoxychlor	5	14	2	17	2	17	1	8
Malathion	6	17	1	8	3	25	2	17
Rotenone	2	5	0	0	1	8	1	8
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE XLVIII

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS USING PHENOTHIAZINE FOR WORMING THE CALVES

Phenothiazine used for worming calves	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	27	75	8	67	10	83	9	75
Phenothiazine	9	25	4	33	2	17	3	25
Total	36	100	12	100	12	100	12	100

*percents are rounded to nearest whole number.

TABLE XLIX

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS USING DIFFERENT GRUB CONTROLLING MATERIALS

Grub controlling materials	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	26	71	8	67	9	75	9	75
Rotenone	8	23	3	25	2	17	3	25
Salt	1	3	0	0	1	8	0	0
Diesel oil	1	3	1	8	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

Each cattleman was asked what he "liked" most about the cow-calf system. Table L shows that 39 percent (14 cattlemen) stated that the cow-calf system involved less risk than many other major farm enterprises. Forty-one percent of the high producers and 33 percent of the low producers were in this group. The second item most frequently mentioned was "less labor and trouble" than many other major enterprises. Other reasons given related to "more money" and "personal preference." Seventeen percent of the high producers and 25 percent of the low did not express a "like" with regard to beef production on the cow-calf system.

Also, each beef cattleman was asked to tell what he "disliked" most about the cow-calf system. In Table LI it is interesting to note that 58 percent stated that there was nothing they disliked about the system. Seventy-five percent of the high producers and 50 percent of the low producers were in this category.

Among the dislikes mentioned were: "Too little profit derived," (11 percent); "Cost of needed forage is too high," (11 percent); "Can't get cows to stick," (8 percent);

TABLE L

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH,
MEDIUM, AND LOW PRODUCERS MENTIONING THINGS THEY LIKE MOST
ABOUT COW-CALF SYSTEM

Thing liked most about cow-calf system	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
No comments	9	25	2	17	4	33	3	25
Less risk	14	39	5	41	5	41	4	33
Less labor and/or trouble	5	14	1	8	2	17	2	17
More money	4	11	2	17	0	0	2	17
Personal preference	4	11	2	17	1	9	1	8
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE LI

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH,
MEDIUM, AND LOW PRODUCERS MENTIONING THINGS THEY DISLIKED MOST
ABOUT COW-CALF SYSTEM

Things disliked most about cow-calf system	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Nothing disliked	21	58	9	75	6	50	6	50
Too little profit derived	4	11	0	0	2	17	2	17
Cost of putting up needed forage is too high	4	11	0	0	2	17	2	17
Cannot get cows to "stick"	3	8	0	0	2	16	0	0
Winter feeding is unpleasant	2	6	1	8	0	0	1	8
Cows have diffi- culty in calving	2	6	2	17	0	0	0	0
Total	36	100	12	100	12	100	12	100
								82

*Percents are rounded to nearest whole number.

"Winter feeding is unpleasant," (6 percent); and "Cows have difficulty in calving," (6 percent).

In Table LII the interviewer gave his opinion of different stages of the adoption process relating to recommended practices. An examination of the data reveals that there was little difference between the high and low producers with regard to adopting recommended practices. The average rating for all cattlemen was 3.1 points (sooner than the average). The high producers also averaged 3.1, while the low producers averaged 2.9 points.

The fact that larger differences did not exist between the average ratings of the high and low producer may be explained in part by recognizing: (1) that the sealing device used is somewhat imprecise; (2) the degree of complete knowledge concerning the individual's practices was less than perfect even following an in-depth interview; and (3) data concerning other possible key practices were not gathered.

In Table LIII all producers reported the frequency with which they sought advice from certain individuals concerning beef production and marketing. The county agent and other beef cattlemen were rated first with 72 percent of all

TABLE LII

INTERVIEWER'S OPINION OF STAGES OF THE ADOPTION PROCESS REPRESENTED BY ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS, IN TERMS OF CERTAIN RECOMMENDED BEEF PRACTICES, BY NUMBERS AND PERCENTS,* AND AVERAGE RATINGS

Stage in adoption of new beef manage- ment practices	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Among the first few (5 points)	4	11	1	9	2	17	1	8
Soon after first few (4 points)	7	19	3	25	3	25	1	8
Sooner than average (3 points)	15	42	4	33	3	25	8	67
A little later than most (2 points)	8	22	4	33	4	33	0	0
Among the last few (1 point)	2	6	0	0	0	0	2	17
Total	36	100	12	100	12	100	12	100
Average rating	3.1		3.1		3.2		2.9	

*Percents are rounded to nearest whole number.

TABLE LIII

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY FREQUENCY WITH WHICH THEY REPORTED HAVING SOUGHT ADVICE CONCERNING BEEF PRODUCTION AND MARKETING OF CERTAIN INDIVIDUALS**

Persons from whom advice was sought	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
None	5	14	1	8	2	17	2	17
County agent	26	72	9	75	8	67	9	75
Other beef cattlemen	26	72	9	75	9	75	8	67
Local veterinarian	20	56	7	58	6	50	7	58
Assistant or special agent	14	39	7	58	4	33	3	25
Feed dealer or salesman	4	11	2	17	2	17	0	0
Vo-Ag teacher	4	11	2	17	2	17	0	0
Banker or PCA representative	2	6	0	0	2	17	0	0
Extension animal husbandman	2	66	0	0	2	17	0	0

*Percents are rounded to nearest whole number.

**Numbers and percents add up to more than totals since some cattlemen reported two or more sources.

cattlemen seeking their advice. Seventy-five percent each of the high and low producers mentioned the county agent, while the percents were 75 percent for the former and 67 percent for the latter with regard to other beef cattlemen.

The local veterinarian was second with 56 percent of all producers reporting this source. Fifty-eight percent of both the high and low producers so reported.

The assistant or special agent was third with 39 percent of all producers being in this group. Fifty-eight percent of the high producers reported this source, compared to only 25 percent for the low producers.

The remaining individuals mentioned and percents of all producers using them were: (1) feed dealer or salesman, 11 percent; (2) vocational agriculture teacher, 11 percent; (3) banker or Production Credit Association representative, 6 percent; and (4) Extension animal husbandman, 6 percent.

Information in Table LIV gives the frequency with which all producers reported receiving different sources for useful information in the management of their beef herd.

Farm magazines provided the most popular sources of information reported by all producers (81 percent agreeing),

with 81 percent of the high group and 81 percent of the

TABLE LIV

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY FREQUENCY WITH WHICH THEY REPORTED RECEIVING INFORMATION USEFUL IN THE MANAGEMENT OF THEIR BEEF HERDS FROM DIFFERENT SOURCES DURING THE PAST YEAR**

Source of useful information	All cattlemen		High producers		Medium producers		Low producers	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Farm magazines	29	81	9	74	10	83	10	83
Daily newspapers	27	75	11	92	8	67	8	67
Radio	26	72	11	92	7	58	8	67
Weekly newspapers	23	64	10	83	6	50	7	58
Newsletters	18	50	7	58	6	50	5	42
Television	16	44	6	50	6	50	4	33
Farm meetings	10	28	6	50	3	20	1	8
Commercial feed company bulletins	9	25	4	33	4	33	1	88
University bulletins and publications	8	22	4	33	3	25	1	8
Field days and tours	5	14	3	25	2	17	0	0

*Percents are rounded to nearest whole number.

**Numbers and percents add up to more than totals since some cattlemen reported two or more sources.

with 74 percent of the high group and 83 percent of the low group being included.

Daily newspapers were reported as a source by 75 percent of all producers. Ninety-two percent of the high producers used this source, while 67 percent of the low producers did likewise.

Radio was third with 72 percent of all producers being in this group. Ninety-two percent of high producers reported radio, compared to 67 percent for the low producers.

Weekly newspapers were close behind radio with 64 percent of all producers reporting use of this source. Eighty-three percent of the high producers reported this source, while 58 percent of the low producers did so.

Data in Table LIV further reveal that the high producers reported using all of the remaining sources more than did the low. The remaining sources and percents of all producers using them were: (1) newsletters (50 percent); (2) television (44 percent); (3) farm meetings (28 percent); (4) commercial feed company bulletins (25 percent); (5) University bulletins and publications (22 percent); (6) field days and tours (14 percent).

From one-fourth (25 percent) to more than one-half (58 percent) of the high producers reported receiving useful information via four channels important to Extension (newsletters, farm meetings, University bulletins and publications, and field days and tours), while the percentage range for low producers on the same items ran from none to 42 percent.

Table LV shows how familiar the interviewer felt he was with the beef cattle situation of the respondent. The interviewer felt he was "very familiar" or "fairly familiar" with 61 percent of the beef cattle situations. Sixty-seven percent of the high producers were included in this group, compared to 42 percent for the low group. On the other hand, the interviewer was "not very familiar" or "not familiar" with 41 percent, which included 33 percent of the high group and 58 percent of the low. The fact that the situations of the high producers were better known is in line with the findings reported by Wilson and Gallup (5:25).

The interviewer expressed his opinion on who should pay more attention to the management of their beef herd. Table LVI presents this information. The interviewer adjudged that all low producers and 83 percent of the high

TABLE LV

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS BY DEGREE TO WHICH INTERVIEWER WAS FAMILIAR WITH THE BEEF SITUATIONS OF THE RESPONDENTS

Degree to which interviewer knew beef situation	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Very familiar	6	17	3	25	1	8	2	17
Fairly familiar	15	42	5	42	7	59	3	25
Not very familiar	9	25	3	25	3	25	3	25
Not familiar	6	16	1	8	1	8	4	33
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

TABLE LVI

NUMBERS AND PERCENTS* OF ALL CAMPBELL COUNTY CATTLEMEN INTERVIEWED, HIGH MEDIUM, AND LOW PRODUCERS WHO SHOULD, IN THE INTERVIEWER'S OPINION, PAY MORE ATTENTION TO THE MANAGEMENT OF THEIR BEEF HERD

Attention paid to management of Beef herd	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Should pay more attention	32	89	10	83	10	84	12	100
Should not pay more attention	1	3	0	0	1	8	0	0
Uncertain	3	8	2	17	1	8	0	0
Not answered	0	0	0	0	0	0	0	0
Total	36	100	12	100	12	100	12	100

*Percents are rounded to nearest whole number.

"should pay more attention" to the management of their beef herds. It was felt that two of the high producers' situations were not clear enough to make such a judgment possible, even following the interviewing, and they were rated "uncertain."

All beef cattlemen were rated by the interviewer as to his judgment of their interest in improving their beef herd management as shown in Table LVII. The average interest rated by all cattlemen was 2.3. Both high and low producers rated 2.2 which put them between "somewhat interested" and "very interested."

TABLE LVII

INTERVIEWER'S OPINION OF THE INTEREST OF ALL CAMPBELL COUNTY CATTLEMEN
INTERVIEWED, HIGH, MEDIUM, AND LOW PRODUCERS,
IN IMPROVING THEIR LEVELS OF BEEF HERD
MANAGEMENT BY NUMBERS AND PERCENTS,*
AND AVERAGE RATING

Degree of interest in improving beef management	<u>All cattlemen</u>		<u>High producers</u>		<u>Medium producers</u>		<u>Low producers</u>	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Not interested (0 point)	0	0	0	0	0	0	0	0
Indifferent (1 point)	2	6	0	0	0	0	2	16
Somewhat interested (2 points)	22	61	10	83	7	58	5	42
Very interested (3 points)	12	33	2	17	5	42	5	42
Total	36	100	12	100	12	100	12	100
Average interest rating (points)	2.3		2.2		2.4		2.2	

*Percents are rounded to nearest whole number.

CHAPTER V

SUMMARY

Cattlemen practicing the cow-calf system were seen to constitute an important segment of Extension's clientele. The situation with regard to beef cattle producers on the cow-calf system in Campbell County, Tennessee was not clearly defined prior to this study. Therefore, interviews with all thirty-six cow-calf producers in the county who had at least 15 cows and produced beef throughout the year 1964 were conducted. The producers were divided into three equal production groups of twelve each based on the pounds of beef weaned per cow, and data for the groups were comparatively analyzed.

Producers were questioned concerning their use of thirty-one items related to one or more of fifteen beef production practices recommended by The University of Tennessee, and an effort was made to find out what motivated them to use or not use the practices.

The purposes of the study, then, were: (1) to determine the characteristics of cattlemen using the cow-calf system in high, medium, and low production categories; (2) to ascertain which of certain recommended practices they were and were not following; and (3) to discover some of the important factors influencing cattlemen to adopt or not adopt certain recommended practices.

A review of related literature disclosed that few similar studies had been conducted. Most available reports dealt with particular beef production practices. They provided bases for recommendations and gave some information concerning practice usage in Tennessee.

For example, a 1964 Elk River Watershed study had shown that an average of seventeen brood cows was kept on 7,500 farms, most of them being Hereford. Hereford and Angus bulls predominated. Most calves were marketed at auctions or on the farm, while few were sold at organizational sales. Tennessee beef cattle handling and feeding facilities were known to be inadequate, in the main, and external parasites were found to be costing cattle producers nearly \$15 million per year.

Other literature disclosed that farmers adopt new ideas or practices at different times.

Findings will be reviewed briefly below as they pertain to each of the three stated purposes of the study. In summarizing the data concerning the characteristics of beef cattlemen on the cow-calf system in Campbell County who were divided into high, medium, and low thirds, according to pounds of beef weaned per cow in 1964, one might conclude that the typical county beef cattleman:

1. Had a little over ten years of formal school education, the high producer averaging 10.8 and the low 9.1 grades.
2. Was fifty-two years of age, the high producer being slightly older (fifty-five years as compared to fifty-three for the low).
3. Had started farming at the age of twenty years, the high producer starting at a later age (twenty-six years as compared to twenty for the low).
4. Owned 142 farm acres and 113 cropland acres, the high producer owning 133 farm acres and 99 acres in cropland and the low producer having 149 farm acres and 133 acres of cropland.

5. Had a herd of about twenty-nine cows, the high producer averaging twenty-five cows compared to thirty-five for the low producer.

6. Owned Hereford cattle in the main (88 percent reporting at least some Herefords), with no appreciable difference between high and low producers.

7. Used an average of slightly more than one (1.4) bull in the herd, the high producer using a single bull per herd, while the low producer used two.

8. Used a registered bull (61 percent reporting), the high producer (42 percent) reporting less such use than the low producer (67 percent).

9. Sold about 78 percent (twenty calves) of the 1964 crop weaned, the high producer selling a smaller number (sixteen) and percent (66) than the low (twenty-six calves constituting 83 percent of the weaned calf crop) due to smaller herds (twenty-five versus thirty-five cows respectively) and, partially, to larger numbers (3.8 versus 2.0 respectively) and percents (67 versus 42 respectively) of replacement heifers kept.

10. Sold calves weighing about 443 pounds per calf, the high producer averaging 544 pounds per calf compared to 363 pounds for the low producer.

11. Received an average price per head for calves sold of \$82.50, the high producer averaging \$98.41, while the low producer received only \$68.00.

12. Marketed mainly (78 percent) at the stockyard, the high producer (50 percent reporting) selling more at the farm than the low (25 percent reporting).

13. Provided winter shelter only for the herd (56 percent reporting), the high producer (83 percent reporting) more nearly limiting herd shelter to the winter than the low (33 percent reporting).

The following is a summary of the major findings as related to certain selected production and management practices in terms of their use by beef cattle producers on the cow-calf system in Campbell County:

1. All producers were estimated by using the fifteen practices studied to a degree approximating roughly one-fourth of their intended recommended use, high producers using the practices to a degree approaching about one-third

of their recommended use and low producers using them to less than one-fourth of their complete recommended use.

2. Only 19 percent of the cattlemen practiced confinement of their bulls from July to April, 25 percent of the high producing group following the practice and 17 percent of the low producers doing so.

3. None of the cattlemen used performance tested or fertility tested bulls.

4. A total of only thirteen cows was bred artificially by all cattlemen, eleven of these in the high production group, and none in the low group.

5. Fifty-six percent reported their most common calving period to be in the winter and spring, 75 percent of the high producers reporting their calving during this period, while only 42 percent of the low producers reported this period.

6. About one-third (36 percent) of all beef cattlemen purchased concentrates, including one-half (50 percent) of the high producers and only 17 percent of the low producers.

7. Nineteen percent creep fed their calves, 42 percent of the high producers reporting creep feeding, while none of the low producers used this method.

8. Approximately 83 percent used the free choice method of supplying salt, all of the high producers and 67 percent of the low producers using this method.

9. Sixty-four percent of all cattlemen reported keeping some records, 67 percent of the high producers and 59 percent of the low producers so reporting.

10. Eight cattlemen used the Tennessee Farm Record Book, five of these being in the high group and none in the low group.

11. Profits and losses were established by 97 percent of the cattlemen each year. All high producers established profits and losses each year compared to 92 percent by the low producers.

12. Forty-five percent of all producers castrated bull calves during the first month, 59 percent of the high producers and 25 percent of the low producers castrating at that time.

13. Sixteen producers (44 percent) practiced dehorning and nine (25 percent) of the sixteen used clippers five high producers and three low producers using clippers.

14. One-half of all cattlemen used recommended materials to control flies, 59 percent of the high producers and 34 percent of the low producers using such materials.

15. Forty-seven percent of all producers controlled lice with recommended materials, 50 percent of the high and 33 percent of the low using these materials.

16. Twenty-five percent of all producers used a recommended material to control worms, 33 percent of the high producers and 25 percent of the low producers reporting such use.

17. Twenty-three percent of all producers used a recommended material to control grubs, 25 percent of both high and low producers reporting such use.

In summarizing the information concerning factors influencing the adoption of management practices by beef cattlemen on the cow-calf system in Campbell County, the findings listed below appear to be relevant:

1. Of the things liked most by beef cattlemen on the cow-calf system, "less risk" was rated first by 39 percent of the cattlemen (41 percent of the high and 33 percent of the low producers).

2. "Nothing" was the most frequently mentioned item, (58 percent reporting) when cattlemen were asked what they disliked about the cow-calf system, 75 percent of the high and 50 percent of the low group reporting this item.

3. Little difference was found between high and low producers with regard to their apparent stage in the diffusion process, all producers averaging in the "sooner than average" stage with regard to the adoption of recommended beef production practices.

4. All producers most frequently sought the advice of the county agent and of friends (other beef cattlemen), 72 percent reporting each, little difference being noted between high and low producers.

5. All producers reported that they received other useful beef cattle information through other media, including farm magazines, daily newspapers, radio, weekly newspapers, newsletters, television, farm meetings, etc.

commercial feed company bulletins, University bulletins and publications, and field days and tours, in that order.

6. The interviewer was more familiar with situations of the high producers (67 percent) than with those of the low group (42 percent).

7. It was felt that all of the low producers and 83 percent of the high producers "should pay more attention" to the management of their beef herds.

8. All high producers and 83 percent of the low producers were at least "somewhat interested" in improving the management of their herds.

It is recommended that the findings of this study be used by the Campbell County Extension staff as a basis for the development of the beef cattle section of the 1967-71 Five Year Plan.

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APPENDICIES

APPENDIX A

SURVEY FORMS

THE CAMPBELL COUNTY AGRICULTURAL EXTENSION SERVICE

Jacksboro, Tennessee

SURVEY OF CATTLEMEN USING THE COW-CALF SYSTEM IN CAMPBELL COUNTY, TENNESSEE

INTRODUCTION: I am working on a survey to assist the County Extension Staff in making plans to give more help to beef cattle producers in production and management practices. The answers you give will be added to those given by other beef cattle men who are being interviewed in this county. We hope to get an over-all picture of the cow-calf situation during 1964. Could I have a small portion of your time to go over these questions?

1. Name _____ Tenure status _____

2. Address _____

3. Number and ages of children

Boy	Girl	Age	4-H Member		
			Present	Past	Never

4. Total farm acres _____ Cropland acres _____

5. Cow-calf system _____
yes no number of cows in 1964 _____

6. Farming experience _____ years
a. Beef cattle experience _____ years
b. Have used cow-calf system _____ years

16. Calving

- [illegible]

17. Organized Feeder Sales

- a. Number sold _____ b. Total weight sold _____ pounds
- c. Average weight per calf sold _____ pounds
- d. Calf quality _____
fancy price choice price good price
medium price

18. Calves sold _____
 at--farm stockyards special stock sales other

a. Total sold _____
 number price

b. Total weight sold _____

c. Average weight per calf sold _____

19. Kinds of Pasture

Annual Fertilization

a. Acres used for cow-
 herd in 1964 _____
 number

Grade or
 Acreage Material Lbs/acre

b. Orchardgrass-white or
 Ladino clover

c. Fescue-white or
 Ladino clover

d. Orchardgrass-alone

e. Fescue-alone

f. Fescue-Lespedeza

g. Lespedeza

h. Woodland

i. Other _____
 (list)

*20. Total

*21. Kinds of Hay used especially for cow herd

	Acres	Yield Tons	Annual Fertilization Material	Lbs/acre
a. Alfalfa	_____	_____	_____	_____
b. Lespedeza	_____	_____	_____	_____
c. Red Clover	_____	_____	_____	_____
d. Pasture Clippings	_____	_____	_____	_____
e. Other _____ (list)	_____	_____	_____	_____

*22. Kinds of Silage

(list)

23. Type of silo

upright trench other

24. Total acreage of pasture and forage for beef herd _____
acres25. Feed was bought last year _____
yes no

a. Tons of hay _____ Kind of hay _____

b. Pounds of concentrates _____

Kind of concentrates _____

C.S.M. S.B.O.M. Other

*26. Creep Fed _____ Creep Ration _____
yes no (grains used)

- *27. Feed additives are used
 yes no kind amount
- *28. Salt and minerals are fed

 free choice in ration not used
- *29. Water is available thru

 ponds number streams number creek other
30. Were nurse cows used in 1964
 yes no number
- *31. Worming
 yes no number materials when treated (month)
- *32. Fly Control

 yes no number materials when treated (month)
- *33. Lice Control

 yes no number materials when treated (month)
- *34. Grub Control

 yes no number materials when treated (month)
- *35. Bull Calves Castrated
 yes no number method month
 after calving
- *36. Calves Dehorned
 yes no polled method

- *37. A workable arrangement of chutes and corrals are used

 Head gate Squeeze chute

yes no yes no yes no

- *38. Kinds of scales available

<u>stationary</u>	<u>portable</u>	<u>other</u>
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
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89	89	89
90	90	90
91	91	91
92	92	92
93	93	93
94	94	94
95	95	95
96	96	96
97	97	97
98	98	98
99	99	99
100	100	100

- *39. Back rubber used
yes no

- | | 12 mo. | winter shelter | year-round shelter |
|--------------------------|--------|----------------|--------------------|
| *40. Cattle stay outside | | | |

41. Type of shelter
 pole other

42. The thing I like most about the cow-calf system is

43. The thing I dislike most about the cow-calf system is

- *44. With whom have you talked concerning beef production and marketing information

- | | | | |
|--------------------------------|-------|--|-------|
| a. County Agent | _____ | e. Feed dealer or salesman | _____ |
| b. Extension Animal husbandman | _____ | f. Banker or P.C.A. representative | _____ |
| c. Local veterinarian | _____ | g. Neighbor or friend (other beef cattlemen) | _____ |
| d. Vo-Ag teacher | _____ | h. Other (specify) | _____ |

*45. From which of the following other sources did you receive information useful in the management of your beef herd during the past year

- a. University bulletins and publications _____
- b. Commercial (feed company) bulletins _____
- c. Farm magazines _____
- d. Daily newspapers _____
- e. Weekly newspapers _____
- f. Radio _____
- g. Television _____
- h. Farm meetings _____
- i. Field days and tours _____
- j. Newsletters _____

*Identifies each of thirty-one items related to one or more of fifteen beef production practices recommended by The University of Tennessee.

QUESTIONS FOR THE INTERVIEWER TO ANSWER (not in interview)

Name of respondent _____

Address _____ County _____

46. Pounds of beef sold last year per cow bred _____
47. All people do not adopt practices at the same time.
About where would you place the respondent with respect
to adopting new recommended beef practices
- a. Among the first few _____
 - b. Soon after the first few _____
 - c. Sooner than average _____
 - d. A little later than most _____
 - e. Among the last few _____
48. Interest of respondent in improving his beef management
(in interviewer's judgment)
- a. Very interested _____ c. Indifferent _____
 - b. Somewhat interested _____ d. Not interested _____
49. Respondent's attitude toward survey (in interviewer's
judgment)
- a. Friendly _____ c. Indifferent _____
 - b. Somewhat friendly _____ d. Antagonistic _____
50. Should the respondent pay more attention to management
of his beef herd in light of his situation
- Yes _____ No _____ Uncertain _____

51. How well do you know the respondent

a. Very well _____ c. Not very well _____

b. Fairly well _____ d. Not at all _____

52. How familiar are you with the respondent's beef situation

a. Very familiar _____ c. Not very familiar _____

b. Fairly familiar _____ d. Not familiar _____

53. If very or fairly familiar with their beef situation, how would you rate the present condition and value of his beef herd

a. Excellent _____ c. Fair _____

b. Good _____ d. Poor _____

APPENDIX B

1977-1978

BEEF CATTLE SURVEY

THE AGRICULTURAL EXTENSION SERVICE, UNIVERSITY OF TENNESSEE

Knoxville, Tennessee

TENNESSEE BEEF CATTLE PRODUCTION SURVEY

Name of respondent _____

Address _____ County _____

Date _____ Number _____ Tenure Status _____

1. How many females of breeding age were in your herd last year _____
2. How many females were bred to calve last year _____
3. How many bulls were used during the breeding season _____
4. How many calves were raised to weaning age in your herd last year _____

RECOMMENDED PRACTICE		YES	NO
* 5.	Are you using one or more performance tested bulls?		
6.	If yes, do the records meet minimum requirements of the breeders' performance tested bull sale?		
* 7.	Is your herd enrolled in the Tennessee Beef Cattle Improvement Program?		
* 8.	Did you have a separate pasture area for your bull(s) during the off-breeding season (Aug-Mar)?		

RECOMMENDED PRACTICE	YES	NO
9. Were your replacement heifers at least 15 months of age and had they attained a minimum weight of 650 lbs. when bred?		
*10. Did you have all of your cows pregnancy tested?		
11. Was your herd checked at least twice a day during the breeding season?		
12. Did you have an identification system for each breeding female in the herd?		
13. Were first-calf heifers checked at least 2 to 3 times daily during the calving season?		
14. Were older cows checked at least once a day during the calving season?		
15. Were arrangements made to have competent help available in case of calving difficulties?		
16. Was a system used to provide for the permanent identification of your calves?		
*17. Were recommended castration practices followed? (Ext. Pub. 330)		
*18. Were recommended dehorning practices followed? (Ext. Pub. 330)		
*19. Did all of the cattle have access to a recommended mineral mixture?		
20. Was a rotational grazing program followed?		

RECOMMENDED PRACTICE	YES	NO
21. Did you provide extra or supplementary grazing for your cow herd during July, August, and September?		
*22. Did you keep your cows on good permanent pasture sod until late fall and early winter in order to reduce winter feed costs?		
23. Were replacement heifers fed separately from the rest of the breeding herd during the winter?		
24. Were thin cows and cows that had recently calved fed more or better quality feed than others?		
*25. Did you feed your bred cows at least 1.5 lbs. of 32-44% protein supplement daily when feeding low quality roughages such as hulls, straw, and poor quality grass hay?		
26. Were bulls fed a concentrate during the breeding season while on pasture?		
*27. Were recommended fly control practices followed (Ext. Pub. 450)		
*28. Were recommended lice control practices followed? (Ext. Pub. 450)		
*29. Were recommended grub control practices followed? (Ext. Pub. 450)		
*30. Were recommended materials used in controlling internal parasites?		
31. Were all brood cows and replacement heifers vaccinated for leptospirosis?		

RECOMMENDED PRACTICE	YES	NO
32. Were your calves vaccinated for blackleg and malignant edema during their nursing period?		
33. Did you check your cattle for signs of possible trouble at least 3 times a week throughout the year?		
*34. Did you have adequate working pens or lots with restraining equipment?		
*35. Did you seek the advice of professionals (livestock specialists) for help related to the management of your herd?		

*Identifies practices given attention in the present study.

Tennessee ET & S 416J1
1/21/66

GUIDE SHEET - BEEF CATTLE SURVEY

Note: For the purposes of this survey a beef producer is defined as one who had 15 or more beef females of breeding age (12-15 months of age or older) in his herd last year.

- 1 & 2. Females having been exposed to herd bulls and expected to calve January 1 through December 31 last year.
3. Bull power used - Pub. 330, p. 23; Ext. A. H. Pink Mimeo (S.O.L.O.) "General Management - Beef Cattle."
4. Live calves raised last year from total females in question 2. Give credit for late-dropped healthy calves not yet weaned by end of last year.
5. Bulls on T.B.C.I.P. or other recognized Performance Testing Programs.
6. Minimum Requirements - Pre-Weaning - No Creep -
No Creep - 1.75 lbs./da. ADG
With Creep - 1.90 lbs./da. ADG
- 7.
8. Recommended - Commercial Herds - Breeding Season - April 1 through July 1; Give credit to August 15
Ext. Pub. 330, p. 21; Ext. A.H. Pink Mimeo (S.O.L.O.) General Management of Beef Cattle, p. 2c.
9. See Pub. 330, p. 20.
10. Recommended at least 60 days after close of breeding season - preferred 100-120 days.
Ext. Pub. 330, pages 9 and 22; Ext. A.H. Pink Mimeo (S.O.L.O.) General Management Beef Cattle, p. 3c.
11. Ext. A.H. Pink Mimeo (S.O.L.O.) General Management Beef Cattle, p. 2c.

12. Ext. A.H. Pink Mimeo (S.O.L.O.) Gen. Mgt. Beef Cattle, p. 1.
13. Ext. A.H. Pink Mimeo (S.O.L.O.) Gen. Mgt. Beef Cattle, p. 4c.
14. Same as Question 13.
15. Same as Question 13.
16. Recommended - commercial and purebred herds - permanent identification of cows and calves - regardless of whether on T.B.C.I.P.
Ref. (to be released) Tennessee Beef Performance Testing Program.
17. See Ext. Pub. 330, p. 28.
18. See Ext. Pub. 330, pages 29, 30 and 31.
19. Recommended - Good commercial mineral mixture or either 2 parts steamed bone meal or dicalcium phosphate and 1 part of salt (keep other salt available). Ext. pub. 330, p. 24.
20. Recommended - Rotational grazing of the herd to different pastures during pasture season. See Ext. Pub. 330, pages 12 and 13.
21. Inclusion of a supplementary grass or legume during summer months. See Pub. 500 - Summer Feed.
22. Permanent pasture sods - allowed to develop heavy growth - pastured in Fall and Winter. Pub. 330, p. 14; and "Your Tennessee Beef Cattle Calendar."
23. Pub. 330, p. 26; Ext. A.H. Pink Mimeo (S.O.L.O.) "The Effect of Nutrition on Number of Healthy Calves Raised to Weaning," pages 2 and 3.
24. Same as Question 23.

25. Ext. Pub. 330, p. 25, "Winter Rations for Beef Cows."
26. Ext. Pub. 330, p. 24; Ext. A.H. Pink Mimeo (S.O.L.O.) "The Effect of Nutrition on Number of Healthy Calves Raised to Weaning," pages 2 and 3.
27. Ext. Pub. 450, pages 9 to 14.
28. Ext. Pub. 450, pages 14 and 15.
29. Ext. Pub. 450, p. 15.
30. Both Phenothiazine and Thibenzole are effective. See Ext. Pub. 450, p. 21 and County Agents Release - (Spring 1965), "Controlling Stomach Worms in Cattle."
31. See Ext. Pub. 330, p. 40.
32. See Ext. Pub. 330, p. 40.
33. See (new publication to be released) Your Tennessee Beef Cattle Calendar.
34. Reference Ext. Agr. Eng. Dept.
Expansible Corral, Ext. 7241-7, Basic Unit; Ext. 7241-8, Second Unit; Ext. 7241-9, Third Unit; Ext. 7241-10, Fourth Unit; Corral Detail Ext. 7241-11.

Ext. Agr. Eng. Dept. S.C. 438.