

To the Graduate Council:

I am submitting a thesis written by Larry D. Kimery entitled "An Analysis of the Results of the 1985 Beef Cattle Survey of the 21 Counties of Extension Service District One and Some Comparisons with 1981 Survey Results." I have examined the final copy of this thesis for form and content and recommend that it be accepted in partial fulfillment of the requirements for the degree of Master of Science, with a major in Animal Science.

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AN ANALYSIS OF THE RESULTS OF THE 1985 BEEF CATTLE SURVEY
OF THE 21 COUNTIES OF EXTENSION SERVICE DISTRICT ONE
AND SOME COMPARISONS WITH 1981 SURVEY RESULTS

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Presented for the
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ABSTRACT

This study is an analysis of responses to the questions asked of 353 randomly selected beef producers in the 21 counties of Extension Service District One in 1985.

Frequencies of certain producer characteristics and practices were analyzed and, in some cases, compared with 1981 survey results. The chi-square test was used to determine the relationship or independence of the use or non-use of performance-tested bulls and the use of some beef production practices. Analysis of variance was used to determine the effect that the use of certain practices had on the percent of cows weaning calves.

It was determined that the average beef producer was approximately 50 years of age, more than half farmed full time, average herd size was 56 cows and the average percentage of cows that weaned calves was 86.

Results of the study indicate that only a small number of producers (about 25%) follow many of the production practices recommended by Agricultural Extension Service personnel.

A larger number of producers who used performance-tested bulls employ more of the other recommended production practices than of those who did not use such bulls. The chi-square test showed that, in most cases, producers who were willing to invest the extra money required to purchase tested bulls were willing also to invest the extra effort and money required to use other recommended practices.

Percentage of cows weaning calves did not seem to be influenced greatly by the use or non-use of most recommended production practices. However, the results do indicate that weaning percent increases with increases in amount of printed extension material received by producers.

The Extension Service offers vast amounts of educational material and assistance to producers at no direct cost to them, such service being financed by appropriated money supplied by taxes. Efforts should be devoted to making producers aware of these services and to encourage them to use them to their advantage.

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CHAPTER I

INTRODUCTION

Even though sales of row crops account for a large portion of the total agricultural income in Extension Service District One, beef cattle production is very important. According to the Tennessee Department of Agriculture (1986), direct sales of cattle and calves in 1985 amounted to \$60,596,747 in this 21 county area.

There were 373,900 head of cattle in District One in 1981. The number peaked at 423,000 in 1983 and has declined each year to 360,700 in 1985. This is typical of the cycles that occur in Tennessee and U.S. cattle numbers.

In the light of this decline in cattle numbers, an analysis was made of some of the questions asked in a survey of District One beef producers. These were selected to give an indication of producer characteristics, practices used and the overall status of the beef cattle industry in West Tennessee.

The effects of the use or non-use of performance-tested bulls on other selected variables in 1985 were analyzed as was the effect that the use of certain practices had on the percentage of cows bred that weaned calves. Frequencies of selected producer characteristics and the use of certain practices in 1985 were analyzed and, in some cases, compared with 1981 survey results.

Before the analysis was conducted, a review of some similar studies was undertaken.

CHAPTER II

REVIEW OF LITERATURE

Characteristics of Beef Producers and Their Herds

Table 1 permits convenient comparison of the findings from the various studies reviewed and with those from the present study. With few exceptions, findings of all the studies are very similar, with the average age of producers varying little between studies. Farming status was almost the same with one exception. The largest variation is in average herd size.

Table 1. Tabular Summary of Results of Various Studies

Average Herd Size (Cows)	Percentage Full-Time Farmers	Average Age of Producer (yrs.)	Average Farm Size (A.)	Average Weight of Calves Sold at Weaning	Source
29	67	52	142	443	Keyes (1966)
18	27	55	179		Mathews (1968)
20	65	51	187	432	Luck (1968)
48	48	54% were 55 or older	214		Taylor (1972)
20	58	51	93	458	Lovely (1975)
48		50	129		Mohamad (1979)
48	52	51			Rutter (1982)
35	54	52% were 51 or older			Lumpkin (1985)
56	59	50		484	Present study

The striking similarities indicate that beef producer characteristics have not changed appreciably. The few differences may well be due only or largely to the variation in size of the area surveyed (county, district or state-wide) and the accompanying variation in number of herds involved.

Beef Production Practices

The Tennessee Agricultural Extension Service (1972) pointed out three areas of improvement to be made by producers to increase returns from their beef herds. These are: (1) improve feeding by producing higher quality forage and by using forage efficiently, (2) increase the percentage of calves weaned per cow bred by using performance testing programs, thereby increasing breeding efficiency, (3) improve the marketing system used in order to receive the best price possible.

Neel (1974) reported that a lactating beef cow should receive about 16 pounds of total digestible nutrients (TDN) per day. This is required to maintain the cow and to raise a calf to weaning. This requirement declines about 25% following the breeding season.

Kirkpatrick (1976) noted that a definite breeding and calving season minimizes labor and makes the operation much more efficient. All cows will be in the same stage of production, and feed requirements will be nearly identical for all cows. Calving losses can be reduced as more time can be spent with the herd. The calves will be less variable in age which will permit the producer to perform at the same time certain management practices such as castration, vaccination, etc.

According to Neel (1975), an increase in production and profits can be realized without an increase in costs by using such management practices as culling open and "shy" breeders, checking bulls for soundness, using genetically superior bulls and by increasing calf weaning weights.

Merriman (1963) reported that pregnancy checks should be used to identify open cows, which should be removed from the herd, and also to alert the producer to the possible existence of a herd-wide sterility problem.

Jamison (1967) reported that performance testing can be used in beef herds to measure differences in the inherited abilities of individual animals. He further stated that producers could benefit from the use of the Tennessee Beef Cattle Improvement Program from both herd improvement and a higher income.

According to a study of the beef producers in the Elk River Watershed by Ranney (1964), no one factor was the sole cause of the various herd performance levels in beef cattle production. Rather, a combination of factors and practices is responsible for the performance of a herd.

CHAPTER III

EXPERIMENTAL PROCEDURE

The data for this study were collected from 353 beef producers in the 21 counties of Extension Service District One in November and December of 1985.

The interview survey was developed by the Animal Science Specialist Staff of the University of Tennessee Agricultural Extension Service. County Extension agents interviewed producers whose herds contained at least 25 cows of breeding age.

Producers interviewed were randomly selected using the "nth number" technique of sampling.

Survey questions sought information about the producer, his farming situation, his general beef production situation, his management practices, his forage production practices, his cattle handling facilities, his marketing practices and his contacts with the extension service.

Two major methods of analysis were used, the chi-square test and analysis of variance. These are standard statistical procedures used to determine probabilities of chance occurrence of observed differences and of the relationship or association between various variables. These analytical methods are described in numerous books on statistical methods such as that by Snedecor and Cochran (1967).

The survey items selected for consideration are listed below. Copies of the complete survey are available from Dr. Cecil E. Carter, Agricultural Extension Education Department.

1. FARMING STATUS (full-time; part-time farm; retired)
2. MAJOR SOURCE OF FARM INCOME (feeder calves; slaughter cattle; row crop sales; other)
3. ESTIMATED AGE OF FARM OPERATOR
4. NUMBER OF COWS AND HEIFERS EXPOSED TO BULL(S)
5. NUMBER OF CALVES LOST AT BIRTH OR WHICH DIED WITHIN TWO DAYS AFTER BIRTH
6. NUMBER OF CALVES WEANED
7. NUMBER OF BULLS USED
8. BREEDING OF FEMALES (crossbred; straightbred; both)
9. WERE BULLS EVALUATED FOR BREEDING SOUNDNESS 30-45 DAYS BEFORE BREEDING SEASON BEGAN? (no; yes; no answer)
10. WERE PERFORMANCE-TESTED BULLS USED? (no; yes)
11. WERE COWS AND HEIFERS PREGNANCY CHECKED? (none; part; all)
12. WERE OPEN FEMALES CULLED FROM HERD? (none; part; all)
13. AVERAGE AGE OF REPLACEMENT HEIFERS WHEN BRED (in months)
14. AVERAGE WEIGHT OF REPLACEMENT HEIFERS WHEN BRED
15. WAS HERD ENROLLED IN TENNESSEE BEEF CATTLE IMPROVEMENT PROGRAM (TBCIP) OR A SIMILAR PERFORMANCE TESTING PROGRAM? (no; yes)
16. NUMBER OF COWS AND HEIFERS BRED BY ARTIFICIAL INSEMINATION
17. KIND(S) OF HARVESTED FORAGES FED LAST WINTER (hay; silage; both hay and silage)
18. WAS HERD GROUPED LAST WINTER BY AGE AND STAGE OF PRODUCTION AND GROUPS FED SEPARATELY? (no; yes)

19. WERE DRY PREGNANT COWS FED LOWER QUALITY FORAGES EARLY IN WINTERING PERIOD? (no; yes)
20. KINDS OF CROP RESIDUE FED LAST WINTER (none fed; corn; soybeans; both corn and soybeans; other)
21. WAS FESCUE STOCKPILED FOR LATE FALL AND WINTER GRAZING? (no; yes)
22. WERE HAYS AND/OR SILAGE "FORAGE TESTED" BEFORE WINTER FEEDING? (no; yes)
23. KIND(S) OF SUPPLEMENTAL PROTEIN FED EACH DAY DURING WINTERING PERIOD (none fed; cottonseed or soybean meal; block or cubes; liquid)
24. NUMBER OF TIMES CALVES WERE IMPLANTED (0 = not any)
25. WERE COWS AND REPLACEMENT HEIFERS VACCINATED FOR LEPTOSPIROSIS? (no; yes)
26. WERE COWS VACCINATED AGAINST INFECTIOUS BOVINE RHINOTRACHEITIS (IBR), BOVINE VIRUS DISEASE (BVD) AND PARAINFLUENZA TYPE 3 (PI3)? (no; yes, part; yes, all)
27. WERE CALVES VACCINATED AGAINST IBR, BVD AND PI3? (no; yes, part; yes, all)
28. WERE CALVES VACCINATED AGAINST BLACKLEG? (no; yes, part; yes, all)
29. WERE REPLACEMENT HEIFERS VACCINATED AGAINST BRUCELLOSIS? (no; yes, part; yes, all; no replacement heifers)
30. SEASON WHEN COWS AND BULLS WERE DEWORMED (not dewormed; fall only; spring only; both fall and spring; other)

31. WERE CALVES DEWORMED? (most recent calf crop) (no; yes)
32. PRIMARY METHOD USED TO CONTROL HORN AND FACE FLIES (none used; backrubbers and/or oilers; dustbags; backrubbers with flaps; oral larvacides; ear tags)
33. MONTH TREATMENT WAS BEGUN FOR HORN AND FACE FLIES
(e.g., 0 4 = April)
34. MONTH CATTLE WERE TREATED FOR LICE (did not treat; by Nov. 1; by Nov. 1 and again in Feb.; did not treat until after Nov. 1 and lice build-up was present)
35. WERE CATTLE TREATED FOR GRUBS BEFORE NOV. 1? (not treated; yes, treated before Nov. 1; yes, treated but not before Nov. 1)
36. NUMBER OF ACRES OF PERMANENT PASTURE LAND
37. ESTIMATED PERCENT OF PERMANENT PASTURE LAND THAT HAD 30% OR MORE LEGUME IN 1985
38. WHAT CATTLE HANDLING FACILITIES WERE AVAILABLE FOR WORKING CATTLE? (headgate only; headgate and holding chute; headgate, holding chute and working chute; headgate, holding chute, working chute and crowding pen; headgate, holding chute, working chute, crowding pens and holding pens; none of the above)
39. NUMBER OF FEEDER CALVES SOLD AT WEANING (1985 calf crop; 0 0 0 = not any)
40. AVERAGE WEIGHT OF FEEDER CALVES SOLD AT WEANING
(1985 calf crop; 0 0 0 = none sold)

41. NUMBER OF CALVES SOLD LAST SPRING (1984 CALF CROP) AS
BACKGROUNDED SHORT YEARLINGS (0 0 0 = not any)
42. NUMBER OF CALVES SOLD SUMMER OR FALL (1985) AS BACKGROUNDED
LONG YEARLINGS (0 0 0 = not any)
43. NUMBER OF CALVES FROM 1984 CALF CROP FINISHED AND SOLD AS
SLAUGHTER CATTLE (0 0 0 = not any)
44. NUMBER OF BEEF CATTLE MEETINGS ATTENDED
45. NUMBER OF EXTENSION OFFICE VISITS MADE (regarding beef
cattle)
46. NUMBER OF TELEPHONE CALLS MADE (regarding beef cattle)
47. NUMBER OF FARM VISITS BY EXTENSION PERSONNEL (total number)
48. NUMBER OF EXTENSION CIRCULARS OR NEWSLETTERS RECEIVED

CHAPTER IV

RESULTS AND DISCUSSION

The results of the study are tabulated in tables 2, 3 and 4. Table 2 consists of frequencies in various categories as determined from the survey. Table 3 contains the results of chi-square tests of independence of use or non-use of performance-tested bulls and other variables and Table 4 contains results of analyses of variance, showing only the F values obtained in testing the mean squares of interest and the probabilities of obtaining larger F values by chance.

Data presented in Table 2 contains the numbers and percentages of West Tennessee beef producers who used various practices and characteristics of these producers in 1985. Some 1985 results will be compared with corresponding 1981 results. The eight categories of results deal with: Producer Characteristics, General Beef Production Situation, Breeding Management, Feeding Management, Health Management, Forages, Handling Facilities and Marketing.

Producer Characteristics

Farming status. More than half of the producers interviewed in 1981 and 1985 farmed full time. A very small percentage stated that they were retired, and the remainder were farming only part-time.

Major source of farm income. Sale of row crops was the major source of farm income for nearly half of the producers. Sales of beef

Table 2. General Results of 1981 and 1985 Surveys

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
<u>Producer Characteristics</u>				
Farming status				
Full-time farmer	208	59	190	54
Part-time farmer	121	34	138	39
Retired	24	7	25	7
Total number responding	353		353	
Major source of farm income				
Cattle sales	94	27		
Row crop sales	159	45		
Other	98	28		
Total number responding	351			
Age of producer				
50 years and younger	185	52		
51 years and older	167	48		
Total number responding	352			
<u>General Beef Production Situation</u>				
Number of cows and heifers exposed to bull				
Fewer than 30	86	24	91	25
30 to 59	154	44	154	42
60 and more	113	32	113	31
Total number responding	353		368	98
Number of calves lost at birth				
0	70	20	83	23
1	56	16	79	22
2	65	18	81	22
3 to 5	107	30	93	25
6 and more	55	16	32	9
Total number responding	353		368	100
Number of calves weaned				
10 to 29	139	39	138	39
30 to 59	130	37	133	38
60 and more	82	23	84	24
Total number responding	351		355	

Table 2 (continued).

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
Number of bulls used				
1	135	38	136	37
2	122	35	129	35
3	42	12	51	14
4 or more	53	15	51	14
Total number responding	352		367	
Percentage of cows bred weaning calf				
70 or less	24	7		
71-79	36	10		
80-89	123	35		
90-95	104	30		
96-100	64	18		
Total number responding	351			
<u>Breeding Management</u>				
Breeding of females (crossbred or straightbred)				
Crossbred	125	35	193	53
Straightbred	100	29	169	47
Both	128	36		
Total number responding	353			
Were bulls checked for soundness before breeding season began?				
No	304	87	271	76
Yes	46	13	85	24
Total number responding	350		356	
Were performance-tested bulls used?				
No	259	74	271	76
Yes	92	26	86	24
Total number responding	351		357	
Were cows and heifers pregnancy checked?				
No	263	75	299	82
Yes	89	25	64	18
Total number responding	352		363	

Table 2 (continued)

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
Were open cows culled from herd?				
None	127	37		
Part	141	41		
All	80	23		
Total number responding	348			
Average age of replacement heifers when bred				
Less than 15 months	54	16	40	12
15 months	72	21	136	41
16 months	61	18	47	14
17 months	23	7	7	2
18 months	79	23	55	17
19-24 months	53	16	45	14
Total number responding	342		330	
Average Weight of replacement heifers when bred				
Less than 600 pounds	20	6	34	10
600 to 699 pounds	110	31	130	38
700 to 799 pounds	160	45	137	40
800 pounds and heavier	63	18	40	
Total number responding	353		341	
Was herd enrolled in TBCIP or similar performance testing program?				
No	316	90	335	92
Yes	37	10	29	8
Total number responding	353		364	
Number of cows and heifers bred by artificial insemination				
Fewer than 10	18	5		
10 to 19	8	3		
20 to 29	5	1		
30 to 49	6	2		
50 or more	9	3		
Total number responding	353			

Table 2 (continued)

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
<u>Feeding Management</u>				
Kinds of harvested forages fed last winter				
Hay	292	83	299	82
Silage	5	1	27	7
Both	56	16	39	11
Total number responding	353		365	
Was herd grouped last winter by age and stage of production and groups fed separately?				
No	218	62	195	54
Yes	134	38	167	46
Total number responding	352		362	
Were dry pregnant cows fed lower quality forages?				
No	202	57	139	40
Yes	151	43	212	60
Total number responding	353		351	
Kinds of crop residue fed last winter				
None fed	176	50	137	38
Corn	32	9	45	12
Soybeans	22	6	48	13
Both corn and soybeans	100	29	112	31
Other	21	6	20	6
Total number responding	351		362	
Was fescue stockpiled?				
No	104	30	134	37
Yes	247	70	232	63
Total number responding	351		366	
Were hays and/or silage "forage tested" before winter feeding?				
No	335	95	336	93
Yes	16	5	27	7
Total number responding	351		363	

Table 2 (continued)

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
Kinds of supplemental protein fed each day during wintering period				
None fed	33	9		
Cottonseed or soybean meal	52	15		
Blocks or cubes	249	71		
Liquid	19	5		
Total number responding	353			
Number of times calves were implanted				
Not any implanted	205	58	277	77
Once	89	25	66	18
Twice	50	14	18	5
Three or more	9	3	1	>1
Total number responding	353		362	
<u>Health Management</u>				
Were cows and replacement heifers vaccinated against leptospirosis?				
No	164	47	180	50
Yes	188	53	183	50
Total number responding	352		363	
Were cows vaccinated against IBR, BVD and PI3?				
No	197	56		
Yes, part	82	23		
Yes, all	73	21		
Total number responding	352			
Were calves vaccinated against IBR, BVD and PI3?				
No	193	55		
Yes, part	61	18		
Yes, all	94	27		
Total number responding	347			
Were calves vaccinated against blackleg?				
No	71	20		
Yes	281	80		
Total number responding	352			

Table 2 (continued)

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
Were replacement heifers vaccinated against brucellosis?				
No	213	63	238	66
Yes	126	37	123	34
Total number responding	339		351	
Season when cows and bulls were dewormed				
Not dewormed	51	15		
Fall only	50	14		
Spring only	111	32		
Both fall and spring	135	39		
Total number responding	347			
Were calves dewormed?				
No	82	23	211	58
Yes	269	77	152	42
Total number responding	351		363	
Primary method used to control horn and face flies				
None used	27	8	20	6
Backrubber and/or oils	64	18	194	54
Dustbags	7	2	20	6
Backrubbers with flaps	31	9	79	22
Oral larvacides	20	6	36	10
Ear tags	201	57	12	3
Total number responding	350		361	
Month treatment for horn and face flies was begun				
Not by April 1	181	54		
By April 1	148	44		
Did not treat	5	2		
Total number responding	334			

Table 2 (continued)

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
Month cattle were treated for lice				
Did not treat	129	37	112	31
Once by Nov. 1	114	23	116	32
Nov. 1 and Feb. 1	61	17	60	16
Did not treat until after Nov. 1 and lice build-up was present	47	13	76	21
Total number responding	351		364	
Were cattle treated for grubs before Nov. 1?				
Not treated	168	48		
Yes, before Nov. 1	150	43		
Yes, after Nov. 1	33	9		
Total number responding	351			
<u>Forage</u>				
Number of acres of permanent pasture				
75 and fewer	93	26	137	38
76 to 149	110	31	100	28
150 to 299	110	31	87	24
300 or more	40	11	36	10
Total number responding	353		360	
Percentage of permanent pasture with 30% legume				
Not any	18	5	28	8
25 or less	63	18	95	26
26-50	94	27	124	34
51-75	92	26	60	16
Total number responding	334		368	
<u>Handling Facilities</u>				
Type of facilities available for working cattle				
Headgate only	29	8		
Headage and holding chute	54	15		
Headgate, holding and working chute	50			
Headgate, holding chute, working chute and crowding pen	29	8		
Headgate, holding chute, working chute crowding pens and holding pens	155	44		
None of the above	36	10		
Total number responding	353			

Table 2 (continued)

Name of Classification Variable	1985		1981	
	Number of Producers	% of Producers Responding	Number of Producers	% of Producers Responding
<u>Marketing</u>				
Number of feeder calves sold at weaning				
25 or fewer	122	35		
26-49	77	22		
50 or more	41	12		
None sold	113	32		
Total number responding	353			
Average weight of feeder calves sold at weaning				
400 pounds and lighter	28	8		
401-450 pounds	60	17		
451-499 pounds	37	11		
500 pounds and heavier	113	32		
Not any sold	115	33		
Total number responding	353			
Number of calves sold in spring as backgrounded short yearlings				
Fewer than 25	72	21	61	17
25-49	30	9	23	6
50 or more	17	5	21	6
Not any	232	66	263	72
Total number responding	351		368	
Number of calves sold in summer or fall as backgrounded long yearlings				
Fewer than 25	40	11	55	15
25-49	10	3	15	4
50 or more	5	1	11	3
Not any	297	84	287	78
Total number responding	352		368	
Number of head finished and sold as slaughter cattle				
Fewer than 25	48	14	49	13
25-49	11	3	9	2
50 or more	7	2	11	3
Not any	287	81	299	81
Total number responding	353		368	

Table 3. Chi-square Tests to Determine Independence of Use or Non-use of Performance-Tested Bulls and Some Other Variables of Interest in Beef Production

Name of Variable	Performance-Tested Bulls				Chi-square	df	P of Larger Chi-square
	Used		Not Used				
	No.	%	No.	%			
<u>Breeding Management</u>							
Number of calves weaned							
10-29	25	28	113	44			
30-59	35	39	94	36			
60-over	31	34	51	20			
Total number responding	91		258		10.5	2	.005
Number of bulls used							
1	29	32	106	41			
2	30	33	90	35			
3	11	12	31	12			
4 and over	22	24	31	12			
Total number responding	92		258		8.1	3	.045
Were bulls evaluated for breeding soundness 30-45 days before breeding season began?							
Yes	21	23	24	9			
No	69	77	234	91			
Total number responding	90		258		10.45	1	.0012
					10.67	1	.0006*
Were cows and heifers pregnancy checked?							
Yes	34	37	55	21			
No	58	63	203	79			
Total number responding	92		258		7.94	1	.0048
					8.75	1	.0031*
<u>Health Management</u>							
Were cows and heifers vaccinated against leptospirosis?							
Yes	67	73	120	47			
No	25	27	138	54			
Total number responding	92		258		17.83	1	0.000
					18.87	1	0.000*

Table 3 (continued)

Name of Variable	Performance-Tested Bulls				Chi-square	df	P of Larger Chi-square
	Used		Not Used				
	No.	%	No.	%			
Were cows vaccinated against IBR, BVD, PI3?							
Yes, all	30	33	42	16			
Yes, part	27	30	55	21			
No	35	38	161	62			
Total number responding	92		258		17.843	2	.0001
Were calves vaccinated against IBR, BVD, PI3?							
Yes, all	34	37	58	23			
Yes, part	17	19	44	17			
No	40	44	153	60			
Total number responding	91		255		8.5617	2	.0138
Were calves vaccinated against blackleg?							
Yes	85	92	194	75			
No	7	8	64	25			
Total number responding	92		258		11.36278	1	.0007
					12.403	1	.0004*
Primary method used to control horn and face flies							
None used	2	2	25	9			
Backrubbers and oilers	6	7	57	22			
Dustbags	2	2	5	2			
Backrubbers with flaps	11	12	20	8			
Oral larvacides	5	5	15	6			
Ear tags	66	72	134	52			
Total number responding	92		256		20.066	5	.0012
Were cattle treated for grubs before Nov. 1?							
Did not treat	31	34	136	53			
Treated before Nov. 1	52	56	97	38			
Not treated before Nov. 1	9	10	24	9			
Total number responding	92		257		10.841	2	.0044

Table 3 (continued)

Name of Variable	Performance-Tested Bulls				Chi-square	df	P of Larger Chi-square
	Used		Not Used				
	No.	%	No.	%			
<u>Pasture</u>							
Percentage of permanent pasture with 30% or more legume							
25 and under	20	26	42	18			
26-50	11	14	82	35			
51-75	27	35	40	17			
76-100	20	26	72	31			
Total number responding	78		236		19.310	3	.0002
<u>Handling Facilities</u>							
Type of facilities available for working cattle							
No facilities	3	3	33	13			
Headgate only	3	3	26	10			
Headgate and holding chute	9	10	45	17			
Headgate, holding and working chute	6	7	22	9			
Headgate, holding chute, working chute and crowding pen	61	66	94	3			
Total number responding	92		259		27.2966	5	.0000
<u>Marketing</u>							
Average weight of feeder calves sold at weaning							
400 and under	4	7	24	13			
401-450	11	19	49	27			
451-499	15	26	22	12			
500 and over	27	47	86	48			
Total number responding	57		181		8.0666	3	.0447
Method used to market feeder calves							
Weekly auction	42	53	151	62			
Feeder calf sale	28	35	58	24			
Local trader	6	8	18	7			
Direct to backgrounder or feeder	4	5	17	7			
Total number responding	80		244		4.11404	3	.2494

Table 3 (continued)

Name of Variable	Performance-Tested Bulls				Chi-square	df	P of Larger Chi-square
	Used		Not Used				
	No.	%	No.	%			
<u>Extension Contacts</u>							
Beef meetings attended							
Not any	36	39	106	41			
1	31	34	100	39			
2	14	15	39	15			
3 and over	11	12	14	5			
Total number responding	92		259		4.585	3	.2048
Number of visits to extension office							
Not any	26	28	87	34			
1	18	20	49	19			
2	19	21	53	21			
3	7	8	24	9			
4	10	11	19	7			
5 and over	12	3	21	8			
Total number responding	92		259		2.2712	5	.8105
Total number of extension contacts							
Not any	3	3	21	8			
1-4	26	28	85	33			
5-9	22	24	71	27			
10 and over	41	45	82	32			
Total number responding	92		259		6.31878	3	.0971

*Before Yeats correction.

Table 4. Results of Analysis of Variance of Percentage of Cows Weaning Calves

Independent (Classification) Variable	% Cows Weaning Calves, Dependent (Response) Variable			
	Number of Producers	Mean	F Value	P of Larger F
<u>Breeding Management</u>				
Breeding of cows (crossbred or straightbred)				
Crossbred	125	87		
Straightbred	99	87		
Both	128	85	1.45	.2345
Total number responding	352			
Was herd enrolled in TBCIP?				
Yes	36	86		
No	316	89	2.1967	.1392
Total number responding	352			
<u>Feeding Management</u>				
Were dry pregnant cows fed lower quality forage?				
Yes	150	88		
No	202	85	5.5954	.0186
Total number responding	352			
Was fescue stockpiled?				
Yes	246	88		
No	104	83	10.9439	.001
Total Number Responding				
Percentage of permanent pasture with 30% or more legume				
25 and less	62	84		
26-50	94	86		
51-75	67	89		
76-100	92	89	4.7945	.0028
Total number responding				

Table 4 (continued)

Independent (Classification) Variable	% Cows Weaning Calves, Dependent (Response) Variable			
	Number of Producers	Mean	F Value	P of Larger F
<u>Health Management</u>				
Were cows and heifers vaccinated against leptospirosis				
Yes	187	86		
No	164	86	.0020	.9640
Total number responding	351			
Were cows vaccinated against IBR, BVD and PI3?				
Yes, all	72	87		
Yes, part	82	86		
No	197	86	.1920	.8254
Total number responding	351			
Season when brood cows were dewormed				
Not dewormed	51	84		
Fall only	50	87		
Spring	111	87		
Fall and spring	134	87		
Other	4	87	.9978	.4087
Total number responding	350			
<u>Extension Contacts</u>				
Beef cattle meetings attended				
Not any	142	86		
1	133	87		
2	52	86		
3 or more	25	85	.1467	.9318
Total number responding	352			
Number of visits to extension office				
Not any	113	88		
1	67	86		
2	73	86		
3	31	86		
4	29	86		
5 or more	39	86	.5120	.7672
Total number responding	352			

Table 4 (continued)

Independent (Classification) Variable	% Cows Weaning Calves, Dependent (Response) Variable			
	Number of Producers	Mean	F Value	P of Larger F
Number of telephone calls to extension office				
Not any	87	86		
1	57	87		
2	79	87		
3	42	88		
4	19	84		
5 or more	68	86	.2590	.9351
Total number responding	352			
Number of farm visits by extension personnel				
Not any	66	84		
1	78	86		
2	61	87		
3	46	88		
4	23	87		
5 or more	78	87	1.1724	.3223
Total number responding	352			
Number of extension circulars or newsletters received				
Not any	34	85		
1-6	177	87		
7-12	102	85		
13 or more	39	85	2.8823	.0359
Total number responding	352			
Total number of extension contacts				
Not any	24	85		
1-4	111	86		
5-9	94	86		
10 or more	123	87	.2476	.8630
Total number responding				

cattle accounted for the income of about one-fourth of the producers while the remainder gave "other" as the major source of farm income.

Age of producer. Slightly more than half of the producers were 50 years of age or younger, and the others were older than 50.

General Beef Production Situation

Number of cows and heifers exposed to bull. The number of breeding females in the herd did not change from 1981 to 1985 with about one-fourth of the producers having fewer than 30, about one-third having 60 or more and the others having between 30 and 59 breeding females exposed to a bull or bulls.

Number of calves lost at birth. Producers lost about the same number of calves at birth in 1981 as they did in 1985.

Number of calves weaned. From 1981 to 1985 there was virtually no change in the percentage of producers weaning the various numbers of calves.

Number of bulls used. Again, there was no change from 1981 to 1985 in the number of bulls being used.

Percent of cows bred weaning calves. About half the producers interviewed were successful in weaning calves from at least 90% of their cows.

Breeding Management

Breeding of females (crossbred or straightbred). In 1985, the breeding of the herds was about equally divided between straightbred, crossbred and a mixture of both crossbred and straightbred females.

Were bulls checked for soundness before breeding season began? Very few producers followed this very important practice in 1981 or 1985.

Were performance-tested bulls used? Only about one-fourth of the producers were willing to go to the extra trouble and expense to buy and use performance-tested bulls in 1981 or 1985.

Were cows and heifers pregnancy checked? This is another practice that was used by only a few producers. The use of the practice did increase slightly from 1981 to 1985. The fact that many West Tennessee beef producers do not have a definite breeding season contributes to the low use of this and other related production practices.

Were open cows culled from herd? Less than one-fourth of the producers culled all of the "free-loader" cattle. About one-half culled part of their open cows, and the others did not cull any of these currently unproductive females.

Average age of replacement heifers when bred. Producers bred heifers at ages from less than 15 months of age to 2 years of age. The wide ranges of ages could result from the fact that bulls stay with the herd year-round on many West Tennessee farms.

Average weight of replacement heifers when bred. The wide range of weights (from less than 600 pounds to more than 800 pounds) of heifers when bred also could be a result of the year-round breeding season of many producers and the introduction of large exotic breeds of cattle.

Was herd enrolled in TBCIP or similar performance testing program? Only about 10% of the producers in West Tennessee make use of this very beneficial program.

Number of cows and heifers bred by artificial insemination. The use of artificial insemination has not gained as wide acceptance among beef producers as is the case in the dairy industry. Many breeders of purebreds have been reluctant to accept this practice because of their desire to protect one of their main sources of income, the sale of herd bulls.

Feeding Management

Kind of harvested forages fed last winter. Most producers still rely on hay as their main source of winter feed.

Was herd grouped last winter by age and stage of production and groups fed separately? Fewer than half of the producers were using this practice in 1981. Even fewer used it in 1985. Many West Tennessee beef producers never separate their herds.

Were dry pregnant cows fed lower quality forages? The limited use of this practice is related to the fact the herds are not grouped so that they can be fed differently.

Kind of crop residue fed last winter. Many producers took advantage of any crop residues they may have had on hand.

Stockpiling fescue. Most producers have used this practice in order to extend the grazing period and reduce winter feeding costs.

Were hays and/or silage "forage tested" before winter feeding? Hardly any producers devoted time or expense to "forage test" in order to better balance their winter ration.

Kinds of supplemental protein fed each day during wintering period. Almost all of the producers provided supplemental protein. A vast majority used blocks or cubes due to convenience and ability to control intake better.

Number of times calves were implanted. Several more producers were implanting calves at least once in 1985 than in 1981. This large increase could be attributed to results of demonstrations which extension agents conducted in the counties to convince producers of the value of this practice.

Health Management

Were cows and replacement heifers vaccinated against leptospirosis? Only about half of the producers follow this important health practice.

Were cows vaccinated against IBR, BVD and PI3? Fewer than half of the producers vaccinated at least part of their cows, with only a few vaccinating all of their cows against these diseases.

Were calves vaccinated against IBR, BVD and PI3? Again, very few producers go to the trouble and expense of vaccinating calves against this disease complex.

Were calves vaccinated against blackleg? This disease has long caused considerable loss in the cattle industry. Still, only about 80% of the producers vaccinate their calves against blackleg.

Were replacement heifers vaccinated against brucellosis? Only about one-third of the producers were following this practice in 1981 or 1985. The incidence of brucellosis in herds in West Tennessee has been greatly reduced during the last several years due to the mandatory testing programs, slaughter of infected animals, quarantines of exposed herds and the restricted interstate shipment of cattle.

Season when cows and bulls were dewormed. Nearly all of the producers interviewed dewormed their cows and bulls at least once during the year. Thirty-nine percent performed this task both in the fall and in the spring.

Were calves dewormed? More than three-fourths of producers dewormed their calves in 1985. This was about the same as in 1981.

Primary method used to control horn and face flies. Nearly all producers devoted some effort to controlling horn and face flies.

The introduction of ear tags impregnated with insecticides has made this control much simpler and easier to accomplish. More than half of the producers interviewed used insecticide-impregnated ear tags to control horn and face flies in 1985.

Month treatment for horn and face flies was begun. Almost half of the producers started horn and face fly treatment programs at the proper time (by April 1) for optimum results. The others started at a later date.

Month cattle were treated for lice. More than a third of the producers did consider this practice worthwhile. The other producers treated lice at some time during the year.

Were cattle treated for grubs before November 1? Almost half of the producers did not treat for grubs at all. Nine percent treated their cattle after November 1, thus possibly jeopardizing their animals' health. The others performed this task before November 1.

Forage

Number of acres of permanent pasture. The number of acres of permanent pasture ranged from fewer than 75 acres to more than 300 acres, with most producers having less than 300 acres.

Percent of permanent pasture with 30% legume. Almost half of the producers had at least 50% of their permanent pasture containing 30% or more legumes. Only a very few producers had no permanent pasture without legumes.

Handling Facilities

Type of facilities available for working cattle. Ninety percent of the producers had some type of cattle handling facilities. This ranged from only the very basic headgate to a complete handling facility including a headgate, holding chute, working chute, crowding pen and holding pens.

Marketing

Number of feeder calves sold at weaning. About two-thirds of the producers sold their feeder calves at weaning. The number sold ranged from fewer than 25 to more than 50. About one-third of the producers retained their calves for later marketing.

Average weight of feeder calves sold at weaning. The average weights of calves sold ranged from less than 400 pounds to more than 500 pounds.

Number of calves sold in spring as backgrounded short yearlings. Backgrounding calves through the winter is becoming more popular with West Tennessee cattle producers. Several producers marketed calves in this fashion.

Number of calves sold in summer or fall as backgrounded long yearlings. Several producers also are taking advantage of temporary summer pastures by carrying a few calves on to heavier weights. This weight gain is not expensive and usually nets a little more profit for the producer.

Number of calves finished and sold as slaughter cattle. Very few producers take advantage of this market, undoubtedly because of the extra facilities and capital needed to carry calves to a slaughter weight.

The variables in Table 3 are grouped into five categories: (1) breeding, (2) health management, (3) pasture, (4) cattle handling facilities and (5) extension contacts.

Breeding Management

Number of calves weaned. The chi-square test shows that use or non-use of performance-tested bulls is not independent ($P < .005$) of the number of calves weaned. The hypothesis of independence would be rejected. That is, if performance-tested bulls were used, the number of calves weaned tends to be larger.

Number of bulls used. On the basis of the chi-square test of the hypothesis of independence ($P < .045$), it can be concluded that these two survey classifications are not independent. That is, the tested hypothesis would be rejected, and the two arrays declared not independent; the data indicate that producers who use performance-tested bulls tend to use more bulls than do those who do not use performance-tested bulls.

Were bulls evaluated for breeding soundness before breeding season began? The percentage of producers using performance-tested bulls who evaluated their bulls for breeding soundness before the

breeding season began was more than twice ($P < .001$) the corresponding percentage of producers who did not use performance-tested bulls.

This probably can be interpreted to mean that producers who are convinced of the general superiority of performance-tested bulls over non-tested ones and are willing to pay for that expected superiority are willing also to go to the trouble and expense of evaluating their bulls for breeding soundness.

Were cows and heifers pregnancy checked? More than a third of the producers who used performance-tested bulls subjected their females to a pregnancy diagnosis, while fewer than one-fourth of those who used non-tested bulls applied this procedure. The chi-square test indicated non-independence, that is, that producers who used performance-tested bulls were more ($P < .005$) likely to obtain pregnancy diagnosis than were those who used non-tested bulls, the same logic seeming to apply here as in the case of evaluating bulls for breeding soundness.

Health Management

Were cows and heifers vaccinated against leptospirosis? Of the producers who used performance-tested bulls, 73% vaccinated their cows and heifers against leptospirosis, while only 47% of those who did not use performance-tested bulls vaccinated against this disease. According to the chi-square test, those who used performance-tested bulls were more (P much less than .0001) likely to vaccinate their cows and heifers against leptospirosis. This, again, seems expected,

in that those willing to invest in performance-tested bulls seem more willing to invest also in vaccination against leptospirosis.

Were calves vaccinated against IBR, BVD and PI3? Of the producers using performance-tested bulls, 37% vaccinated all of their calves against IBR, BVD and PI3, and 19% vaccinated part of their calves against these diseases. Of the producers who did not use performance-tested bulls, only 23% vaccinated all of their calves, and 17% vaccinated part of their calves against IBR, BVD and PI3. Results of the chi-square test are similar to those with respect to the test with cows, in that producers who used performance-tested bulls appear to be more ($P < .0138$) likely to vaccinate their calves against IBR, BVD and PI3 than were those who did not use tested bulls.

Were calves vaccinated against blackleg? Ninety-two percent of the producers who used performance-tested bulls vaccinated their calves against blackleg, while only 23% of those who did not use performance-tested bulls vaccinated their calves against blackleg. Thus, the use of performance-tested bulls is strongly associated ($P < .014$) with the practice of vaccinating calves against blackleg.

Primary method used to control horn and face flies. Only 2% of the producers who used performance-tested bulls did not use any horn and face fly control, while 9% of those who did not use performance-tested bulls did not apply any horn and face fly control methods. The chi-square test shows that producers who use performance-tested bulls appear much more ($P < .001$) likely to practice horn and face fly control.

Were cattle treated for grubs before November 1? Sixty-six percent of the producers who used performance-tested bulls treated for grubs, while only 47% of those who did not use performance-tested bulls treated for grubs. Again, the chi-square test shows that the use of performance-tested bulls is strongly associated ($P < .004$) with the practice of treating for grubs.

Pasture

Percentage of permanent pasture containing 30% or more legumes.

Sixty-one percent of the producers who used performance-tested bulls had at least 50% of their total acreage of permanent pasture containing 30% or more legumes, while only 48% of the producers who did not use performance-tested bulls had at least one-half of their permanent pasture acreage containing 30% or more legumes. Again, the chi-square test shows that the practice of using performance-tested bulls is associated ($P < .0002$) with the practice of keeping legumes in permanent pastures.

Handling Facilities

Type of facilities available for working cattle. Sixty-six percent of the producers who used performance-tested bulls had handling facilities consisting of headgate, holding chute, working chute, crowding pen and holding pen; while only 3% of those who did not use performance-tested bulls had the same facilities. Results of the chi-square test indicate that the use of performance-tested bulls has a strong relation (P much less than .0001) to the type of handling facilities

used. Again, it appears that willingness to invest in performance-tested bulls is associated with willingness to invest in handling facilities.

Marketing

Average weight of calves sold at weaning. Seventy-three percent of the producers who used performance-tested bulls sold calves at weaning that averaged more than 450 pounds in weight. Only 60% of the producers who did not use performance-tested bulls sold weaning calves as heavy as this. Results of the chi-square test show that the use of performance-tested bulls does favorably influence ($P < .045$) the weight of calves sold at weaning.

Method used to market feeder calves. Thirty-five percent of the producers who used performance-tested bulls marketed their calves through feeder calf sales, while only 24% of the producers who did not use performance-tested bulls marketed their calves through these sales. In this case, unlike previously described tests, this chi-square test indicated no association ($P < .249$) of use of performance-tested bulls with the use of feeder calf sales to market calves.

Extension Contacts

Total number of extension contacts. Forty-five percent of the producers who used performance-tested bulls had 10 or more extension contacts, while 32% of the producers who did not use performance-tested bulls had 10 or more extension contacts. Results of the

chi-square test indicate slight association ($P < .097$) of the use of performance-tested bulls and total number of extension contacts, but the number of visits to the extension office and the number of beef meetings attended did not appear to be associated with the practice of using performance-tested bulls ($P < .810$ and $P < .205$, respectively).

Table 4 contains the results of various analyses of variance conducted in an effort to determine the effect of various practices on percentage of cows weaning calves. The practices considered are in four classes: (1) breeding, (2) feeding, (3) health management, and (4) extension contacts.

Breeding Management

Breeding of cows (crossbred or straightbred). In many such studies, percentage of crossbred cows weaning calves is greater than this value for straightbred cows. However, in this study, both kinds of cows had 87% weaning calves. The producers who used both crossbred and straightbred cows had 85% of their cows weaning calves. Since it is not known whether crossbred cows were first-generation crossbreds or graded up to a pure breed, it may be that many of the cows classified as crossbred received more than half of their heredity from one pure breed, thus reducing the influence of heterosis on reproductive efficiency.

Was herd enrolled in TBCIP? Only 10% (36 producers) had their herds enrolled in the TBCIP, and 86% of their cows weaned calves. Analysis of variance showed no real difference ($P < .139$) between this

and the 89% value in the herds (316, 90%) not enrolled. Although having one's herd enrolled in the TBCIP appears to have no effect on the percentage of calves weaning calves, there are other possible benefits from TBCIP which should be considered before deciding not to enroll.

Feeding Management

Were dry pregnant cows fed lower quality forage? Percentage of cows weaning calves (88%) in herds in which dry pregnant cows were fed lower quality forage was greater ($P < .019$) than the 85% value in herds in which dry pregnant cows were not fed lower quality forage. This result is difficult to interpret because classification of producers into two groups as to whether or not they fed lower quality forage to dry pregnant cows provides no information as to other aspects of the feeding program in each herd, such as whether or not fescue was stockpiled, which is to be considered next.

Stockpiling of fescue. A majority of the responding producers (246, 69%) stockpiled fescue, and 88% of their cows weaned calves, which is larger ($P < .001$) than the 85% value for the 104 (31%) responding producers who did not stockpile fescue. The fact that more than two-thirds of the responding producers have seen fit to use this practice is some evidence of its merit in addition to the statistical evidence of its apparent favorable effect on percentage of cows weaning calves.

Percent permanent pasture containing 30% or more legumes.

Only 62 producers (20%) had 25% or less of their permanent pasture containing at least 30% legumes. Eighty-four percent of their cows weaned calves, which is the lowest ($P < .0028$) value for the four categories considered here. The survey results indicate a strong tendency for percentage of cows weaning calves to increase with increasing percentage of permanent pasture containing 30% or more legumes, with 89% being the value for the third and fourth categories in which 51-75% and 76-100% of the permanent pasture was reported to contain 30% legumes.

Health Management

Were cows and heifers vaccinated against leptospirosis?

According to the analysis of variance, percentage of cows weaning calves did not differ ($P < .964$) between herds (187, 53%) which were vaccinated against leptospirosis and herd (164, 47%) which were not so vaccinated, both groups having 86% of the cows weaning calves. This result makes it appear that leptospirosis is not a serious disease problem in the area covered by the survey.

Were cows vaccinated against IBR, BVD and PI3? Seventy-two producers (21%) vaccinated all of their cows against these diseases. Analysis of variance did not show that herds in the various categories with respect to vaccination against these diseases differed ($P < .825$) in percentage of cows bred weaning calves, the value obtained in all categories being about 86 to 87%. The fact that a large majority

of responding producers do have a vaccination program with respect to these diseases indicated that vaccination is a widely accepted practice and probably should be continued as insurance against the possibility of upward fluctuations in the populations of the disease organisms involved and possible resulting outbreaks of the diseases.

Season when cows were dewormed. The results clearly indicate that deworming or not deworming and the season in which it is done had no effect on the percentage of cows bred weaning calves, at least in this survey. Again, it is known that populations of parasitic worms fluctuate in size from year to year as do populations of disease-causing organisms. If worm populations are large in a given year, failure to deworm or deworming during other than the optimum season could result in some seriously debilitating effects on cows and calves, making a recommended deworming program logical and desirable even though deworming does not appear to increase the percentage of cows bred weaning calves.

Extension Contacts

Number of extension circulars or newsletters received. The Agricultural Extension Service provides much information in newsletters and circulars which may be obtained by any producer. The analysis designed to assess the influence of this information on producers' experience with respect to percentage of cows bred weaning calves shows a greater ($P < .036$) percentage of cows bred weaning calves with increasing amounts of this printed material received by producers.

Total number of extension contacts received. Unlike the results with respect to printed information (discussed above), the effects of personal contacts with extension personnel are not striking, according to the analysis of variance. However, there appears to be a tendency, though not statistically significant, for percentage of cows bred weaning calves to increase with increasing number of personal contacts with extension personnel.

CHAPTER V

SUMMARY

This study is an analysis of responses to the questions asked of 353 randomly selected beef producers in the 21 counties of Extension Service District One in 1985.

Frequencies of certain producer characteristics and practices were analyzed and, in some cases, compared with 1981 survey results. The chi-square test was used to determine the relationship or independence of the use or non-use of performance-tested bulls and the use of some beef production practices. Analysis of variance was used to determine the effect that the use of certain practices had on the percentage of cows weaning calves.

It was determined that the average beef producer was approximately 50 years of age, more than half farmed full time, average herd size was 56 cows and the average percentage of cows that weaned calves was 86.

Results of the study indicate that only a small number of producers (about 25%) follow many of the production practices recommended by Agricultural Extension Service personnel.

A larger percentage of producers who used performance-tested bulls employed more of the other recommended production practices than of those who did not use such bulls. The chi-square test showed that in most cases producers who were willing to invest the extra money required to purchase tested bulls were willing also to invest

the extra effort and money required to use other recommended practices.

Percentage of cows weaning calves did not seem to be influenced greatly by the use or non-use of most recommended production practices. However, the results do indicate that weaning percentage increases with increases in amount of printed extension material received by producers.

The Extension Service offers vast amounts of educational material and assistance to producers at no direct cost to them, such service being financed by appropriated money supplied by taxes. Efforts should be devoted to making producers aware of these services and to encourage them to use them to their advantage.

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VITA

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He attended The University of Tennessee, Knoxville and was graduated in June 1968 with a B.S. degree in Agricultural Economics.

He has been employed with The University of Tennessee Agricultural Extension Service since August 1968, currently serving as Extension Leader in Gibson County.

He is the father of two daughters and one son.

He is a member of Epsilon Sigma Phi, honorary Extension fraternity and Gamma Sigma Delta, honorary agricultural society.