Table 39
Feedstuff Analyses

	Dry matter, %	Moisture, %	Protein, %	Ash, %	Ether extract, %	Crude fiber, %	N.F.E.	Carotene, mgs. per lb.
Colby:								
Sorghum silage	32.09	67.91	1.95	2.01	0.66	6.86	20.61	2.28
Alfalfa hay	94.17	5.83	17.01	9.70	1.84	30.25	35.37	9.23
Sorghum grain	88.54	11.46	10.71	2.86	1.05	1.09	72.83	....
Garden City:								
Sorghum silage	35.77	64.23	1.58	2.57	0.52	5.67	25.43	3.05
Alfalfa hay	90.80	9.20	13.46	8.89	2.57	29.97	35.91	37.60
Sorghum grain	87.38	12.72	9.23	1.06	1.59	1.82	73.58	....
Manhattan:								
Sorghum silage	35.77	64.23	1.84	1.29	0.70	6.87	25.07	1.07
Alfalfa hay	91.73	8.27	22.54	7.48	2.57	26.59	32.55	5.34
Sorghum grain	87.32	12.68	10.19	1.78	2.38	1.84	71.19	....
Mound Valley:								
Sorghum silage	35.77	64.23	2.47	1.90	0.67	7.15	23.58	0.72
Alfalfa hay	94.96	5.04	19.96	5.96	2.75	33.46	32.84	5.11
Sorghum grain	88.34	11.66	9.69	1.55	2.66	1.89	72.48	....

Influence of Nitrogen Source on Ruminal pH, Ammonia Production and Protein Synthesis (Project 596).

L. H. Harbers, D. Richardson, and R. K. Abe

Previous reports from this station indicate little advantage in feeding combined sources of protein (soybean meal and cottonseed meal) to beef cattle. The results were obtained by determining total nitrogen and protein nitrogen in the rumen of fistulated steers at six hours after feeding. By this technique, data that express the ability of the microorganisms to convert nitrogen to bacterial protein may be rapidly determined. Bacterial protein has high biological value; it is, thus, important that maximum conversion be obtained from nitrogen sources of less biological value. Factors that influence conversion can be carefully controlled using fistulated animals. Once optimum rations are formulated under such conditions of rapid screening, costly feeding trials can be minimized.

Steers fitted with ruminal cannulae were used to study the effect of nitrogen source on ruminal pH, ammonia production, crude protein, and true protein. Soybean meal, cottonseed meal, and urea were the sources of supplemental nitrogen to a basal ration of prairie hay, salt, and steamed bone meal (Table 40). Tests were conducted with and without added grain. Rations within each test contained the same amounts of nitrogen and had the same caloric value.

Results and Discussion

Measurement of ruminal pH is an indication of the amount of acid formed during fermentation following feeding. A pH value of less than 7 indicates acid conditions; a value above 7 indicates alkalinity. Data from these investigations (Figure 1) show no significant differences in pH due to nitrogen source. When grain is added, the values are somewhat lower due to the added carbohydrate that is fermented to volatile fatty acids.

Ammonia arising in the rumen is one of the end products of bacterial degradation of feedstuff protein and may be used to synthesize bacterial protein. As seen in Figure 2, the amounts produced from the oil meals do not differ. Those levels of ammonia are capable of being utilized by the bacteria. In the case of urea, most of the ammonia is produced during the first two hours. Those amounts are much greater than the bacteria are able to utilize during that short time. Some ammonia is lost due to absorption by the rumen and is then detoxified to urea by the

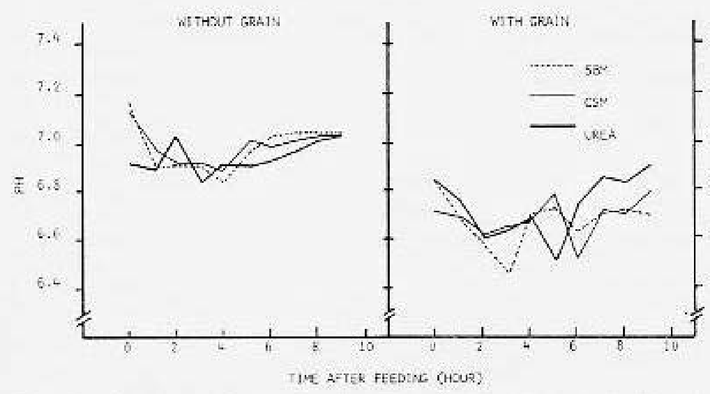

Fig. 1.—Average pH values of rumen liquor from three fistulated steers.

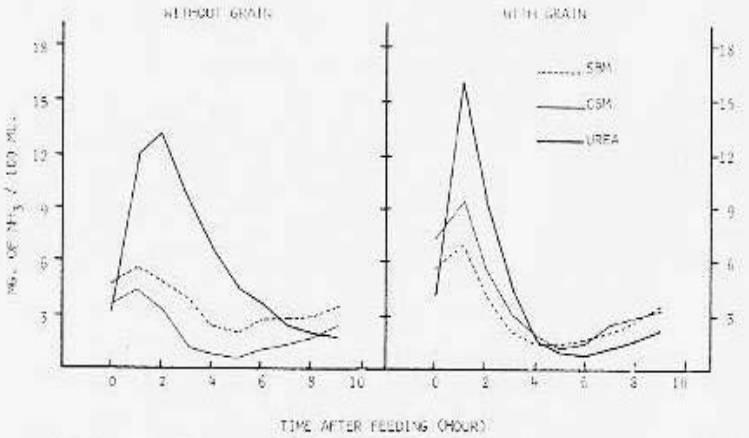

Fig. 2.—Average ammonia level of rumen liquor from three fistulated steers.

liver and subsequently excreted in the urine. A portion of the urea comes back into the rumen through the saliva.

Further evidence of loss of ammonia from urea is presented in Figures 3 and 4. Crude protein (protein nitrogen plus nonprotein nitrogen) and true protein (protein nitrogen) levels are much lower when urea is fed than when the ration is supplemented with either of the oil meals. That may be largely overcome with adequate grain in the diet.

Levels of crude protein and true protein were the same for soybean meal and cottonseed meal, which further indicates that, for all practical purposes, those protein sources are similar, so a combination would not be superior to one or the other.

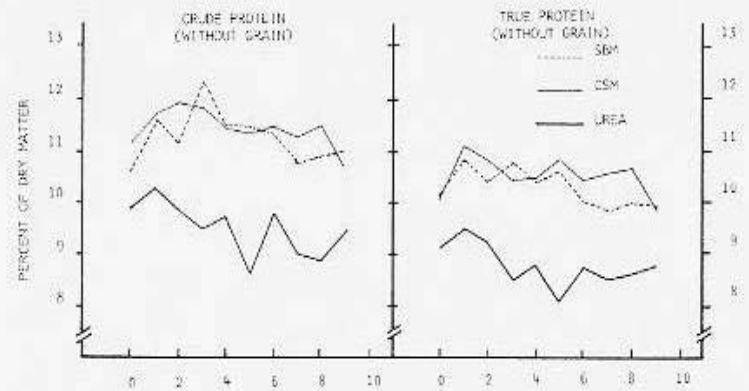

Fig. 3.—Average percentage of crude protein and true protein of dried rumen samples from three fistulated steers.

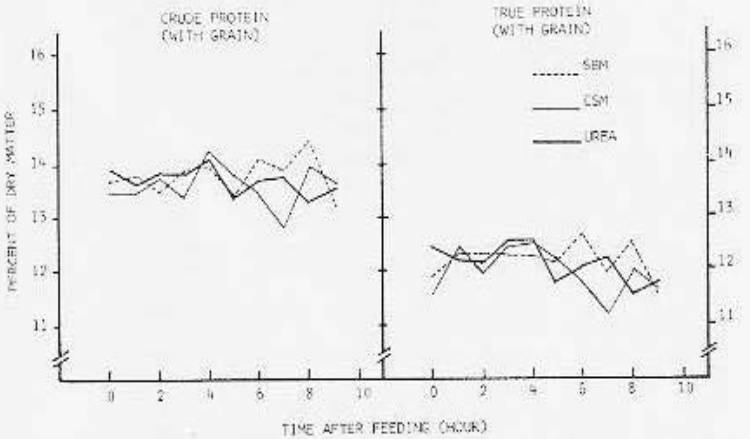

Fig. 4.—Average percentage of crude protein and true protein of dried rumen samples from three fistulated steers.

Table 40
Composition of rations.

Ingredients	Rations: Without added grain A	B	C	With added grain D	E	F
Prairie hay, lbs.	10	10	10	6	6	6
Corn, lbs.			1	6	6	6
Soybean meal, lbs.	1			0.73		
Cottonseed meal, lbs.		1.05			0.78	
Urea, grams			62			40
Basal ration, C.P.	0.56	0.56	0.56	0.97	0.97	0.97
Added C.P., lbs.	0.47	0.47	0.47	0.34	0.34	0.34
Total C.P., lbs.	1.03	1.03	1.03	1.31	1.31	1.31

C.P.: crude protein.

Influence of Breeding and Length of Feeding Period on Carcass Characteristics and Palatability of Beef (Project NC-58, Kansas 639).*

D. L. Mackintosh, D. H. Kropf, R. C. Fletcher, and G. A. Ahlschwede

Phase I. Sire Testing.

During 1962-63, in cooperation with the American Hereford Association, 70 head of Hereford steers, sired by four different bulls, were slaughtered in Kansas City and the rib cut from 40 (10 from each sire group) was purchased for detailed analyses and palatability tests, a procedure followed with all cattle on this phase of the project.

All cattle were classified as "choice" on foot, but dropped nearly one grade in carcass, due to lack of marbling. Final distribution of carcass grades was: Low choice, 3; high good, 4; average good, 13; low good, 46; high standard, 4.

* This project was supported by NC-58 funds and funds from the American Angus Association.