reorganization which was adopted unanimously and the Kansas Livestock Association as we know it today came into being.

Mr. Potter was elected a member of the State Board of Agriculture in 1885 and every year thereafter for 33 years. He was president for three successive terms and upon being urged to accept a fourth successive term he stepped down from the chair, declined the nomination, stating that there were others in the organization as worthy of the honor as he, and placed ex-governor George W. Glick in nomination. Governor Glick was elected unanimously. No person was ever assigned more responsible jobs and commissions as a member of the board than Mr. T. M. Potter.

Mr. Potter devoted considerable time and talent to public service on a state wide basis as well as locally. Included in this service was one term as State Senator and eight years as a member of the Board of Regents of Kansas University. Incidentally, Potter Lake on the campus of Kansas University was named in his honor.

Mr. Potter was a man of high ideals and a real statesman who abhorred insincerity and chicanery in politics and his outspoken criticism of them militated against political preferment in a large way.

Mr. Potter was also a religious man and very active in church work. Of the many honors that came to him, none gave more satisfaction than his selection as commissioner to the General Assembly of the Presbyterian Church. One of the many fine things he did for the churches of his community was the establishment of an endowment for an annual Sunday School picnic of all the churches in Peabody and nearby towns.

After his death many tributes were paid Mr. Potter by the press and by the organizations to which he belonged. Space will allow only a few excerpts:

The KANSAS STOCKMAN, official publication of the Kansas Livestock Association, stated that "few men gave time, talent, thought and action to public questions with greater zeal and devotion than he. He was dignified, upright, fearless, sincere, honest and faithful to the cause he pursued. He had a high concept of duty and never hesitated to speak against those things he considered unjust."

A tribute which appears in the minutes of the annual meeting of the Kansas State Board of Agriculture of January 8-10-1930 includes: "In the passing of Thomas M. Potter, Kansas was bereft of a pioneer builder to whom the present structure of the state owes much. A man of large heart, great ability, and unusual achievement, his personal influence upon the fabric of Kansas is at once pronounced and indelible."

Mr. Potter died at Piedmont, California, December 3, 1929.

Project 110: Swine Feeding Investigations

EXPERIMENT I—Summer, 1950

C. E. Aubel

The Value of Sorghum Distillers Dried Solubles* in Protein Feed Mixtures When Fed As a Supplement to Shelled Corn for Fattening Spring Pigs on Alfalfa Pasture.

In recent years much attention has been given to the feeding of distillers by-products to livestock. One of these is distillers dried solubles derived from the malting of various grains. In addition to other nutrients, it furnishes some of the B vitamins that have lately been shown to be important in swine feeding.

* The sorghum distillers dried solubles used in the experiment were furnished through the courtesy of the Midwest Solvents Co., Inc., Atchison, Kansas.

A discussion of an experiment conducted at Kansas State College to determine the value of sorghum distillers dried solubles in protein supplements for swine follows:

EXPERIMENTAL PROCEDURE

Five lots of pigs were self-fed shelled corn on alfalfa pasture. In addition to the corn ration, protein supplements were fed as follows: in Lot 1, tankage; in Lot 2, a mixture of tankage 50%, soybean meal 50%; in Lot 3, a mixture of tankage 50%; dried solubles 50%; in Lot 4, a mixture of soybean meal 50%, dried solubles 50%; in Lot 5, a mixture of tankage ⅓, soybean meal ⅓ and dried solubles ⅓.

The protein content of the tankage was 60%, soybean meal 43%, and the dried solubles 25%.

The following table gives a summary of the results of this experiment:

EXPERIMENT I—Summer, 1950

The Value of Sorghum Distillers Dried Solubles in Protein Feed Mixtures When Fed As a Supplement to Shelled Corn for Fattening Spring Pigs on Alfalfa Pasture.

(June 7, 1950 to Aug. 21, 1950—76 days)

	SHELLED CORN, MINERAL MIXTURE (self-fed) ALFALFA PASTURE				
Ration fed	Tankage (self-fed)	Tankage 50% Soybean meal 50% (self-fed)	Tankage 50% Distillers solubles 50% (self-fed)	Soybean meal 50% Distillers solubles 50% (self-fed)	Tankage ⅓ Soybean meal ⅓ Distillers solubles ⅓ (self-fed)
Lot number	1	2	3	4	5
Number pigs per lot	10	10	10	10	10
	Lbs.	Lbs.	Lbs.	Lbs.	Lbs.
Average initial weight per pig	66.75	67.10	66.94	67.95	67.35
Average final weight per pig	196.50	203.20	194.66	199.00	196.60
Average total gain per pig	129.75	136.10	127.72	131.05	129.25
Average daily gain per pig	1.70	1.78	1.67	1.72	1.70
Average daily ration per pig					
Shelled corn	4.48	4.59	4.48	4.61	4.50
Tankage	.33	.37	.44		.32
Soybean meal		.37		.35	.32
Distillers Sol.			.44	.35	.32
Mineral mixture	.017	.014	.015	.013	.013
Feed consumed per 100 pounds gain					
Shelled corn	262.83	256.42	266.20	267.45	264.60
Tankage	19.65	20.94	26.62		18.83
Soybean meal		20.94		20.53	18.83
Distillers Sol.			26.62	20.53	18.83
Mineral mixture	.99	.80	.93	.76	.77
Feed cost per 100 pounds gain	$7.65	$8.19	$9.17	$8.11	$8.95

Feed prices charged: Shelled corn $1.40 per bu.; Tankage $110.00 per ton; Sorghum distillers dried solubles $80.00 per ton; Soybean meal $60.00 per ton.

Methods of feeding: All lots were self-fed shelled corn and a mineral mixture, made up of equal parts steamed bone meal, ground limestone and salt. The pigs were all pastured on alfalfa. The protein supplements were mixed in the proportions indicated and self-fed in a separate compartment from the corn and minerals.

DISCUSSION OF RESULTS

It will be seen from the foregoing figures that Lots 3, 4 and 5 which received the sorghum dried solubles made very similar gains ranging from 1.67 to 1.70 pounds per head daily. The gains made in Lots 1 and 2 which received no solubles were as good or better than in the solubles-fed lots. In fact, the lot receiving equal parts of tankage and soybean meal made the largest daily gains of all. The feed consumption per 100 pounds gain varied in about the same relation. There was no appreciable difference in favor of the dried solubles-fed pigs.

EXPERIMENT III—Winter, 1951

Testing the Comparative Palatability of Different Sorghums

C. E. Aubel, Kansas State College and A. F. Swanson, Fort Hays Branch Agricultural Experiment Station

Plant breeders at the Fort Hays Branch Agricultural Experiment Station desired to know the relative palatability for livestock feeding of many of the new varieties of sorghum grain they had produced. They asked the Animal Husbandry Department to test this quality in nine of the varieties.

To do this, three pigs were individually fed. Three self-feeders, each containing three compartments, were placed before each pig. In each of the compartments, twenty-five pounds of one of the varieties of ground sorghum grains was placed. In this manner, each pig was given free access to the nine varieties. No other feed was given except a daily allowance of tankage. As soon as the first allowance of twenty-five pounds of a variety was consumed by the pig, an additional fifteen pounds was placed in the compartment. When this was consumed, the feeder which contained this variety was shifted to a different position in the pen, and another fifteen pounds added. When the third allowance was consumed, no more of that particular sorghum grain was supplied. This made it necessary for the pig to make a second choice from the remaining eight varieties. Other choices followed the second and were made in turn from the remaining varieties left after each choice.

It was assumed that a pig, self-fed in this manner with the sorghums to be tested, would eat first those that he liked best, and that a preference for a variety and thus its relative palatability would be indicated, if the pig would consume a total of fifty-five pounds of a certain variety before as much of any other was consumed. It would especially indicate a preference if the last fifteen pounds was consumed after the pig had hunted it out from a changed position.

The following table shows the varieties of sorghums and the order of their selection by each pig:

Order of choice	Pig No. 1	Pig No. 2	Pig No. 3
1	Westland	Cody x Wonder Club	Gurno
2	Westland x Cody	Westland	Midland
3	Martin	Gurno	Midland x Wonder Club
4	Cody	Midland	Midland x Wonder Club
5	Midland x Wonder Club	Midland x Wonder Club	Westland
6	Gurno	Cody	Martin
7	Leoti x Atlas	Martin	Cody
8	Midland	Leoti x Atlas	Cody x Wonder Club
9	Cody x Wonder Club	Westland x Cody	Westland x Cody
			Leoti x Atlas

In order to make a final placing of the palatability of the sorghums, each variety was given the number in the order it was selected by each pig and the sum of these placings was divided by the number of pigs in the test.

The following table shows the averages and the indicated relative palatability of the varieties:

Order of choice	Variety	Individual placing	Total	Average
1	Westland	1-2-4	7	2.33
2	Gurno	6-3-1	10	3.33
3	Midland x Wonder Club	5-5-3	13	4.33
4	Midland	8-4-2	14	4.66
5	Martin	3-7-5	15	5.00
6	Cody (waxy)	4-6-6	16	5.33
7	Cady x Wonder Club (waxy)	9-1-7	17	5.66
8	Westland x Cody (waxy)	2-9-8	19	6.33
9	Leoti x Atlas (waxy)	7-8-9	24	8.00

Although there is no complete accord in the tastes of the several pigs, yet the above order represents to some degree the combined tastes of the several pigs for the various varieties of sorghums tested. It is interesting that the first five varieties are the so-called non-waxy-endosperm type of sorghum, and the last four are waxy. The waxy type has rather a bland taste, the non-waxy has a stronger flavor.

EXPERIMENT IV—Winter, 1950-51

The Preparation of Milo Grain for Finishing Pigs Full-Fed in the Dry Lot.

C. E. Aubel

Swine feeders have complained for some time of the difficulty of grinding sorghum grains in hammer mills because of pulverizing, which has been thought to interfere somewhat with the economy of grain consumption when full-fed to pigs. Since the introduction of rolling mills and their adoption in grain preparation, the question has arisen whether rolling milo is a better method of preparing it than grinding. Consequently, an experiment was set up and three lots of pigs were fed; one received whole milo, one ground milo and another rolled milo. In rolling the milo in this experiment, there was some pulverizing as the milo was exceedingly dry.

Discussion of Results

It would seem from this experiment that slightly better results are to be secured from rolling sorghum, in preparation for full-feeding fattening and growing pigs, than by feeding it whole or grinding it. The ground milo and the rolled milo seemed more palatable than the whole milo for more was consumed daily. However, it required more ground or rolled milo than whole milo per 100 pounds gain, but the pigs consuming the whole milo consumed more tankage per 100 pounds gain than those fed processed grain.

The following table gives a summary of the results of this experiment:

EXPERIMENT IV—Winter, 1950-51

The Preparation of Milo Grain for Finishing Pigs Full-Fed in the Dry Lot.

(December 1, 1950 to February 27, 1951—89 days)

Ration fed	Tankage, alfalfa hay (self-fed) Whole milo (self-fed)	Ground milo (self-fed)	Rolled milo (self-fed)
Lot number	1	2	3
Number pigs in lot	10	10	10
Average initial weight per pig	61.80	63.00	61.15
Average final weight per pig	196.60	203.10	203.70
Average total gain per pig	134.80	140.10	141.55
Average daily gain per pig	1.51	1.57	1.58
Average daily ration per pig			
Whole milo	4.56		
Ground milo		5.25	
Rolled milo			5.17
Tankage	.72	.62	.59
Alfalfa hay	.24	.23	.27
Feed consumed per 100 pounds gain			
Whole milo	301.55		
Ground milo		333.69	
Rolled milo			325.32
Tankage	47.47	39.97	37.44
Alfalfa hay	16.32	16.31	17.37
Feed cost per 100 pounds gain	$10.12	$10.35	$10.01

Feed prices charged: Milo $2.25 cwt.; Tankage $130.00 ton; Alfalfa hay $30.00 ton.

Methods of feeding: The pigs in all lots were self-fed, free choice. The pigs were fed in a dry lot. The ground milo was processed through a ⅜" screen and the rolled milo was rolled dry.

EXPERIMENT V—Winter, 1950-51

The Effect of an APF-Aureomycin Supplement in Swine Rations.

C. E. Aubel

Recently much has been written on the use of the "Animal Protein Factor" (APF) supplements and different antibiotics in swine nutrition. The results indicate so far that there is a wide use for them in swine feeding. Vitamin B_{12}, one of the important components of the so-called "animal protein factor," has been assigned a part in swine nutrition. Now the antibiotics, another component of the "animal protein factor," are recognized from recent experiments as being important factors in promoting rapid gains in pigs.

An experiment was conducted this past winter at this station, with growing and fattening pigs in the dry lot, to determine some of the practical applications of an "APF supplement" which contained, besides vitamin B_{12}, one of the antibiotics (aureomycin). Lederle's Aurofac, vitamin B_{12} and Antibiotic Feed Supplement, used in the experiments, was obtained from Lederle Laboratories Division, American Cyanamid Company, New York. It contained approximately 1.8 mg. of vitamin B_{12} and 1.8 grams aureomycin per pound. For convenience of reference it is designated as APF in this report.

In this experiment, beginning on December 1, 1950, four lots of 44-pound fall pigs were fed in the dry lot to market weight. There were 10 pigs to a lot and the pigs were self-fed free choice on shelled corn, a protein supplement, alfalfa hay and a mineral mixture. The

mineral mixture was made up of equal parts ground limestone, steamed bone meal and salt.

Three pounds of the APF supplement were included in the different protein supplements in Lots 2 and 4. This amount was estimated to give the pigs about 0.5 per cent of APF supplement in the total ration.

Lots 1 and 2 received only soybean meal and alfalfa hay as protein supplements. Lot 2 as noted above had APF added. Lots 3 and 4 received as a protein supplement a mixture of four parts meat and bone scraps, four parts soybean oil meal, one part linseed oil meal and one part alfalfa meal. Lot 4 as noted above had the APF supplement added.

The following table gives a summary of the results of this experiment:

EXPERIMENT V—Winter, 1950-51

The Effect of an APF-Aureomycin Supplement in Swine Rations.

(December 1, 1950 to March 9, 1951—98 days)

Ration fed	Shelled corn, alfalfa hay, mineral mixture (self-fed) Soybean oil meal	Soybean oil meal plus APF	Protein Suplt.	Protein Suplt. plus APF
Lot number	1	2	3	4
Number pigs per lot	10	10	10	10
Average initial weight per pig	44.00	43.55	44.35	43.85
Average final weight per pig	179.50	204.40	189.50	213.00
Average total gain per pig	135.50	160.85	145.15	169.15
Average daily gain per pig	1.38	1.64	1.48	1.72
Average daily ration per pig:				
Corn	3.74	4.47	4.44	5.15
Protein supplement	1.48	1.53	.92	.91
Alfalfa hay	.10	.12	.12	.13
Feed consumed per 100 pounds gain:				
Corn	262.06	272.61	300.37	298.84
Protein supplement	107.74	93.25	62.69	53.20
Alfalfa hay	7.60	7.58	8.81	8.04
Mineral mixture	.72	.49	.20	.17
Feed cost per 100 pounds gain	$11.01	$11.65	$11.07	$11.41
Average per cent APF in total ration		.75		.44

Feed prices charged: Shelled corn $1.50 per bu.; Supplement Lot 1 $72.00 per ton, Supplement Lot 2 including APF $93.84 per ton, Supplement Lot 3 $92.80 per ton, Supplement Lot 4 including APF $114.04 per ton; Alfalfa hay $30.00 per ton; Mineral mixture 3c a pound; APF 40c a pound.

OBSERVATIONS

The soybean oil meal-alfalfa hay supplement was efficient in supplementing the grain in Lot 1, although the gain was not quite so much as in Lot 3 where a mixed protein was fed. Adding APF-aureomycin supplement to the soybean meal-alfalfa hay supplement increased the rate of gain about ¼ pound per head per day but it also increased the amount of feed consumed per 100 pounds gain and increased the cost of these gains 64c a hundred.

In Lot 3 where a mixed animal and plant protein supplement was fed, the gains were larger than when a straight plant protein was

fed as in Lot 1 but not so large as where the APF was added to the plant protein as in Lot 2. The costs per 100 pounds gain were less in Lot 3 also. Adding APF to a mixed protein supplement as fed in Lot 3 increased the rate of gain, reduced the amount of feed consumed per 100 pounds gain, but increased the cost of the gains.

In this experiment, the efficiency of gain, indicated by the feed requirements, was in favor of the rations containing APF. The lots receiving APF also had a marked increase in the rate of gain.

The cost of gain increased slightly when the APF was fed with the different supplements.

It is evident from these results that the chief advantage of feeding APF in these experiments was the increased rate of gain of the hogs, rather than in any marked improvement in reducing the cost of the gains.

EXPERIMENT II—Summer, 1950

The Value of Thyroprotein in the Ration of Growing and Fattening Spring Pigs in the Dry Lot.

C. E. Aubel

It has long been known that the thyroid gland influences growth, metabolism and other functions in the body. In recent years numerous attempts have been made to influence growth, fattening, reproduction, milk and egg production in farm animals. Some trials have shown that an increased secretion of the thyroid gland or hyperthyroidism has, within certain limits, increased the growth rate in certain species of animals.

In this experiment, the effects of hyperthyroidism in swine were studied through the feeding of thyroprotein, which in this case was thyroactive iodinated casein. It contains the hormone produced by the thyroid gland and its administration results in hyperthyroidism.

In the trial reported here, three lots of pigs weighing about 50 pounds were self-fed a basal ration of corn and wheat with a good protein and mineral mixture. One lot received only the basal ration, one received 5 grams (0.011%) of thyroprotein to each 100 pounds of the basal ration and a third lot received 10 grams (0.022%) to each 100 pounds of basal ration.

The following table gives a summary of the results of this experiment:

EXPERIMENT II—Summer, 1950

The Value of Thyroprotein in the Ration of Growing and Fattening Spring Pigs in the Dry Lot.

(June 9, 1950 to September 3, 1950—87 days)

		Basal Ration (self-fed)	
Ration fed	Basal ration only	5 grams thyroprotein per 100 lbs. basal ration	10 grams thyroprotein per 100 lbs. basal ration
Lot number	1	2	3
Number pigs per lot	6	6	6
	Pounds	Pounds	Pounds
Average initial weight per pig	47.83	48.33	49.08
Average final weight per pig	199.83	200.00	194.50
Average total gain per pig	152.00	151.67	145.42
Average daily gain per pig	1.74	1.74	1.67
Average daily ration per pig Feed mixture	6.11	6.13	6.25
Feed consumed per 100 pounds gain Feed mixture	349.78	351.64	374.20

Methods of Feeding: A basal ration was self-fed in a feeder in the dry lot. The basal ration was composed of 66% corn, 20% wheat, 13% protein mixture and 1% mineral mixture. The mineral mixture was equal parts steamed bone meal, ground limestone and salt. The protein mixture was 4 parts meat scraps, 4 parts soybean meal, 1 part linseed meal and 1 part alfalfa leaf meal.

Discussion of Results

The addition of 5 grams (0.011%) of thyroprotein to 100 pounds of the basal ration did not affect the rate or total gain of the pigs as compared to another lot which did not receive thyroprotein. The amount of feeds per 100 pounds gain was practically the same in both lots.

In the lot that received 10 grams (0.022%) of thyroprotein or double the amount in the other lot, the gains were depressed and the feed consumption per 100 pounds gain was increased.

It would therefore seem, from this experiment, that the addition of thyroprotein to the ration of growing and fattening pigs was of no benefit so far as growing and fattening were concerned.

LAMB FEEDING EXPERIMENTS

Wheat Pasture and Feedlot Fattening Tests with Lambs.

Studies carried on by the Department of Animal Husbandry and the Garden City Branch Experiment Station.

By T. Donald Bell and A. B. Erhart.

This year's experiments included first, a series of wheat pasture tests, and later, various feedlot fattening tests. In the five lots of lambs on wheat pasture the effect of withholding salt, the value of additional roughage, and the efficiency of soda as well as vaccination in the control of over-eating disease, were studied. A check lot was fed a standard western Kansas feedlot ration.

Because of insufficient wheat pasture the lambs were removed after 39 days of grazing. They were re-sorted, weighed, and re-allotted into 11 lots and a new series of tests was started. Sorghum stover of different ages and other roughages were compared. The value of salt in the ration, as well as the value of drenching for worm control, were also studied.

Lambs:

New Mexico whiteface lambs were used in this year's tests. They were smooth and of good quality but because of drouth conditions the lambs were lighter when received at the range loading point than in previous years. After a preliminary feeding period the lambs went on the initial tests weighing about 64 pounds.

Feed Prices:

Westland Milo	$ 2.00 per cwt.
Alfalfa	25.00 per ton
Current year's Axtell Stover	7.00 per ton
One-year-old Axtell Stover	5.00 per ton
Two-year-old Axtell Stover	5.00 per ton
Axtell Tailings	7.00 per ton
Soybean oil meal pellets	86.00 per ton
Salt	.90 per cwt.
Ground limestone	1.00 per cwt.
Bicarbonate of Soda	4.85 per cwt.
Wheat Pasture	.30 per head per month

Thirteen of the 642 lambs died during the experimental feeding periods, a loss of 2 per cent. Six of these lambs died during the period that they were grazing on wheat pasture and seven died during the tests in the feedlot.