

Briefly stated, these six bills provided for:

- (1) a livestock sanitary commission consisting of three members to be appointed by the governor;
- (2) a state veterinarian who would work under the supervision of the Livestock Sanitary Commission;
- (3) a fund to finance the Livestock Sanitary Commission to be derived from a tax of 2/10 of one mill on each dollar of taxable property in the state;
- (4) authority for the Livestock Sanitary Commission to create and enforce quarantine against Texas Fever in any of the unorganized counties;
- (5) a new and more restricted quarantine ground for Texas cattle to protect domestic cattle from Texas Fever; and
- (6) authority for the Livestock Sanitary Commission to co-operate with federal authorities in the suppression of contagious diseases among domestic animals.

So finally, with the aid of an outbreak of foot and mouth disease, Governor Glick secured the passage of a livestock sanitary law for which he had worked many years. It was a good beginning, but many changes have been made in this law through the intervening years.

It might be of interest to note that sheep were subject to the provisions of the livestock sanitary laws of 1884 only in case of foot and mouth disease. The reason apparently lies in the fact that the legislature of 1883 had passed a law requiring county commissioners to appoint a county sheep inspector if and when six sheep owners in the county vouched for the presence of a contagious disease in that county. The county sheep inspector was supposed to handle the situation. However, his authority was quite limited and in a few years this separate provision for sheep was abolished.

The special attention given sheep at that early day was due to two major factors. One was the large number in the state—1,154,195 head—which was 10,000 greater than the number of cattle in the state at that time. The other was the prevalence of scab. It might also be well to mention the fact that nearly all these sheep were breeding sheep maintained for their wool. Lamb feeding had not yet appeared on the scene.

While at his winter home in Florida during the winter of 1909-10, he fell and broke a hip, from which injury he never recovered. After more than a year of suffering he died April 13, 1911, in his 84th year and his body was returned to Atchison for burial.

A veritable stream of tributes poured forth from individuals, organizations, and the press when his death was announced. The few excerpts that follow indicate the esteem in which he was held by agricultural interests.

From the State Board of Agriculture: "We mourn his death but we are proud of the splendid record of achievement he has left for our inspiration and emulation. . . . He filled many offices of trust and honor, all with dignity and characterized by sterling integrity and ability."

From comments by T. M. Potter, three times president of the State Board of Agriculture: "Humble and modest to a fault, considerate of the interests of all, and especially the humble, I know of no other man for whose sterling worth and character I have higher regard. . . . Pure in character, wise in judgment, conciliatory in all his feelings and aspirations, a despiser of pretense, . . . we have lost a wise counselor, a man of clear judgment whose interest in our organization and interest in the state are seldom equalled."

From the Kansas Farmer: "His entire life was devoted to the good of his state and his fellow men."

Governor Glick served with the Second Kansas Regiment during the Civil War, was in a number of engagements on the border, and was wounded in the Battle of the Big Blue.

In 1913, the Kansas legislature appropriated \$5,000 for a marble statue of Governor Glick to be placed in Statuary Hall in Washington, D.C. It was placed June 24, 1914, and formally accepted July 18, 1914.

Project 110: Swine Feeding Investigations

EXPERIMENT I—Summer, 1951

C. E. Aubel

The Effect of Antibiotics (Aureomycin-B₁₂ Supplement) on Weanling Pigs on Alfalfa Pasture.

Recently much has been written on the use of antibiotics in swine nutrition. Research has shown that different vitamin B₁₂-antibiotic supplements stimulate gains in growing and fattening swine. Some problems, however, present themselves.

First, is it necessary to feed the antibiotic supplement until the pig reaches market weight to get the full benefit of the stimulated gain, or does the stimulation resulting from feeding this supplement during early growth carry over into the fattening stage of the hog's development?

Another problem that is apparent in the use of the B₁₂-antibiotic supplement is the relative efficiency of the antibiotics in plant protein supplement diets and in mixed plant and animal protein supplement diets.

Furthermore, is antibiotic feeding as effective with pasture-fed pigs as with dry lot-fed pigs?

Experiments were conducted last summer and winter at this station with weanling pigs to determine some of the practical applications of antibiotic feeding. Lederle's Aurofac, the vitamin B₁₂ 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 B₁₂ and 1.8 grams aureomycin per pound. When mixed in the protein supplements, 3 pounds of Aurofac were used to each 100 pounds of the protein supplement. This amount was estimated to give the pigs about 0.5 percent of the aureomycin supplement in their total ration.

In Experiment I, begun June 13, 1951, six lots of 45-pound spring pigs were fed on alfalfa pasture. There were 10 pigs to a lot and the pigs were self-fed free choice on shelled corn, a protein supplement, and a mineral mixture. The mineral mixture was made up of equal parts of ground limestone, steamed bonemeal, and salt.

Aurofac was included in the different protein supplements, except in Lots 1 and 4; also, Aurofac was not included in the protein supplements in Lots 2 and 5 after the pigs reached the weight of 80 pounds, it being one of the purposes of this experiment to determine the carry-over effect of the early feeding of the aureomycin to the pigs. Another purpose of this experiment was to determine the relative efficiency of the antibiotics when fed in plant protein, and mixed plant and animal protein supplement diets.

Lots 1, 2, and 3 received only soybean meal as a protein supplement. Lot 2 as noted above received aureomycin in the supplement until the pigs reached 80 pounds in weight, and then they were fed only the soybean meal; Lot 3 received aureomycin in their protein supplement throughout the experiment until the pigs were finished.

Lots 4, 5, and 6 received as a protein supplement a mixture of 4 parts tankage, 4 parts soybean meal, 1 part linseed meal, and 1 part

alfalfa meal. Lot 5 as noted above received aureomycin in the supplement until the pigs reached 80 pounds in weight, and then they were fed only the mixed protein supplement. Lot 6 received aureomycin in their protein supplement throughout the experiment until the pigs were finished.

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

EXPERIMENT I—Summer, 1951

The Effect of Antibiotics (Aureomycin-B₁₂ Supplement) on Weanling Pigs on Alfalfa Pasture.

(June 13, 1951, to Sept. 24, 1951—103 days)

Ration fed	Alfalfa pasture, shelled corn, mineral mixture (self-fed)					
	Soybean oil meal	Soybean oil meal plus aureo.-B ₁₂ to 80 lbs.	Soybean oil meal plus aureo.-B ₁₂ to finish	Protein mixed suplt.	Protein mixed suplt. plus aureo.-B ₁₂ to 80 lbs.	Protein mixed suplt. plus aureo.-B ₁₂ to finish
Lot number	1	2	3	4	5	6
No. pigs in lot	10	9	10	10	10	10
Av. initial wt. per pig	Pounds 45.3	Pounds 44.66	Pounds 45.7	Pounds 46.2	Pounds 46.4	Pounds 46.0
Av. final wt. per pig	202.7	204.66	206.0	208.1	194.2	215.7
Av. total gain per pig	157.4	160.0	160.3	161.9	147.8	169.7
Av. daily gain per pig	1.52	1.55	1.55	1.57	1.43	1.64
Av. daily ration per pig:						
Corn	4.66	4.85	4.78	4.95	5.16	5.57
Protein suplt. mix .....	.74	.69	.66	.66	.48	.58
Feed consumed per 100 pounds gain:						
Corn	304.95	312.5	307.54	315.0	359.6	338.24
Protein suplt. mix	48.91	44.44	42.66	42.0	33.49	35.41
Mineral mixture .....	.25	.26	.24	.19	.17	.18
Feed cost per 100 lbs. gain	\$11.25	\$11.46	\$11.51	\$11.34	\$11.86	\$12.13

Feed prices charged: Shelled corn, \$1.68 per bushel; supplement Lot 1, \$86.00 per ton; supplement Lots 2, 3 with Aurofac, \$110.80 per ton; supplement Lot 4, \$90.80 per ton; supplement Lots 5, 6 with Aurofac, \$112.20 per ton; mineral mixture, 3c per pound; Aurofac, 43c per pound.

Observations

The soybean meal supplement was efficient in supplementing the grain in Lot 1, although the gain was not quite so much as in Lot 4 where a mixed protein was fed. Adding aureomycin supplement to the soybean meal increased slightly the rate of gain per head per day, but it also increased the amount of feed consumed per 100 pounds gain and increased the cost of these gains.

There was little effect from eliminating the aureomycin from the protein supplement after the pigs had reached 80 pounds in weight in Lot 2 as compared with feeding it throughout the feeding period, in Lot 3. The daily gains were the same, but the grain consumption was a little higher and the feed costs a little lower, because the aureomycin was fed a limited time.

In Lot 4 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, or when the plant protein was supplemented by aureomycin either limited as in Lot 2 or unlimited as in Lot 3.

When aureomycin was added to the mixed protein supplement and fed throughout the experiment in Lot 6, the daily gains were more rapid but the feed consumption per 100 pounds was not decreased.

For some reason or other, aureomycin added to the ration of the pigs only until they weighed 80 pounds on a mixed protein supplement, reduced the daily gain per pig and increased the feed consumed per 100 pounds gain.

In this experiment the efficiency of gain indicated by the feed requirements was not particularly in favor of the rations containing the antibiotic. In some cases, the amount of feed required was considerably more.

The feeding of the antibiotic generally increased the daily gain per pig.

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

EXPERIMENT II—Summer, 1951

The Effect of Antibiotics (Aureomycin-B₁₂ Supplement) on Growing Pigs on Alfalfa Pasture.

C. E. Auel

This experiment conducted in the summer of 1951 was designed to see what effect withholding the feeding of the antibiotic would have on pigs, waiting until they were 80 pounds in weight before starting to feed it.

Four lots were self-fed corn; the pigs of all lots were self-fed a mixed protein supplement made up of 4 parts tankage, 4 parts soybean meal, 1 part linseed meal, and 1 part alfalfa meal; in addition they received a mineral mixture of equal parts ground limestone, steamed bonemeal, and salt.

An antibiotic, Aurofac, was fed in Lots 2 and 4 at the rate of 3 pounds to 100 pounds of the protein supplement.

Lots 1 and 2, in this experiment, started with 46-pound pigs and Lots 3 and 4 with 81-pound pigs. All feeds were self-fed on alfalfa pasture.

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

EXPERIMENT II—Summer, 1951

The Effect of Antibiotics (Aureomycin-B₁₂ Supplement) on Growing Pigs on Alfalfa Pasture.

Ration fed	Alfalfa pasture, shelled corn, mineral mixture (self-fed)			
	Protein mixed suplt.	Protein suplt. plus aureo.-B ₁₂ to finish	Protein mixed suplt.	Protein mixed suplt. plus aureo.-B ₁₂ to finish
Lot number	1	2	3	4
No. days fed	103	103	68	68

No. pigs in lot	10	10	10	10
Av. initial wt. per pig	Pounds 46.2	Pounds 46.0	Pounds 81.8	Pounds 81.8
Av. final wt. per pig	208.1	215.7	196.1	209.1
Av. total gain per pig	161.9	169.7	114.3	127.3
Av. daily gain per pig	1.57	1.64	1.67	1.89
Av. daily ration per pig:				
Corn	4.95	5.57	6.11	6.13
Protein suplt. mix .....	.66	.58	.50	.61
Feed consumed per 100 pounds gain:				
Corn	315.0	338.24	363.51	327.96
Protein suplt. mix	42.0	35.41	30.18	32.99
Mineral mixture .....	.19	.18	.08	.07
Feed cost per 100 lbs. gain	\$11.34	\$12.13	\$12.60	\$11.69

Feed prices charged: Shelled corn, \$1.68 per bushel; supplement Lots 1, 3, \$90.80 per ton; supplement, Lots 2, 4 (with Aurofac, \$112.20 per ton; mineral mixture, 3c per pound; Aurofac, 43c per pound.

Observations

1. The addition of Aurofac aureomycin supplement to a mixed protein supplement when fed to pigs weighing initially either 46 or 81 pounds had the effect of increasing their daily gain. With the 46-pound pigs it did not decrease the amount of feed required for 100 pounds gain, but with the heavier pigs it did decrease the amount of feed required for 100 pounds gain.

It is evident from the results of this experiment that increases in the rate of gain and decreases in feed requirements are to be expected if an antibiotic is fed to pigs, even if they are older than weanling pigs.

EXPERIMENT III—Winter, 1952

The Effect of Antibiotics (Aureomycin-B₁₂ Supplement) on Weanling Pigs in the Dry Lot.

C. E. Aubel

This experiment was conducted this past winter with fall pigs in the dry lot. It was designed to get information on two points. First, how much does the addition of an antibiotic improve an all-plant protein supplement or diet, and how much does it improve a mixed protein supplement of plant and animal protein for weanling pigs? The second point to get information on, was whether it is necessary to feed the antibiotic to pigs after they weighed 100 pounds.

The antibiotic used in this experiment was aureomycin fed as Aurofac and it was mixed in the protein supplements at the rate of 3 pounds to 100 pounds.

In this experiment, beginning November 21, 1951, six lots of 42-pound fall pigs were fed in the dry lot. They were self-fed free choice on shelled corn, a protein supplement, and a mineral mixture. The mineral mixture was made up of equal parts ground limestone, steamed bonemeal, and salt.

Lots 1, 2, and 3 received only soybean meal as a protein supplement; Lot 2 received aureomycin in the supplement until the pigs reached 100 pounds in weight and then they were fed only the soybean meal. Lot 3 received aureomycin in their protein supplement throughout the experiment, until the pigs were finished at a weight of 200 pounds.

Lots 4, 5, and 6 received as a protein supplement a mixture of 4

parts tankage, 4 parts soybean meal, 1 part linseed meal and 1 part alfalfa meal. Lot 5 received aureomycin in the supplement until the pigs reached 100 pounds in weight, and then they were fed only the mixed protein supplement; Lot 6 received aureomycin in their protein supplement throughout the experiment until the pigs were finished.

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

EXPERIMENT III—Winter, 1951-52

The Effect of Antibiotics (Aureomycin-B₁₂ Supplement) on Weanling Pigs in the Dry Lot.

(November 21, 1951, to February 26, 1952—97 days)

Ration fed.....	Shelled corn, alfalfa hay, mineral mixture (self-fed)					
	Soybean oil meal	Soybean oil meal plus aureo.-B ₁₂ to 100 lbs.	Soybean oil meal plus aureo.-B ₁₂ to finish	Protein mixed suplt.	Protein mixed suplt. plus aureo.-B ₁₂ to 100 lbs.	Protein mixed suplt. plus aureo.-B ₁₂ to finish
Lot number	1	2	3	4	5	6
No. pigs in lot	9	10	10	10	10	10
Av. initial wt. per pig	Pounds 43.95	Pounds 42.85	Pounds 43.00	Pounds 42.35	Pounds 42.65	Pounds 42.50
Av. final wt. per pig	179.88	200.30	205.00	196.90	196.60	210.30
Av. total gain per pig	135.96	157.45	162.00	154.55	153.95	167.80
Av. daily gain per pig	1.40	1.62	1.67	1.59	1.58	1.72
Av. daily ration per pig:						
Corn	3.55	4.78	4.72	5.20	4.98	5.34
Alfalfa hay .....	.05	.03	.05	.03	.04	.04
Protein suplt. ..	1.03	1.15	1.12	.85	.80	.82
Feed consumed per 100 lbs. gain:						
Corn	253.33	294.69	283.02	326.43	314.38	308.99
Alfalfa hay .....	.36	.21	.32	.22	.25	.23
Protein suplt.	73.95	71.45	67.28	53.38	50.99	47.67
Mineral mix ....	.13	.12	.08	.06	.05	.05
Feed cost per 100 lbs. gain	\$11.60	\$13.22	\$13.01	\$13.24	\$13.05	\$12.94

Feed prices charged: Shelled corn, \$1.86 per bushel; soybean meal, \$86.00 per ton; soybean oil meal with Aurofac, \$110.00 per ton; alfalfa hay, \$50.00 per ton; mixed protein supplement in Lots 5 and 6, \$90.80 per ton; mineral mixture, 3c per pound; mixed protein supplement with Aurofac in Lots 5 and 6, \$112.20 per ton; Aurofac, 43c per pound.

Observations

When aureomycin was added to a soybean meal protein supplement ration and fed to pigs only until they reached a weight of 100 pounds, the rate of gain was increased, as was also the feed required per 100 pounds gain. When the antibiotic was fed in the supplement through-

out the experiment, it further increased the gains and slightly lowered the feed requirements.

The gains were very satisfactory in both lots receiving the antibiotic.

The mixed plant and animal protein supplement without an antibiotic as fed in Lot 4 produced more rapid daily gains than did the plant protein supplement alone, soybean meal, as fed in Lot 1.

When the antibiotic was added to the mixed protein supplement in Lot 5, until the pigs reached 100 pounds, the rate of gain was unchanged, but the feed requirements were slightly lowered. When the antibiotic was fed in the supplement throughout the experiment, the rate of gain was markedly increased and the feed requirements decreased.

It is evident from these results that aureomycin added to the ration, either for a limited time or for the duration of the feeding period, increased the rate of gain, and this was therefore its chief effect; the effect of the antibiotic was most marked when it was fed throughout the experiment.

The effect of the antibiotic was more apparent in the all-plant protein-fed pigs and not so effective where a mixed protein supplement was fed.

EXPERIMENT IV—Winter, 1952

The Effect of Antibiotics (Aureomycin-B₂ Supplement) and Vitamin B₂ Supplement on Weanling Pigs in the Dry Lot.

C. E. Aubel

This experiment was conducted this past winter with fall pigs in the dry lot. Its object was to get information on the effect of feeding a vitamin B₂ supplement along with antibiotics.

Three lots of pigs were fed. Lot 1 received a mixed animal and plant protein supplement of 4 parts tankage, 4 parts soybean meal, 1 part linseed meal, and 1 part alfalfa meal. Lot 2 received a similar protein supplement, but to which aureomycin had been added as Aurofac at the rate of 3 pounds to 100. Lot 3 received the same as Lot 2 except that a vitamin B₂ supplement, containing riboflavin, niacin, pantothenic acid, choline chloride, and folic acid, Lederle's C-49 was added at the rate of 3 pounds per 500 of the supplement.

All lots were self-fed shelled corn as well as the protein supplement, and some very poor loose alfalfa hay was offered but was consumed very sparingly.

The following table gives the results of this experiment:

EXPERIMENT IV—Winter, 1951-52

The Effect of Antibiotics (Aureomycin-B₂ Supplement) and Vitamin B₂ Supplement on Weanling Pigs in the Dry Lot.

(November 21, 1951, to February 26, 1952—97 days)

Ration fed.....	Shelled corn, alfalfa hay and mineral mixture (self-fed)		
	Protein mixed suplt.	Protein mixed suplt. plus aureo.-B ₂	Protein mixed suplt. plus aureo.-B ₂ and B ₂ suplt.
Lot number	1	2	3
No. pigs in lot	10	10	10
Av. initial wt. per pig	Pounds 42.35	Pounds 42.50	Pounds 42.60
Av. final wt. per pig	196.90	210.30	214.80

Av. total gain per pig	154.55	167.80	172.20
Av. daily gain per pig	1.59	1.72	1.77
Av. daily ration per pig:			
Corn	5.20	5.34	5.25
Alfalfa hay .....	.03	.04	.04
Mixed protein suplt. ....	.85	.82	.97
Feed consumed per 100 lbs. gain:			
Corn	326.43	308.99	295.87
Alfalfa hay .....	.22	.23	.27
Mixed protein suplt.	53.38	47.67	55.16
Mineral mix .....	.06	.05	.04
Feed cost per 100 lbs. gain	\$13.24	\$12.94	\$13.14

Feed prices charged: Shelled corn, \$1.86 per bushel; alfalfa hay, \$50.00 per ton; mixed protein supplement, \$90.80 per ton, in Lot 1; mineral mixture, 3c per pound; mixed protein supplement, Lot 2, with Aurofac, \$112.20 per ton; mixed protein supplement, Lot 3, with Aurofac and B₂ supplement, \$120.24 per ton; Aurofac, 43c per pound, Vitamin B₂ supplement, C-49 Lederle, 57c per pound.

Observations

When aureomycin was added to the diet as in Lot 2, the rate of gain was materially increased, and the feed requirements per 100 pounds gain were decreased.

When the vitamin B₂ supplement was added to the aureomycin diet, the result was to increase the daily gains further and decrease the feed requirements.

From the results of this experiment, it is evident that the addition of an antibiotic and vitamin B₂ supplement improved the efficiency of the ration when the protein supplement was one of mixed plant and animal proteins.

Project 236: The Relation of Physical Balance and Energy Value in Sheep Rations

A Comparison of Different Roughages Combined with Two Levels of Concentrate Allowance for Wintering Ewe Lambs.

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Introduction

Many experimental trials with fattening lambs at the Kansas Agricultural Experiment Station have indicated that rations including approximately 55 percent roughage and 45 percent concentrates produce more economical gains in relation to nutrients consumed than rations containing either a higher or lower proportion of concentrates. Because of the variability of the chemical and nutritive composition of many of the roughages, this physical balance relationship of the ration may be more accurately described by the ratio of crude fiber to total digestible nutrients, and the ratio found to be most economical in lamb fattening rations has been approximately 1 part crude fiber to 4 parts T.D.N.*

Ewe lambs, being raised for breeding replacements, are commonly wintered on rations composed largely of roughages, with few if any additional concentrates. If lambs respond most economically to

*T.D.N. refers to Total Digestible Nutrients.