cient diet, the simultaneous administration of ω-methylpantothenic acid did not alter the course of the infection with *P. lophurae*.

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Effect of Feeding Aureomycin to Fattening Lambs. (18155)

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The recent work of Stokstad *et al.*(1) with chicks provided the first indication that a growth promoting factor in addition to vit. B_{12} was produced by *Streptomyces aureofaciens*. More recently Stokstad *et al.*(2), in further work with chicks, found that aureomycin produced a growth response when added to diets containing vit. B_{12} and B_{12b}. Similar findings have been reported by Cunha *et al.* (3) and Jukes *et al.*(4) with swine. On the other hand, Colby *et al.*(5), in work with young lambs, found that an animal protein factor concentrate containing aureomycin was harmful. In the trial reported herein, it was decided to test the effects of adding vitamins to the rations of lambs fed aureomycin* in an attempt to overcome these harmful effects. The effect on vitamin levels was indicated in the earlier work with lambs since the blood levels of vitamin B_{12} were found to be lower in those lambs fed the APF concentrate containing aureomycin.

Experimental. Eighteen lambs of mixed breeding weighing an average of about 58 lb were used in this study. They were divided into 3 lots of 6 on the basis of weight and sex. The lambs in Lot I received the basal ration consisting of 90% milo, 10% cottonseed meal plus alfalfa hay, free choice. The lambs in Lot II received the basal ration plus sufficient crude aureomycin to furnish 100 mg of pure aureomycin, daily by capsule. The lambs in Lot III were fed the basal ration plus 100 mg of aureomycin daily by capsule and in addition received an allowance of B-vitamins fed orally by capsule every second day. The B-vitamins fed were as follows (per lamb daily, based on the quantities reported by Lindley *et al.*)(6); thiamine 6.8 mg, riboflavin 1.6 mg, niacin 15.6 mg, pantothenic acid 6.5 mg, pyridoxine 2.6 mg, choline 130 mg, biotin 34 μg, folic acid 169 μg, para-aminobenzoic acid 16.9 mg, and inositol 167 mg. In addition a mixture of vit. B_{12} and B_{12b} was fed at the rate of 20 μg per lamb daily. Feed and weight records were kept. At the close of the trial, 2 lambs from each of the 3 lots were slaughtered, their stomach contents sampled and total bacteria counts made. Bacterial counts were made by the tryptose agar plate method. The cultures were incubated at 37½°C and the total count made at the 48th hour period of incubation.

Results and discussion. The gains and feed efficiency of the 3 lots of lambs used in this trial are shown in Table I. It may be noted that the lambs in Lot I made very satisfactory gains (0.52 lb per head per day)

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* The crude aureomycin and vitamins B_{12} and B_{12b} used in this study were obtained through the courtesy of Dr. T. H. Jukes and Lederle Laboratories, Pearl River, N. Y.

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TABLE I. Effect of Aureomycin on Weight, Gains, and Feed Consumption of Lambs.

Lot No.	I	II	III
Supplement fed	.	Aureomycin	Aureomycin + B-vitamins
Avg initial wt of lambs	54.66	58.30	58.75
Avg daily gain or loss	0.52	—.16	—.20
Avg daily feed consumption, lb.			
Concentrates	1.50	.10	.10
Alfalfa hay	1.25	.20	.18

TABLE II. Effect of Aureomycin Supplementation on Rumen Bacteria Counts and Character of Rumen Contents of Lambs.

Sheep No.	Character of rumen content	Bacterial count per g rumen content, ×100,000
4903 control	Large rumen, contents coarse, moist, fermented with gas formation	5
5293 "	Same	7.5
4904 aureomycin	Intermediate size rumen, contents coarse, moist, fermented with gas formation	22
4908 "	Intermediate size rumen, contents coarse, dry, and small amount of gas formation	8
4906 " + B-vit.	Small rumen, contents fine and quite liquid, no gas formation	64,000
4901 aureomycin + B-vit.	Same	61,000

during the 14 days of the trial. The lambs that received aureomycin alone lost an average of 0.16 lb per head per day while the lambs fed the aureomycin plus B-vitamins (Lot III) lost an average of 0.2 lb per head daily. The trial was of short duration because the two groups of lambs fed the aureomycin were losing weight so rapidly, it was decided to conclude the tests rather than sacrifice the lambs. The lambs in Lot I consumed 1.5 lb of the concentrate mixture daily plus 1.25 lb of alfalfa hay. In contrast, the lambs in Lot II ate only an average of 0.10 lb of concentrates and 0.20 lb of alfalfa hay each day. The lambs in Lot III ate 0.10 lb of concentrates and 0.18 lb of alfalfa hay daily. It may be noted that no beneficial effect was derived from the vitamin supplement fed because those lambs receiving this supplement plus aureomycin ate less feed and lost more weight than the lambs fed aureomycin alone.

The bacterial counts and rumen character of the lambs, as shown in Table II, indicates quite a difference between the 3 lots of lambs. The control animals had a large rumen well filled with feed of normal appearance. In addition these animals had a low bacterial count (500,000 and 750,000 bacteria per gram) for perhaps two reasons: (1) the rumen of these control animals was well filled with feed and hence made a certain "dilution" factor for the bacterial counts and (2) there was probably a normal competitive environment between the various kinds of bacteria which tended to keep counts low. In the groups of animals (Lot II) receiving aureomycin alone, the rumen was somewhat smaller and contained much less feed. The contents were, however, of fairly normal character. Bacterial counts were much higher; 8,000,000 and 22,000,000 bacteria per gram of rumen contents. This may indicate that the aureomycin had destroyed certain strains of bacteria, thus eliminating the competitive environment and permitting other less desirable strains of bacteria to grow more rapidly. The animals in Lot III had the highest bacterial counts (61,000,000,000 and 64,000,000,000 per g). It is most likely that the rumen requires certain essential strains of bacteria for it to digest food and function properly. These essential bacteria may have been destroyed by the aureomycin and the

vitamins may have aided the growth of other less desirable strains. This is further indicated since the feed in the rumen of the animals in Lot III was finely divided and quite liquid, indicating that it had been in the rumen for some period of time, since the rumen was not functioning properly.

The findings in this trial lend further support to the earlier work of Colby *et al.*(5). The previous work might be criticized because the lambs had included in their ration an APF supplement containing aureomycin. This might have caused the ration to be unpalatable and hence reduced feed consumption and gains. In this trial, the aureomycin was fed orally by capsule and all lambs received the identical ration. The aureomycin must have produced such harmful effects within the lambs, probably by its effect on the rumen flora, to cause the animal to lose its appetite and thus result in weight losses. It is further postulated that the effect of the aureomycin was not due to the loss of vitamins normally supplied by bacterial synthesis, since feeding vitamins produced no beneficial effects. The findings during this trial and the previous trial reported by Colby *et al.*(5) indicate that aureomycin has a deleterious effect on lambs.

Summary. The feeding of 100 mg of aureomycin daily to lambs resulted in markedly decreased feed consumption and weight loss. Bacterial counts of rumen contents of lambs fed aureomycin and aureomycin plus vitamins was much higher than control animals, indicating that perhaps the aureomycin had destroyed certain strains of bacteria, thereby, eliminating a normal competitive environment and permitting less desirable strain of bacteria to multiply.

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The Vitamin B_{12} Requirement of the Syrian Hamster.*† (18156)

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The white rat has been proposed as an assay animal for estimating the vit. B_{12} potency of foods and liver extracts(1-3). For these tests iodinated casein and/or sulfaguanidine were added to a soybean oil meal or casein basal ration, and a depletion period used to accentuate a vit. B_{12} deficiency. Available information, although contradictory in certain instances(4,5), indicates that the dietary requirement of the hamster for certain factors may be greater than for the white rat. Since studies on the requirement of the hamster for vit. B_{12} have not been reported, it was of interest to determine the vit. B_{12} requirement with the use of different basal rations. Further, if the hamster was shown to have a definite vit. B_{12} requirement, an additional animal species would be available for assaying the vit. B_{12} potency of various materials.

Experimental and results. Four basal rations were used in the preliminary investigations: a corn-soybean ration with and without

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