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

* We are indebted to Wilson Laboratories for supplying the Whole Liver Substance, to Merck and Co. for the vitamin B_{12} and National Oil Products Co. for the vitamin A and D concentrate used in these studies.

† Journal Paper No. 31, American Meat Institute Foundation.

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iodinated casein, and a casein ration with and without iodinated casein.‡ The composition of the corn-soybean oil meal rations was as follows (in percent): ground yellow corn 40.64, soybean oil meal 50, corn oil 4.4, cystine 0.3, fortified cod liver oil 0.6 (400 D and 2250 A per g), Salts IV(6) 4, and iodinated casein 0.06, when added. For the casein ration, 24% casein, 63.67% sucrose, and 3% celluflour replaced the ground yellow corn and soybean oil meal. The B vitamins (except vit. B_{12}) and 2-methyl-1, 4-naphthoquinone were added to all rations in amounts described in previous studies with hamsters (7). Food and water were provided *ad libitum*. The corn-soybean oil meal ration is similar to that described by Register, *et al.* (1); however, the amount of soybean oil meal has been increased and all the vitamins were added as supplements in the present studies. Male Syrian hamsters were purchased§ for the initial experiments. The initial weight of these animals averaged 51.5 g. They were distributed into four groups and fed the basal rations indicated for a 2-week depletion period. A high mortality was observed during this period for those animals which received the casein ration plus iodinated casein; consequently, the corn-soybean oil meal ration plus iodinated casein was fed to this group for the remainder of the experiment. After the 2-week depletion period, each group was divided into 3 equal sub-groups. The animals for these sub-groups were selected as uniformly as possible on the basis of weight and gain in weight for the previous 2-week test. Each sub-group received either the basal ration, the basal ration plus 50 μg of vit. B_{12} per kg of ration, or 2% whole liver substance (added at the expense of the entire ration). This level of vit. B_{12} was selected since in our experience with white rats, 50 μg per kg would provide 3-5 times the requirement with the use of similar basal rations. Two per cent whole liver substance was chosen as a supplement which may provide additional unknown factors, if any, required by the hamster as well as vit. B_{12} (estimated 40-60 μg per kg of ration), and at a level which would increase the total protein content of the ration by only a small amount. The number of animals in each group, the initial weights after depletion, and the final weights after 4 weeks on experiment are shown in Table I.

TABLE I. Studies on the Vitamin B_{12} Requirement of the Hamster.

Basal ration	Supplement	No. of animals	Avg wts Initial	Avg wts Final†
Corn-soybean	0	12	64	97
+ iodinated	50 μg B_{12}/kg	12	62	95
casein	2% W.L.S.‡	12	63	97
Corn-soybean	0	7	67	95
+ iodinated	50 μg B_{12}/kg	7	66	101
casein*	2% W.L.S.	7	67	101
Corn-soybean	0	12	67	94
	50 μg B_{12}/kg	12	65	88
	2% W.L.S.	12	66	93
Casein	0	9	66	101
	50 μg B_{12}/kg	9	66	90
	2% W.L.S.	9	67	101

* The depletion ration for this group was the casein + iodinated casein ration (see text).
† After 4 wk on experiment.
‡ Whole liver substance.

The results of this experiment show that a vit. B_{12} requirement of the hamster could not be demonstrated. Although a slight improvement in the performance was noted when vit. B_{12} was added for one of the groups, either no difference in growth or slightly less growth was observed for the other 3 groups receiving vit. B_{12} as compared to the basal groups. Also, no increase in gain was noted with the addition of 2% whole liver substance, which showed that at this level of intake no additional unknown factors were provided when either the corn-soybean oil meal or casein basal ration was used. An inspection of the data for the animals that were smaller at the start of the experiment showed that the growth rates were similar to those for the groups as a whole, which indicated that the initial

‡ Protamone, purchased from the Cerophyl Laboratories.

6. Hegsted, D. M., Mills, R. C., Elvehjem, C. A., and Hart, E. B., *J. Biol. Chem.*, 1941, v138, 459.

7. Schweigert, B. S., McBride, B. H., and Carlson, A. J., PROC. SOC. EXP. BIOL. AND MED., 1950, v73, 427.

§ Haskins Rabbitry, St. Louis, Mo.

weights of the animals, within the limits available for the study, were not a factor in affecting the response to the ingestion of vit. B_{12}.

Since in our own experience, as well as that of others(1,2), rats develop a definite vit. B_{12} deficiency with the use of a similar dietary regimen, a further study was conducted to compare the growth of white rats and of hamsters when fed the corn-soybean oil meal plus iodinated casein basal diet with and without crystalline vit. B_{12}. Weanling, male, white rats and weanling hamsters (28 g) were used for this study. The latter were obtained from our stock colony which was maintained on rations designed to avoid an excessive intake of vit. B_{12}. The same ingredients were used in the preparation of the diets since it was possible that in the first experiment the amount of vit. B_{12} in the basal rations may have been sufficiently high so that a vit. B_{12} requirement could not be demonstrated.

All animals were fed the basal ration for a depletion period of 2 weeks. On the basis of the performance during this period uniform groups of rats were selected and fed the following supplements: 1—none; 2—50 μg of vit. B_{12} per kg; 3—2% whole liver substance; and 4—50 μg of vit. B_{12} per kg with the food intake restricted to the average intake of Group 1. The food efficiency for Groups 1, 2, and 4 was also determined. The hamsters were fed the same diets; however, the group with the restricted food intake was omitted. The results for this experiment are shown in Table II.

These studies confirm the findings of the first experiment with hamsters in that no requirement for vit. B_{12} or of additional unknown factors could be shown. A definite vit. B_{12} deficiency was demonstrated for the rat, however, with the use of identical diets. No additional response was observed when the liver supplement was added. The food efficiency of the basal group was 0.20, for the vit. B_{12} supplemented group (fed *ad libitum*) 0.26, and the supplemented group (food intake restricted) 0.21.

Discussion. Although a vit. B_{12} requirement could not be demonstrated for the hamster with the use of experimental conditions

Holtzmann Rat Co., Madison, Wisc.

TABLE II. Growth of Hamsters and Rats Fed a Corn-Soybean-Iodinated Casein Ration Plus Various Supplements.*

Supplement to basal diet	White rat		Hamster	
	No. per group	g gain/wk	No. per group	g gain/wk
None	7	21.2	7	8.0
50 μg B_{12}/kg	7	38.7	4	8.6
2% W.L.S.	7	36.4	5	8.1
50 μg B_{12}/kg†	6	22.2		

* 4-week period for the rats and a 6-week period for the hamsters.

† Food intake restricted to that for the group receiving no supplement.

equivalent to that of the rat, it is recognized that with other conditions a requirement may be demonstrated. It would appear that a higher initial store of the vitamin was not a complicating factor in the present study since weanling animals from our colony, without a large intake of vit. B_{12}, also failed to show a vit. B_{12} requirement. It is apparent, therefore, that if the hamster does require dietary source of vit. B_{12}, its requirement is much less than that of the white rat. From these results and those reported recently(5) it appears likely that the hamster does not have greater dietary requirement for vitamins than the white rat as indicated by a summary of earlier studies(4). On the basis of these findings, the hamster is not a suitable test animal for the determination of the vit. B_{12} potency of foods.

The high mortality observed in the first experiment for hamsters fed the casein ration plus iodinated casein is in accord with results obtained with rats(8,9). These findings support the conclusions of Ershoff(10) and others(8,11) that soybean oil meal and liver contain an anti-thyrotoxic factor(s) not pres-

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ent in sufficient quantities in the purified casein rations.

Summary. A vit. B_{12} requirement was not demonstrated for the Syrian hamster when fed either a corn-soybean oil meal ration with or without iodinated casein, or a casein basal ration with or without iodinated casein. No increase in the rate of gain was observed when 2% whole liver substance was added to these rations. Parallel experiments were conducted with rats fed the corn-soybean oil meal ration plus iodinated casein in which a vit. B_{12} requirement was demonstrated. A reduction in food efficiency was observed in rats attributable to the vit. B_{12} deficiency.

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Anticonvulsant Properties of Benadryl and Pyribenzamine.* (18157)

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It is well known that antihistaminic drugs, such as diphenhydramine (Benadryl) and tripelennamine (Pyribenzamine), produce side effects by acting on the central nervous system. According to Feinberg(1) the most consistent side effect of all antihistaminic drugs is sedation. The clinical implication of this effect has been recognized, particularly in relation to the use of antihistaminic agents in the treatment of diseases referable to the central nervous system.

The salutary effect of Benadryl in paralysis agitans was reported by McGavack and coworkers(2). Subsequently, Budnitz(3) called attention to the beneficial effect of this drug in Parkinson's disease. These observations have since been confirmed(4-7) and extended to include other antihistaminic agents(4,6,7). McGavack and coworkers(2) also tried Benadryl in 3 patients with grand mal epilepsy, and reported an increased frequency of seizures as a result of this medication. More recently, Churchill and Gammon(8) have shown that Benadryl diminished the electrical abnormality and decreased the incidence of seizures in petit mal; on the other hand, both Pyribenzamine and Benadryl induced seizures in some patients with grand mal epilepsy. Such reports on the use of antihistaminic drugs are particularly interesting when one considers that convulsions may occur when large doses of these agents are ingested(9-11).

In view of the wide use of antihistaminic agents and because of the limited information on their central nervous system actions, it was thought important to study their anticonvulsant effects in experimental animals. It was anticipated that such a study might not only provide information on the anticonvulsant properties of these drugs but might also indicate the validity of employing them in the treatment of allergic manifestations in epileptic patients.

Methods. Male albino rats obtained from

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