toxic compound that will be effective as a prophylactic and as a therapeutic agent is so great that further studies should be made with the flavonoid group of compounds on a wide spectrum of animals to make certain that no possibility of a beneficial effect is overlooked.

Conclusion. 1. A flavonoid (vit. "P") compound is of no value in the treatment of radiation injury in the LD_{60} to LD_{100} range in mice.

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The Effect of Aureomycin on Digestion in Steers. (18464)

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Experiments with several species of animals have demonstrated that aureomycin and other antibiotics have a pronounced effect on microorganisms in the gastrointestinal tract. The ruminant is primarily dependent upon an active microbial flora for efficient digestive processes. An experiment was undertaken, therefore, to determine the effect of aureomycin* on the digestion of feed by steers.

Experimental. Six Hereford steers weighing about 620 pounds were used in this digestion experiment. The steers were kept in metabolism stalls with provisions made for separate collection of feces and urine. They were fed a constant amount of ration during 10-day preliminary and 15-day collection periods. Digestibility of nutrients and nitrogen retention were calculated from the chemical analyses of feeds and excreta. Blood samples were taken periodically for the determination of blood urea. All other experimental technics were similar to those reported by Briggs and Gallup(1). The composition of the daily ration fed each steer during collection periods is given in Table I. The digestibility of these rations without the addition of aureomycin had been determined with these same steers in a previous series of digestion trials. In the previous experiment, each of the steers was fed the basal ration and the urea† ration during 10-day preliminary and 10-day collection periods. No feed refusals or digestive disturbances were observed during this entire period of approximately four months.

Prior to the present experiment it was necessary to obtain information on the approximate amount of aureomycin which would not interfere with continued feed consumption. A level of 0.6 g per day was found to produce a marked anorexia and a severe fetid diarrhea within 48 to 72 hours. This condition persisted for 4 to 5 days after aureomycin feeding was discontinued. The anorexia appeared to be due to a digestive disturbance and not to unpalatability of the ration. The feeding of 0.2 g per day did not appear initially to interfere with a constant daily feed intake. Aureomycin feeding was discontinued until the appetite and digestive processes appeared normal. A standard 10-day preliminary period was then conducted during which each steer was fed a constant amount of the assigned ration without aureomycin. Aureomycin (0.2 g) was then added to the rations of steers 1, 2, 3, and 6. Steers 4 and 5 were continued on the basal ration. Urine and feces collections were started immediately.

Results and discussion. The digestion coefficients, nitrogen retention, and blood urea levels determined in the previous experiment during which the steers were fed the rations without aureomycin are given in part A of

* The crystalline aureomycin hydrochloride was supplied by Dr. E. L. R. Stokstad, Lederle Laboratories Division, American Cyanamid Company, Pearl River, New York.

1. Briggs, H. M., and Gallup, W. D., *J. Ani. Sci.*, 1949, v8, 479.

† Urea in the form of "Two-Sixty-Two" feed compound was supplied by E. I. du Pont de Nemours and Company, Inc., Wilmington, Delaware.

TABLE I. Composition of Daily Ration (grams).

Ingredients	Steer number and ration identification					
	1 Urea + aureomycin	2 Basal + aureomycin	3 Basal + aureomycin	4 Basal	5 Basal	6 Urea + aureomycin
Prairie hay	1800	1800	1800	1800	1800	1800
Corn	1730	1730	1730	1730	1730	1730
Soybean oil meal	70	70	70	70	70	70
Urea	45	—	—	—	—	45
Bone meal	50	50	50	50	50	50
Salt	30	30	30	30	30	30
Aureomycin	0.2	0.2	0.2	—	—	0.2

TABLE II. Effect of Aureomycin on Digestion Coefficients, Nitrogen Retention, and Blood Urea.

Steer No.	3-day period	% apparent digestibility of: Dry matter	Crude protein	Ether ext.	Crude fiber	N-free ext.	N retention, g	Blood urea, mg %
(A) Avg values obtained in previous exp.								
				Basal ration				
All		64.94	48.32	65.43	65.49	69.65	7.62	8.41
				Urea ration				
All		65.45	62.40	66.62	65.55	69.70	12.14	20.06
(B) Avg values obtained in aureomycin exp.								
				Basal ration				
4	1	69.07	51.93	63.31	66.35	74.91	9.10	7.66
and	2	68.38	52.68	58.58	62.77	74.93	7.67	6.59
5	3	70.69	55.42	65.94	67.01	76.20	9.74	8.86
	4	69.37	55.15	66.93	65.45	75.40	10.27	7.10
	5	72.67	60.83	71.52	70.60	77.96	13.03	5.34
	Avg	70.04	53.20	65.26	66.44	75.88	9.96	7.11
				Basal ration + aureomycin				
3	1	76.38	65.64	74.63	66.29	81.86	17.74	15.43
	2	63.71	56.27	62.76	49.71	70.48	9.63	14.24
	3	58.00	47.60	66.31	35.88	67.25	9.60	13.41
	4	54.06	45.31	60.50	30.72	63.49	1.66	20.38
				Urea ration + aureomycin				
1	1	74.58	72.10	71.58	69.98	79.65	14.38	21.11
and	2	66.23	67.46	62.77	52.70	73.52	6.79	22.06
6	3	63.84	65.05	65.44	51.37	70.20	6.46	22.63
	4	59.53	68.42	67.57	39.78	66.79	6.96	23.78
	5	59.58	67.86	65.13	42.86	66.89	9.04	22.24

Table II. The same values for consecutive 3-day periods following the addition of aureomycin to the rations are given in part B of Table II. The third day after aureomycin feeding was started steers 1 and 2 developed a mild anorexia and diarrhea. Steer 2 continued to refuse feed and had to be removed from the experiment. About the fifth day, steers 1, 3, and 6 became slightly constipated and developed a "paunchy" or bloated condition. Their feces became dry and fibrous. During the last three days of the experiment, steer 3 developed such a severe fetid diarrhea and marked anorexia that digestion coefficients were not calculated for this final 3-day period. Steers 4 and 5 consumed their rations and no digestive disturbance was noted.

Data in Table II show that the most pronounced effect of aureomycin was on the digestibility of crude fiber, which suggests that it had a detrimental effect on the cellulytic micro-organisms in the gastrointestinal tract. In periods 4 and 5 the digestibility of dry matter was decreased to less than 60 percent and crude fiber digestibility was decreased to less than 45 percent. Aureomycin also decreased the digestibility of dry matter and nitrogen-free extract. Steers fed aureo-

mycin had higher blood urea levels than when aureomycin was not fed.

Summary. The effect of feeding crystalline aureomycin hydrochloride on digestion and nitrogen retention was determined in balance trials with six steers. Feeding 0.2 g aureomycin daily caused a marked reduction in the digestibility of crude fiber. It also reduced the digestibility of dry matter and of nitrogen-free extract. When 0.6 g of aureomycin was fed daily to steers, it produced a marked anorexia and a fetid diarrhea within 48 to 72 hours. This condition persisted for several days after the aureomycin feeding was discontinued. Continued feeding of 0.2 g aureomycin daily, produced somewhat milder digestive disturbances.

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Loss of Protection by Vaccination Following Cortisone Treatment in Mice with Experimentally Induced Tuberculosis. (18465)

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Cortisone administered in single or repeated doses has been shown to reduce the amount of circulating antibody(1-3). Cortisone has also been reported to decrease the tuberculin reactivity of guinea pigs sensitized to the tubercle bacillus(4,5) and to cause a spread of the disease in guinea pigs(6). Also studies in the mouse, using both a chronic and acute tuberculosis infection showed that the enhancing effect of cortisone was most marked in the chronic infection(7). In the present study, in addition to acute and chronic infection, the effect of cortisone on mice vaccinated with heat-killed cells was also investigated. Our results are in essential agreement with those of D'Arcy Hart and Rees(7) and in addition indicated that the protective effect of vaccination is abolished by cortisone.

Materials and methods. 1. *Strain of organisms.* Two substrains of *Mycobacterium tuberculosis*, human type, H37Rv, were used. The first, possessing the original characteristics of the strain as obtained from the Trudeau Laboratories, was highly virulent for mice. The second, obtained after 2 years of serial weekly passage in Dubos Tween-albumin medium, showed reduced virulence for mice. The highly virulent substrain has been maintained by serial passage in mice. 2. *Preparation of vaccine and vaccination of mice.* Vaccine was prepared from the original strain grown in Dubos Tween-albumin medium for 14 days at 37°C. The culture was adjusted to a turbidity permitting 65% transmission of light at 650 mμ* and subjected to free-flowing steam for one hour. Sterility controls of such suspensions showed no growth after 2 months of incubation at 37°C. Mice† weighing 12 g were injected intraperitoneally with 0.5 ml amounts of vaccine administered 3 times per week for a period of 2 weeks. 3. *Infection of animals.* Test animals were infected by intravenous inoculation of 0.25 ml amounts of culture in Dubos medium adjusted to permit 70% transmission of light at 650 mμ. Mice dying during the course of the

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* On a Coleman Spectrophotometer Model 6A.

† Barckman, IS-32 mice were used throughout the course of these experiments.