on a protein-deficient diet and exhibiting hypoproteinemia. Such a situation can be interpreted along the lines expressed by Henschel, Mickelsen, Taylor and Keys(3) as representing a reduction of cellular mass without a large change in the absolute amount of extracellular fluid.

Summary. Hypoproteinemia induced in rats and dogs by protein-deficient diets was accompanied by a fall of the P.V. and "SCN" when expressed per unit of control weight and increased when expressed per unit of experimental weight. Thus, there was a decrease in the absolute extracellular volume, as measured by thiocyanate, in the presence of a "relative" extracellular hydration. The extracellular phase of muscle calculated on the basis of the muscle chloride content progressively increased as the plasma albumin decreased. This can be interpreted as indicating an accumulation of extracellular fluid accompanying a progressive hypoproteinemia. However, because of the observed decrease of the "SCN," these observations appear better explained on the basis of a reduction in cellular mass without a large change in the absolute amount of extracellular fluid.

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Protective Action of Antibiotics Against the Toxin of *Pasteurella pestis* in Mice. (18261)

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Many investigators(1-4) have pointed out the antitoxic activity of penicillin and the sulfonamides against various bacterial toxins. Both penicillin and aureomycin exhibit antitoxic activity against certain strains of the psittacosis-lymphogranuloma venereum microparasites(5) and aureomycin, against some viral and rickettsial toxins(6). Penicillin and the sulfonamides, however, offer little or no protection against toxins of *Pasteurella pestis*(7). Because more success in experimental therapy has been achieved with other antibiotics(8,9), the following experimental work was instigated.

Exp. 1. *Protection with Aureomycin, Terramycin and Chloramphenicol.* The toxins were obtained by extracting a 2% suspension of acetone-killed and dried, agar-grown *Pasteurella pestis* (Yreka) in physiologic saline. The bacteria were removed by centrifugation. To test the protective value of aureomycin, terramycin and chloramphenicol, 1.0 ml of a solution containing 2 mg/ml of the antibiotic was injected intraperitoneally into albino (Swiss) mice. Four hours later, 0.5 ml of a serial dilution of the toxic solution was injected intravenously into groups of 10 mice each. A control group of mice was given 1.0 ml of physiologic saline. Results are presented in Table I.

Exp. 2. *Duration of protection.* In this series, the period between giving the antibiotic and giving the toxin was varied to determine how long the protection lasts. The same amount of the drug was given in each dose by the same route; 1, 12 and/or 24 hours later, plague toxin (2 LD_{50}) was given intra-

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TABLE I. Titration of Plague Toxin in Mice Pretreated with Antibiotics.

Antibiotic* (2 mg/ml, i.p.)	Survivors/total mice, 48 hr after toxin inj. Toxin dilution (0.5 ml, i.v.) 1:40	1:80	1:160	1:320	1:640	1:1280
Aureomycin	0/10	1/10	8/10	9/10		
Terramycin	1/10	5/10	10/10	10/10	10/10	
Chloramphenicol		3/10	3/10	8/10	9/10	
Controls		0/10	1/10	1/10	6/10	10/10

* Given 4 hr before toxin. Controls were given physiologic sodium chloride sol.

TABLE II. Duration of Protection of Mice Against *P. pestis* Toxin.*

Antibiotics (2 mg/ml, i.p.)	Hr before toxin inj.	No. mice	Survival rate 8-12 hr	20-24 hr	48 hr
Aureomycin	24	20	10	10	10
	12	20	95	95	95
	1	20	90	75	75
	12, 6, 1	20	100	100	100
Terramycin	12	10	80	70	70
	1	10	80	80	80
Chloramphenicol	12, 6, 1	20	70	65	60
	1	20	60	35	35
Streptomycin	12, 6, 1	20	50	40	40
	1	20	50	35	25
Controls		20	35	35	25

* 2 LD_{50} of plague toxin given i.v.

venously. The results are presented in Table II. The protective action of aureomycin and terramycin lasted at least 12, but not 24 hours. Only when 6 mg of chloramphenicol was given did the survival rate reflect protection. Streptomycin, the most effective therapeutically, exerted no antitoxic effect, even when 6.0 mg was given.

Summary. Intraperitoneal administration of aureomycin, chloramphenicol and terramycin in 2.0 mg doses within 12 hours of intravenous injection of plague toxin conferred definite, but limited, antitoxic protection to mice. Streptomycin was without this protective action. Aureomycin injected 1 hour or 12 hours prior to toxin exerted the greatest protective effect. Chloramphenicol was not as effective as either aureomycin or terramycin against *Pasteurella pestis* toxin.

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Interference of Aureomycin and of Terramycin with Action of Penicillin *in Vitro.** (18262)

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Recent studies have established that one antibiotic may interfere with the action of another both *in vitro* and *in vivo*(1-6). It has been shown that chloramphenicol antagonizes penicillin in the test tube and in a streptococcal infection of mice(3,4,6). The interference *in vitro* of aureomycin with the bactericidal action of penicillin against enterococci has also been demonstrated(6).

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