filtrates introduced via the blood stream. Studies on other possible explanations are under way.

Torrey and Kahn[9] found that filtrates of certain gram positive anaerobes remained without effect upon transplantable tumors of mice and rats. Inasmuch as their purpose was to employ preparations of high proteolytic activities but the phenomenon-producing potency was not determined, the negative results reported by them are not considered contradictory.

The observations reported in this paper are considered of interest because there appears to be a remarkable selective destruction of a tumor of high malignancy and of rapid growth; and also because being obtained in mice they offer an opportunity for further thorough studies on the relation of the "phenomenon of local skin reactivity to bacterial filtrates" to problems of tumor growth.

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B. coli Bacteriophage in the Treatment of B. coli Peritonitis in Mice.

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The bacteriophage which was used for this study was found to produce a complete lysis of 2 virulent strains of *B. coli* which we obtained from patients with peritonitis. One one hundred billionth of a cc. of this bacteriophage caused lysis of approximately one billion bacteria of strain "T" in 10 cc. of broth. The minimal lethal dose of the "T" strain of *B. coli* for mice at the time of the experiments was 1-5 million organisms which killed within 5 to 12 hours after injection of an actively growing, 3-hour, 2% dextrose cooked meat medium culture. Fifty million bacteria which constituted 10-50 M.L.D.'s were suspended in 0.5 cc. of broth and inoculated intraperitoneally into a series of mice. 0.5 cc. of bacteriophage was injected simultaneously into 2 of these mice, and into 2 more mice at varying intervals up to 4½ hours after the bacterial inoculation. This approached closely the lethal period for control animals. In the control series plain broth injections were given at the same intervals as phage. The table shows

[9] Torrey and Kahn, *J. Cancer Research*, 1929.

one of these experiments. From this table one can see that 0.5 cc. of bacteriophage protected all of the mice when given up to 3½ hours after bacterial inoculation. Only 50% of mice could be

TABLE I.

No.	Dose	Used for treatment Broth cc.	Used for treatment Bacteriophage cc.	Interval between inoculation and treatment	Result in 20 hr.	Final result*
1	50 m	0.5		Simultan.	D	D
2	"		0.5	"	L & W	S
3	"		0.5	"	L & W	S
4	"	0.5		15 min.	D	D
5	"		0.5	"	Sl. sick	S
6	"		0.5	"	Sl. sick	S
7	"	0.5		30 min.	D	D
8	"		0.5	"	Sl. sick	S
9	"		0.5	"	Sl. sick	S
10	"	0.5		1 hour	D	D
11	"		0.5	"	Sick	S
12	"		0.5	"	Sl. sick	S
13	"	0.5		2 hours	D	D
14	"		0.5	"	Sl. sick	S
15	"		0.5	"	Sl. sick	S
16	"	0.5		3 hours	D	D
17	"		0.5	"	Sl. sick	S
18	"		0.5	"	Sick	S
19	"	0.5		3½ hours	D	D
20	"		0.5	"	Sick	S
21	"		0.5	"	Active	S
22	"	0.5		4 hours	D	D
23	"		0.5	"	D	D
24	"		0.5	"	Sl. sick	S
25	"		0.5	4½ hours	D	D
26	"		0.5	"	D	D
27	"				D	D
28	10 m				D	D
29	2 m				D	D
30	1 m				Sl. sick	S
31			2		L & W	S
32			4		L & W	S

* Control mice begin to die in 5 hours and at least half of them are dead before 7 hours after inoculation.
S = survived. D = died. L & W = living and well.

saved when bacteriophage was given after 4 hours. In similar experiments there was occasional recovery when phage was inoculated after 4½ hours or later. Control animals receiving *B. coli* filtrate instead of phage were not saved. The bacteriophage itself proved to be innocuous, for 2 cc. and 4 cc. of it injected respectively into the peritoneal cavity of 2 mice did not produce any harmful effect. Both mice survived and the one inoculated with the larger dose suffered only slight discomfort for 1 or 2 hours, probably due to distention from the quantity of fluid injected. With smaller doses of phage or

larger doses of bacteria the period after injection of organisms at which protection was obtained with phage, was shortened.

In another series of experiments bacteriophage was given subcutaneously, while the organisms were injected intraperitoneally. In these experiments, only mice inoculated with bacteriophage simultaneously or 15 minutes after the injection of bacteria could be saved. The mice inoculated with bacteriophage at later periods succumbed at the same time as the controls. When mice which had survived these experiments were autopsied several days later no signs of peritonitis were found, and yet from the peritoneal exudate and blood the bacteriophage was recovered. All of these experiments have been repeated several times and our results have been consistent. The results seem to offer encouragement for further experiments in this field.

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Return of Gastric Acidity after Subtotal Gastrectomy and Double Vagotomy.

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The following study was undertaken to determine the influence of subtotal gastric resection and double vagotomy upon gastric acidity in dogs. Portis and Portis[1] showed that the total acidity remained unaltered after subtotal gastrectomy in dogs. Hartzell[2] found a marked reduction in acid after supra-phrenic double vagotomy, but 2 years later Vanzant[3] working with the same animals reported that the acid had returned to normal values.

Complete studies have been made upon 5 dogs. Preliminary to resection and vagotomy, a Pavlov pouch was made. Then, 2 to 3 weeks later when the acidity of the pouch was stabilized, the second operation was performed. This consisted of isolation and division of the anterior and posterior vagal trunks on the abdominal portion of the esophagus and resection of the distal portion of the stomach from a point approximately 3 cm. proximal to the *incisura angu-*

[1] Portis, S. A., and Portis, B., *J. Am. Med. Assn.*, 1926, **86**, 836.

[2] Hartzell, J. B., *Am. J. Physiol.*, 1929, **91**, 161.

[3] Vanzant, F. R., *Am. J. Physiol.*, 1932, **99**, 375.