ach (120 gm. daily or the equivalent of 450 gm.). It should be pointed out that the preparation of our material (except pepsin) was started within one hour after death of the hog, and that during the process of desiccation there is a considerable opportunity for autolysis to occur which was not the case in the preparation of the fresh hog's mucosa in which the enzymes were destroyed with heat.

Three patients did not respond to the fresh hog's mucosa, but did to liver. Two patients did not respond to pepsin, but did to liver. Of 4 patients on desiccated mucosa, one responded definitely but slowly; 3 did not respond, but stated that they felt better, and later responded to liver. One patient on desiccated gastric muscle remained stationary for 2 months. Three patients responded definitely and typically to desiccated whole stomach. (By response we mean a definite increase in reticulocytes and red cells within 2 weeks after the institution of therapy.)

Our observations confirm those of Sturgis and Isaacs, namely, that a small amount of the anti-pernicious anemia principle is present in gastric mucosa, very little, if any, is present in gastric muscle, and that when the whole stomach is ground and desiccated, a considerable quantity of the active principle is produced or liberated, most probably by autolysis.

5320

Influence of Gastric Acid Secretion upon the Bactericidal Power of the Gastro-Intestinal Tract.

S. F. FURBY AND LLOYD ARNOLD.

From the Department of Bacteriology and Preventive Medicine, University of Illinois College of Medicine, and Research Laboratory of State Department of Public Health, Chicago.

The bactericidal power of the free H-ion of the gastric contents has been thought to be the principal disinfecting agent. We have used *B. prodigiosus* as the test bacteria. Suspensions of one agar plate growth in 100 cc. saline were administered to dogs by stomach tube. Alcohol was used to stimulate gastric secretion. Fifty cc. of a 7% ethyl alcohol were administered by stomach tube. Ninety-six dogs were used for these experiments. The number were equally divided in each experiment as nearly as possible. All animals were without food for 24 hours before the experiments began. The accompanying table shows the results. All animals were killed 2

hours after the administration of the material. The lumen of the stomach and small intestine was examined immediately by transferring as uniform an inoculum from the contents of the various levels on to the surface of agar plates. Bent glass spreaders were used for uniform distribution and the same spreader was used to smear other sterile agar plates for dilutions in case of overgrowth. Where the *B. prodigiosus* appeared in the same concentration as was present in the original suspension, the growth was recorded as 100%.

TABLE I.

Effects of Gastric Acidity and Manipulation of the Duodenum upon the Self-Disinfecting Power of the Stomach and Small Intestine.

B. prodigiosus in saline	Gastric Acidity	Stomach	Duodenum	Upper Jejunum	Lower Jejunum	Ileum
Without alcohol	Free					
	Deficit	20%	20%	40%	70%	90%
Plus alcohol at	Free	0	0	0	0	0
same time	Deficit	10%	10%	40%	20%	0
Plus alcohol	Free	0	0	0	0	0
30 minutes after	Deficit	30%	50%	50%	60%	0
Plus alcohol	Free	0	0	0	0	0
30 minutes before	Deficit	10%	40%	30%	20%	0
Alcohol in stomach						
and *B. prodigiosus*	Free	10%	40%	20%	10%	0
in duodenum	Deficit	20%	20%	20%	0	0
Alcohol and *B. prodigiosus* in stomach						
and sterile saline in	Free	20%	20%	30%	20%	0
duodenum	Deficit	40%	20%	20%	0	0

The dogs showing a free acidity and a deficit of free acid after the 2 hour period are recorded separately in the table. One could conclude that where free acid was present, the administered bacteria were not viable within the stomach or small intestine after 2 hours.

The last 2 experimental results shown on the table do not substantiate the above statement. The alcohol test meal was given by stomach tube. The dogs were given general anesthetic, duodenum opened, *B. prodigiosus* in saline was injected directly into the duodenum. Two hours later the animal was killed. There does not seem to be any relationship between gastric acidity and survival of ingested bacteria. The last part of the table records the results obtained after administering the bacterial suspension and the alcohol test meal in the usual way, both at the same time. The abdomen was opened under general anesthesia and sterile saline injected into the lumen of the duodenum. As in the previous experiment, these results show no apparent relationship between gastric acidity and

the survival of ingested bacteria. The manual manipulation of the intestinal tract seems to be an important factor in these experiments in inhibiting the bactericidal power. Free acid as high as 60 was observed in some of the last recorded experiments with viable *B. prodigiosus* after 2 hours.

5321

Influence of Broth Cultures and Media upon the Self-Disinfection of the Skin.

B. E. MONTGOMERY. (Introduced by Lloyd Arnold.)

From the Department of Bacteriology and Preventive Medicine, University of Illinois College of Medicine, and State Department of Public Health, Chicago.

Arnold, Gustafson, Hull, Montgomery and Singer[1] reported upon the disappearance of viable bacteria from the skin when applied in 1:200 saline dilution. This suspension was chosen after varying concentrations had been applied to the skin. Pease, and Himebaugh[2] reported some observations using undiluted broth cultures of bacteria under certain conditions. These workers overloaded the skin with the foreign solids in the broth. The air drying of the skin causes a concentration of the protein and other materials in the broth upon the skin and delays its self-disinfecting power. The undiluted 24-hour-old broth cultures contain more bacteria than the skin can remove in 15 minutes, but the foreign substances covering the cornified layer are more important in the reaction than the concentrations of the bacteria.

The middle finger of both hands was submerged in the various fluid media indicated in the table. Immediately after removal the

TABLE I.

24-hour Broth Culture	% of Viable Bacteria Destroyed.
Undiluted	25
Diluted 1:10 (saline)	35
" 1:200 "	90
Sterile broth, air dried, submerged in 1:200 (saline)	32

Fingers submerged in suspensions of *B. prodigiosus*. Dried in air for 15 minutes and palmar surface pressed against agar plate.

[1] Arnold, L., Gustafson, C., Hull, T. G., Montgomery, B. E., and Singer, C., *Am. J. Hyg.*, 1930, **11**, 345.

[2] Pease, H. D., and Himebaugh, L. C., *Am. J. Pub. Health*, 1930, **20**, 820.