the lesion was followed by roentgen-ray. Cavities as large as 2.5 cm. in diameter could be demonstrated.

Results. Some of the dogs died due to the magnitude of the abscess cavity or to the added burden of infection spread to adjacent lobes. Other dogs were sacrificed at intervals. There was practically a routine production of an abscess cavity from 1 to 2.5 cm. in diameter following the injection. One goat died following the administration of barbital. Another goat developed convulsions and died soon after operation. The third presented an abscess 2.5 cm. in diameter demonstrable by roentgen-ray.

Abscess cavities formed from 10 days to 2 weeks following injection, and persisted as long as 7 months. It might well be that a substance having a higher specific gravity would be necessary to retain infective organisms in a dog's lung than in a human lung, while an abscess was being produced. The above method is being used at present in an attempt to produce bronchogenic lung abscess with pyogenic organisms.

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Inverse Concentration Ratios for Sodium and Potassium in Gastric Juice and Blood Plasma.

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The acidity of the gastric juice is the result of the secretion of fluid at least as rich in chloride ion as the blood plasma but less concentrated with respect to fixed base. It has long been known that the sodium ion concentration in gastric juice is less than in blood plasma in direct ratio with the free acidity of the juice. The behavior of the other metallic cations has not been so carefully studied. Bliss[1] showed that the average potassium content of the gastric juice in the dog and man was consistently higher than the normal potassium concentration in the blood plasma. He presented no simultaneous analytical figures for blood and gastric juice in the same individuals, and consequently his conclusions could not be taken without qualification. Austin and Gammon[2] studied the potassium concentration in gastric juice but made no comparison

[1] Bliss, T. L., *Ann. Int. Med.*, 1930, **3**, 838.

[2] Austin, J. H., and Gammon, G. D., *J. Clin. Invest.*, 1931, **10**, 287.

with the concentration in the blood. We found it, therefore, of importance to study simultaneously the concentrations of sodium and potassium in the gastric juice in relation to their concentration in the blood at the time of secretion.

Dogs under ether or amytal anesthesia were used. The pylorus was cannulated and gastric juice collected after the injection of .03 mg. histamine in Ringer's fluid intravenously. Sodium was estimated by the Kolthof and Barber method[3] and potassium by the method of Breh and Gaebler.[4]

In 24 experiments in which the sodium and potassium concentrations in blood plasma and gastric juice have been studied we have found that the concentration of potassium is invariably greater in the gastric juice than in the plasma, and sometimes the former may be as much as 4 times the latter. On the other hand we have always observed, in conformity with previous workers, that the sodium concentration is markedly lower in gastric juice than in the plasma

TABLE I.

Ratio Between Concentration in Gastric Juice and in Blood Plasma for Potassium and Sodium.

	Potassium			Sodium		
	Blood	Gastric Juice	Ratio	Blood	Gastric Juice	Ratio
Exp.	mg./100 cc.	mg./100 cc.	G/B	mg./100 cc.	mg./100 cc.	G/B
1	16.41	39.98	2.43	355.5	253.1	.71
2	14.21	21.92	1.54	322.0	285.0	.88
3	7.56	18.36	2.42	336.8	281.9	.83
4	14.27	30.21	2.12	332.1	240.4	.72
5	16.26	20.75	1.28	337.1	230.2	.69
6	19.65	27.83	1.42	332.6	154.4	.43
7	11.81	28.34	2.40	330.8	111.5	.34
8	10.62	25.21	2.36	351.8	236.7	.67
9	9.67	33.32	3.45	318.8	135.9	.43
10	18.37	33.39	1.81	351.2	125.3	.35
11	24.06	89.00	3.70	360.3	271.3	.75
12	20.12	26.25	1.31	370.0	280.4	.76
13	14.29	39.84	2.72	347.3	269.7	.78
14	11.68	31.69	2.71	336.0	328.0	.98
15	7.26	18.59	2.56	334.1	234.4	.70
16	14.48	31.22	2.15	340.6	250.6	.74
17	16.00	17.59	1.06	348.3	244.6	.70
18	16.56	25.20	1.52	381.3	184.7	.49
19	9.18	22.41	2.44	356.0	190.8	.53
20	7.42	23.26	3.13	359.1	273.2	.76
21	8.09	30.21	3.74	358.6	248.8	.69
22	13.11	31.38	2.38	371.4	142.8	.38
23	18.51	61.60	3.32	392.4	218.3	.56
24	31.08	61.60	1.98	373.1	164.2	.44
		Mean	2.33			.64

[3] Kolthof, I. M., and Barber, H. H., *J. Am. Chem. Soc.*, 1928, **50**, 1625.

[4] Breh, F., and Gaebler, H., *J. Biol. Chem.*, 1930, **87**, 81.

of the animal at the time of secretion. The results are shown in Table I.

It is rather surprising that the 2 monovalent cations, sodium and potassium, behave in this inverse manner with respect to their secretion in the gastric juice. In the ultrafiltration of plasma, as Ingraham, Lombard and Visscher[5] have shown, the potassium ion appears in the ultrafiltrate as a smaller fraction of its concentration in the plasma than does the sodium. Therefore, in any ultrafiltration process one would expect the potassium to be diluted to a greater extent than the sodium. Furthermore, in any distribution of ions set up by electrical potential differences operating to produce iontophoresis it would be expected that all cations would be concentrated or diluted in proportion to their migration velocities, but not that one cation species would behave qualitatively in a different manner from other ions of the same charge. Macallum[6] has pointed out that in mixtures of sodium and potassium salts potassium is selectively adsorbed to silica. He has suggested that the higher migration velocity of potassium ions may be responsible for this selective adsorption.

Tentatively we would suggest as the reason for the difference between the behavior of potassium and sodium in gastric juice that potassium enters the lumen of the gland from the secreting cells themselves, while the sodium reaches the lumen through the intercellular spaces. This is in accordance with the well-known fact that potassium occurs in high concentration within the cells, whereas sodium is very much less abundant. This difference is presumably due to differences in cell membrane permeability with respect to ions as well as to the specific adsorption effect noted by Macallum.

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A Simple Method for Staining Fungi.

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The ordinary dyes, when applied to bacteria, do not stain well the mycelium and the spores of the fungi. Slightly better results are

[5] Ingraham, Lombard and Visscher, *J. Gen. Physiol.*, in press.

[6] Macallum, A. B., *Proc. Roy. Soc. London*, Sect. B, 1928-29, **104**, 440.