cation with equal dosages of prontylin by these 2 routes. (Marshall, *et al.*[12])

Prontylin orally appears to be 1.8 times more effective than prontosil for low-grade infections and 1.4 times more effective for high-grade infections. The therapeutic margin of safety of prontosil administered orally, however, is quite superior to that of prontylin.

Disulon orally in dosages of 40 gm. per kilo does not produce symptoms referable to the central nervous system. This compound, due to its lower toxicity, better tolerance and the greater protective efficiency of unit dosages in the presence of infections, has a therapeutic margin of safety quite superior to that of prontylin. The observed superior therapeutic efficiency of disulon as compared with prontylin confirms similar observations of Rosenthal.[10]

9554

Sodium Chloride Content of Gastro-Intestinal Secretions.*

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The necessity for replacing the sodium chloride carried away when excessive amounts of gastro-intestinal secretions are lost, as by vomiting, or drainage from biliary or intestinal fistulæ, has been repeatedly emphasized. In fact, the value of sodium chloride solutions in such instances is so well known that a definite tendency exists for their use in all patients requiring parenteral fluids. This procedure is not without risk, since the development of edema from the administration of excessive amounts of sodium chloride to sick patients is not uncommon. To avoid this mistake and at the same time provide sufficient salt, the physiologically and chemically minded surgeon knows about the metabolism of these electrolytes and fits his treatment to the needs of the individual patient.

The purpose of this paper is to show the amount of sodium chloride present in various gastro-intestinal secretions obtained from

[12] Marshall, E. K., Jr., Emerson, K., and Cutting, W. C., *J. A. M. A.*, 1937, **108**, 953.

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surgical patients and, in particular, to draw attention to these amounts in relation to the quantity of sodium chloride in physiological saline or Ringer's solution, the common materials used for sodium chloride replacement.

Sodium was determined by the Butler-Tuthill method.[1] Estimations of chloride were made by the Wilson and Ball modification[2] of Van Slyke's method, except for a few of the first determinations done on thin vomitus, in which the Volhard-Arnold principle was followed. All analyses were run on samples from 24-hour collections.

The data are shown in Table I. The vomitus was collected from both preoperative and postoperative patients; the bile came from common duct T-tubes; the enterostomy drainage was from the mid-

TABLE I.
The Sodium Chloride Concentration of Gastro-intestinal Secretions and of Physiological Saline and Ringer's Solution.

Material	Patient No.	Sodium		Chlorine		Sodium Chloride
		Gm./L.	m.Eq./L.	Gm./L.	m.Eq./L.	Gm./L.
Vomitus	1			0.73	20	1.20
	2			2.60	73	4.30
	3			2.85	80	4.72
	4			3.33	94	5.50
	5			2.15	60	3.55
	6			1.21	34	2.00
	7			3.40	96	5.60
	8			1.00	28	1.65
	9			1.09	31	1.80
	10			1.27	36	2.10
	11	0.38	16	0.73	20	1.20
	12	0.54	23	3.78	106	6.24
	13	0.80	35	2.00	56	3.30
	14	0.07	3	1.68	47	2.78
	15	0.42	18	1.16	33	1.92
	16	0.48	21	0.91	26	1.50
	17	1.79	78	3.11	88	5.12
	18	0.97	42	3.31	93	5.46
Hepatic Bile	19	3.26	142	3.69	104	6.09
	20	3.30	143	3.83	108	6.31
	21	3.39	147	4.62	130	7.62
	22	3.54	154	4.32	121	7.13
Enterostomy Drainage	23	2.44	106	2.62	74	4.32
	24	2.19	95	3.65	103	6.02
Phys. Saline		3.34	145	5.15	145	8.50
Ringer's Solution	Na	3.34	145	5.15	145	8.50
	K			0.14	4	0.30
	Ca			0.13	4	0.20

[1] Butler, A. M., and Tuthill, E., *J. Biol. Chem.*, 1931, **93**, 171.
[2] Wilson, D. W., and Ball, E. G., *J. Biol. Chem.*, 1928, **79**, 221.

ileum of 2 patients with intestinal obstruction. The figures for sodium chloride were calculated from the chloride determinations as if all the chlorine were present as sodium chloride.

The point we wish to emphasize is that excepting 2 instances (sodium in patients 21 and 22) the concentration of sodium chloride in the gastro-intestinal secretions examined was always less than the concentration of sodium chloride in physiological saline or Ringer's solution.

This suggests for patients losing gastro-intestinal secretions and requiring fluids parenterally that the sodium chloride lost may be replaced by giving a volume of physiological saline or Ringer's solution equal to the volume of gastrointestinal secretion lost. The possibility of preventing a deficiency of sodium chloride by this volume for volume rule is being investigated now in a series of surgical patients.

9555

Toxicity of meta-Substituted Phenols to *Paramecium caudatum.*

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The duration of life of individual paramecia was measured at various concentrations of antiseptic agents, at 25 ± 1°C., and at pH 7.6. Duplicate runs were made on separate pure cultures of *Paramecium caudatum,* using an average of 20 organisms at each concentration in each run. The solution of the toxic agent and the 0.5% oat straw infusion paramecium culture were measured from microburettes, mixed in small depression slides, and placed in a stage thermostat for microscopic observation. Death was considered to occur when motility ceased. Morphological alterations indicated that the organisms actually were dead, especially the formation of clear spherical blisters about the periphery, the disappearance of the vacuoles, and a darkening and clumping together of the cytoplasmic elements. The death times at each concentration in each run were averaged. The average of the probable error in the death times was 3.3%.

The results of each run on each compound were plotted separately, log c against log t. The straight lines obtained conform to the