new ulcers form seems to us to definitely exclude operative trauma as a significant factor in the pathogenesis of the ulcers. It is difficult to understand, however, how a chemical factor alone can be the effective agent. The clamp lesions heal in the same areas in which new ulcers form, bathed by the same fluid. An attractive hypothesis is suggested by the work of Whitlow, who found that the gastric mucosa bleeds readily when the protective layer of mucus is wiped away and hydrochloric acid or acid gastric juice is then applied to the unprotected surface. It may be that the continued ejection of acid gastric chyme is similarly effective in removing the protective layer of mucus from a certain small area of the jejunal mucosa and in traumatizing the cells, thus rendering them susceptible to the attack of chemical agents.

Conclusions. 1. In a total series of 47 animals, the duodenal drainage operation of Mann and Williamson resulted in jejunal ulcer formation in 38 instances, 70.2%. 2. The incidence of death from peritonitis secondary to perforation was 34%. 3. There was no relationship between the site of drainage, *i. e.*, whether high or low in the intestine, and the incidence or rapidity of ulcer formation. 4. Traumatic lesions of the jejunum healed promptly in spite of the formation of new ulcers in adjacent areas. 5. The experimental ulcers under consideration are not due to operative trauma, or merely to the chemical digestive action of the gastric juice, or to the two together. It is quite possible, however, that the continued mechanical and chemical trauma inflicted on the cells of the jejunal mucosa by the ejected acid chyme may be entirely responsible for the formation of the lesions.

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Bromide and Chloride Distribution Between Serum and Cerebrospinal Fluid.

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The report that bromide, after administration by mouth, exists in a higher concentration in the blood serum than in the cerebrospinal fluid attracted our attention because of the following considerations. If equilibrium exists between serum and cerebrospinal fluid, if bromide ions are freely diffusible, and if the protein ions are the only

restraining factor, the application of the Gibbs-Donnan Law would lead to a predicted distribution ratio of $(Br)_s/(Br)_{csf} = 0.95$.

The bromide distribution ratios of Malamud, Fuchs and Malamud[1] were approximately 3.0 for normal individuals and did not fall below unity in patients with damaged permeability, as in paresis. Since the colorimetric method employed by these investigators did not permit the determination of actual bromide concentrations, observations have been made using the electrometric titration method previously described[2] as well as the colorimetric gold chloride method. The procedure followed was to administer to the patients 0.01 gm. of sodium bromide per pound of body weight 3 times a day for 5 days. Twenty hours following the last dose of bromide, blood and cerebrospinal fluid were drawn for analysis. This procedure was followed with 5 patients. Two others, O and R, were given larger doses of sodium bromide for a longer period before analyses were made. The results of 3 paretic and 2 non-paretic patients are given in Table I. Concentrations have been expressed in millimols per kilogram of water.

In all instances, with both methods, the ratio $(Br)_s:(Br)_{csf}$ was greater than unity. This substantiates the theory that bromides are not freely diffusible between serum and cerebrospinal fluid. In all except one instance the bromide ratio determined electrometrically was lower than that obtained colorimetrically.

TABLE I.
Halide Distribution Between Blood Serum and Cerebrospinal Fluid Following Sodium Bromide Administration.

	Electrometric Method									Colorimetric Method	
Subject	$(Br+Cl)_s$	$(Br+Cl)_{csf}$	$(Br)_s$	$(Br)_{csf}$	$(Cl)_s$	$(Cl)_{csf}$	$\frac{(Br+Cl)_s}{(Br+Cl)_{csf}}$	$\frac{(Cl)_s}{(Cl)_{csf}}$	$\frac{(Br)_s}{(Br)_{csf}}$	$\frac{(Br)_s}{(Br)_{csf}}$	Diagnosis
Li	—	—	—	—	—	—	—	—	—	2.86	Paresis
Li	111.5	128.3	4.8	3.4	106.7						"
S	111.0	134.5	8.4	2.4	102.6	132.1	0.83	0.78	3.50	2.72	"
Le	111.8	127.2	6.4	3.2	105.4	124.0	0.88	0.85	2.00	2.50	"
F	111.8	126.2	6.5	3.3	105.3	122.9	0.89	0.86	1.97	3.1	Eczema
G	—	—	5.2	3.3	—	—	—	—	1.57	2.80	Luetic Aortitis
O	107.4	124.0	36.4	19.0	71.0	105.0	0.87	0.68	1.92	—	Duodenal Ulcer
R	—		24.8	12.1	—	—	—	—	2.05	—	Epilepsy

[1] Malamud, W., Fuchs, D. M., and Malamud, N., *Arch. Neur. and Psych.*, 1928, **20**, 780.

[2] Hastings, A. B., and Van Dyke, H. B., *J. Biol. Chem.*, 1931, **92**, 13.

Although our series is too short to be conclusive, there is no evidence of a difference in bromide distribution in paretic and non-paretic individuals. The total halide distribution ratio $(Br+Cl)_s$: $(Br+Cl)_{csf}$ was practically constant, 0.85-0.89 in the 5 cases in which it was determined. It should be noted that this is lower than that observed for the system, serum: edema fluid, and that predicted for the system by the Gibbs-Donnan distribution law. This agrees with the values for the ratio $(Cl)_s:(Cl)_{csf}$ found in the absence of bromide by others,[3, 4]

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The Effect of High Doses of Irradiated and Non-Irradiated Ergosterol on the Albino Rat.*

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There have been many conflicting reports concerning the toxicity of irradiated products. This report covers the work of 4 years throughout which we endeavored to follow procedures which closely resemble the clinical administration of these irradiated products. We used a commercial product prepared and furnished to us by Mead Johnson and Company.

All materials were reassayed by us for vitamin D potency by the McCollum line-test. We also studied the blood calcium and phosphorus of representative animals at various stages. Our high dosages of irradiated ergosterol varied from 100 X to 465,000 X the therapeutic dose. All animals were carefully weighed and observed for their behavior. A record of the matings and condition of all litters was kept. All animals sacrificed or found dead were carefully autopsied and microscopic sections made of the thyroid, thymus, aorta, heart, lungs, liver, stomach, duodenum, spleen, kidneys, and gonads.

In summarizing our results we can say that: 1. Special, very potent commercial preparations of irradiated ergosterol were stan-

[3] Fremont-Smith, F., Dailey, M. E., Merritt, H. H., Carroll, M. P., Thomas, G. W., *Arch. Neur. and Psych.*, 1931, **25**, 1271.

[4] Muntrogler, E., Way, C. T., Pomerene, E., *J. Biol. Chem.*, 1931, **92**, 733.

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