direction, in that a relatively simple process (inflammation induced by intradermal colitoxin) seems to speed appreciably the return towards a normal blood picture in the rabbit receiving HN_2. The significance of the data remains to be determined, but it appears that inflammation may change the rate of development and the rate of discharge from the marrow of the cell or cells that give rise to the normal heterophils in the peripheral blood. This problem is being further studied and details will be presented elsewhere.

Conclusions. 1. The protective action of cysteine against the leucopenia induced by HN_2 is confirmed and extended to the suppressive action of that agent on the Shwartzman phenomenon. 2. The regular pattern of leucopenia may be considerably altered by repeated small inflammatory reactions induced after the administration of HN_2. The suppressive action of the mustard on the Shwartzman phenomenon appears to decrease when such alteration is produced. 3. Additional support for the correlation between the presence of leukocytes (probably granulocytes) and the production of the Shwartzman phenomenon is supplied by these experiments.

Following completion of this manuscript, it was learned that Dr. Ivan Bennett had also completed a study on the protective action of cysteine against nitrogen mustard suppression of the Shwartzman Phenomenon.

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Failure of "Tween 80" to Alter Fecal Fat Excretion in Bile Fistula Dogs. (19847)

JOHN H. ANNEGERS.
From the Department of Physiology, Northwestern University Medical School, Chicago, Ill.

The wetting agent "Tween 80" (polyoxyethylene sorbitan monooleate) has been reported to correct steatorrhea in a child with celiac disease when doses of 40 mg/g dietary fat were given(1). It has also been pointed out that the fat absorptive defect in sprue and in celiac disease resembles that in patients and in experimental animals deprived of bile, in that in these conditions fecal fat excretion is approximately linearly related to dietary fat intake and unabsorbed fat is largely hydrolyzed(2). If the steatorrheas of celiac disease and of biliary deficiency have a common cause, "Tween 80" would be expected to reduce fecal fat excretion in both conditions. Furthermore, if the solubilizing properties of bile salts are chiefly concerned in the facilitation of fat absorption by bile, "Tween 80" would be expected to reduce fecal fat excretion in bile deficient animals since sodium glyco- and taurocholate have been shown capable of so doing(3). The present study was undertaken to test these two implications.

Methods. External bile fistula dogs were fed diets consisting of either "Pard" alone or "Pard" plus 25 g of lard, containing a total of 15 and 40 g of triglyceride fat/day, respectively. Either 2 or 4 grams of "Tween 80" were added to each of these diets. The mixtures of food and "Tween 80" were given in one daily feeding for 7 days, the last 5 days of which all feces were collected, blended, and analyzed for petroleum ether soluble material extracted in 5 hours(4). Seven dogs received 2 of the test mixtures and one dog was tested once.

Results. As summarized in Table I, neither dose of "Tween 80" reduced fecal fat excretion below the expected limits for untreated bile fistula dogs.

Discussion. Although "Tween 80" has been shown to reduce fecal fat excretion in 4 partially gastrectomized patients with steatorrhea(6) and to reduce the fat concentration in the feces of 3 out of 4 additional gastrectomy patients(7), it does not appear that

TABLE I. Total Fecal Fat Excretion in Bile Fistula Dogs.

Dietary fat intake, g/day	Total fecal fat excretion				
	Untreated, g/day*	2 g "Tween 80"†		4 g "Tween 80"†	
		No. dogs	g fat/day	No. dogs	g fat/day
15	12.4 ± 1.2 S.E.	2	14.2	5	12.1
40	27.3 ± 3.2 S.E.	3	26.6	5	25.4

* Estimated from previously-demonstrated relationship that fecal fat excretion in bile fistula dogs equals 3.7 g plus .58 ± .08 times dietary fat intake(5).

† Supplied by Smith, Kline, and French.

it will effectively control steatorrhea due to bile deficiency.

The present results fail to support a previous suggestion(2) that the absorptive defect in sprue and in celiac disease may be caused by bile salt deficiency. A dissimilarity in etiology cannot be considered as established, however, because a) the effect of "Tween 80" on fecal fat excretion in the idiopathic steatorrheas has received very limited study; b) the dose of "Tween 80" used in the present study, though up to 3 times that reported to be effective in celiac disease(1), may have been insufficient; and c) the large doses of conjugated bile salts given as desiccated ox bile necessary to reduce effectively the steatorrhea of bile fistula dogs(3) have not been tested on patients with idiopathic steatorrhea.

The present results also fail to support the hypothesis that bile salts play primarily a solubilizing role in their facilitation of fat absorption. Such a possibility has not been disproven, however, in view of the inability to equate the oral dose of "Tween 80" to that of desiccated ox bile, in terms of solubilizing properties, which has been shown to be sufficient to reduce steatorrhea in bile fistula dogs.

Summary and conclusions. Two and 4 g daily doses of "Tween 80" were not shown to alter fecal fat excretion in 8 bile fistula dogs when the mixed diet contained 15 g (5 tests) and 40 g (10 tests) of triglyceride fat per day.

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New Design of Electrophoresis-Convection Apparatus. (19848)

SAMUEL RAYMOND. (Introduced by H. M. Rose.)

From the Department of Microbiology, College of Physicians and Surgeons, Columbia University, New York.

The electrophoresis-convection cell has been widely used recently in the preparative separation of proteins(1,2,3). This type of cell combines horizontal electrophoresis with vertical convection in a manner that efficiently separates the components of a mixture. The apparatus is much more practical for separations than the Tiselius type of cell, since it can handle larger volumes, requires no fragile glass parts or delicate adjustments, and is more economical.

The apparatus consists essentially of a cell composed of two reservoirs which are connected by a vertical channel with walls of dialysis membrane. The cell is immersed in a buffer solution between two electrodes.