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)

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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.

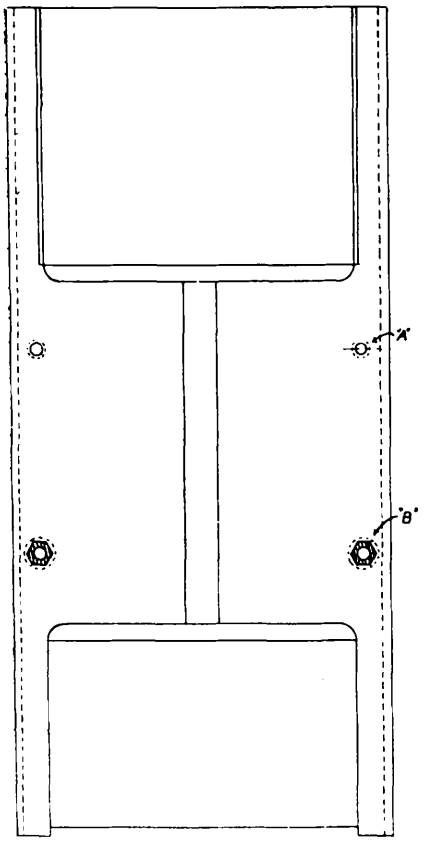

FIG. 1. Face plate. One with bolt-holes as "A." One with nuts as "B."

Earlier designs(4,5) of the apparatus have been of great value in many biological problems. Nevertheless, practical experience has indicated a need for certain improvements: 1) adjustable volume capacity, 2) leak-free construction, 3) aseptic operation. By making use of a new method of construction the apparatus described herein meets these requirements.

The essential feature of the new design is the construction of the cell itself. The entire cell, including channel and reservoirs, is formed of a continuous bag of dialysis tubing which can be sterilized by autoclaving and the contents thereof kept free of subsequent contamination by sterile technics. The bag is supported in the appropriate shape by an external frame. Two electrodes and a container for the buffer solution complete the apparatus. The cell frame is formed of two face plates, constructed of lucite, one of which is shown in Fig. 1. The dimensions of a convenient size for cells of 20 to 250 ml capacity are 12 inches high, 5¾ inches wide and ¾ inch thick. The verticle center slot which exposes the channel is 5 inches by ½ inch. The upper and lower recesses forming chambers for the reservoirs when the two plates are clamped together are 3 inches high, 4½ inches wide and ⅜ inch deep. The two plates are clamped together with 4 stainless steel screws which engage units embedded in one of the plates. To avoid electrolytic action at least one end of the screw must be insulated from the buffer solution. To assemble the cell-and-frame assembly a bag of dialysis tubing of the appropriate size is well soaked in buffer and laid flat upon one of the

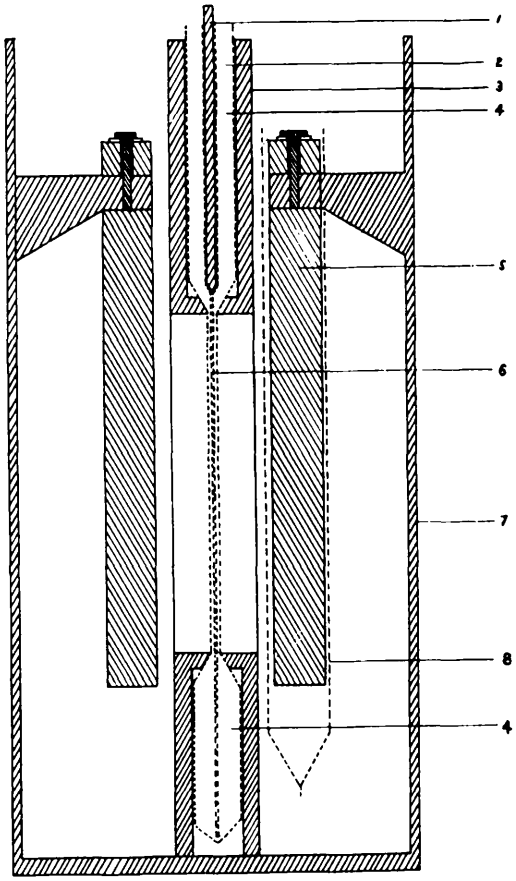

FIG. 2. Electroconvection cell median section. 1. Sliding gate; 2. Solution; 3. Face plate; 4. Reservoir; 5. Electrodes; 6. Channels; 7. Buffer box; 8. Anode diaphragm.

face-plates. The other face-plate is then placed on top and the two are clamped together. When filled with the solution to be treated the bag bulges out into the recesses of the plates, forming the upper and lower reservoirs, and to a lesser extent in the channel slot, forming the channel. It is convenient to use a double length of tubing folded into a U-shaped bag instead of a single bag of tubing tied at the lower end, since this forms two upper reservoirs, two parallel channels, and a U-shaped lower reservoir. The speed of separation is doubled because of the two channels.

The cell frame shown in Fig. 1 may be used with bags of dimensions from 1 inch by 9 inches (measured when the bag is flattened) up to 3 inches by 12 inches, thus giving a range of capacity from 20 ml to approximately 250 ml.

Fig. 2 is a cross-section of the assembled apparatus. The container is a lucite cylinder 6 inches O.D. by 12 inches high provided with inlet and outlet (not shown) for circulation of the buffer. At the upper end of the U-shaped cell is a sliding gate, consisting of a flat plate of lucite with bevelled edges, which can be slid down between the two upper reservoirs into a V-shaped groove to pinch off the tubing at that point. This prevents mixing of the reservoir contents with the channel contents while the former are being removed.

Either graphite or platinum electrodes can be used. With graphite electrodes a cellophane bag must be placed around the anode to prevent contamination of the buffer by carbon particles.

The apparatus is especially useful in fractionating mixtures where maintenance of sterility is important. The procedure consists of autoclaving a length of dialysis tubing closed at each end, assembling the sterilized bag and frame, opening and filling the cell with the sterile solution using sterile precautions, and reclosing the bag during the run. Bacteria cannot pass through the dialysis membrane even though the external buffer is exposed to bacterial contamination.

Summary. An electrophoresis-convection apparatus for fractionating proteins is described which (1) has variable capacity, (2) is of simple leak-free construction, and (3) can be operated under sterile conditions.

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Improvement of a Hemin Standard by Recrystallization. (19849)

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The lack of a satisfactory primary standard for the determination of hemoglobin has led to the development of several methods for the preparation of a hemin standard. The present investigation was undertaken to show that the hemin standard proposed by King (5) can be improved by recrystallization. The effect of recrystallization of crude hemin on its purity and stability was studied.

Experimental. Hemin was prepared from both bovine blood and human blood (outdated transfusion blood). Independently prepared samples* of both crude and recrystallized hemin were also used. For the first sample from bovine blood the method of Hans Fischer(3) was used, the increase in purity