The Cell-Catch Procedure
A New Method Which Preserves All Cellular Elements of Spinal-Fluid Samples*

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The overall importance of examination of the spinal fluid has always been emphasized. Until now only quantitative studies, e.g. the counting of cells present, have been made a matter of general medical practice. Qualitative studies, such as the differential count of spinal-fluid cells, have not been done as a routine procedure since the methods used previously to procure cellular elements from cerebrospinal fluid have all yielded rather unsatisfactory results.

The embedding method of Alzheimer is a very laborious and complicated one which gives good results as far as the demonstration of individual cells is concerned but fails to yield an over-all picture of all cells present. Centrifugation of spinal fluid has been practiced widely before, but, in spite of all modifications introduced, produces heavy cellular damage which precludes the demonstration of the delicate structural elements of the cell. A chemical procedure using massive precipitation of protein proved to be unsatisfactory. The first methods of any usefulness at all were the so-called "Sedimentierkammer-Verfahren" ("chamber-sedimentation-method") and the numerous filtration methods and their various modifications which have been introduced in recent years. The "Sedimentierkammer-Verfahren", though previously the best one available, fails to demonstrate about 50-70 per cent of all cells present, and does not show well the morphology of those cells seen.

Since all of the above methods give results which are unsatisfactory in one way or another, we have searched for a completely new way to overcome the previously en-

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Fig. 1. (a) The artificially produced delicate meshwork of fibrin which has developed 30 sec. after thrombin solution has been added to the specimen of spinal fluid. (b) Rotation of the test tube results in detaching the meshwork of fibrin from the wall of the glass. (c) The ball of fibrin formed by further rotation of the tube. (The meshwork of fibrin, as illustrated, has been developed in a specimen of protein-enriched spinal fluid in order to improve the structural detail for photographic reproduction.) In genuine samples of spinal fluid, the coagulum is more delicate in structure, appears more translucent and exhibits less tendency to retract.
countered difficulties. An ideal method, we believe, should meet the following criteria:

1. Quality of cells should be comparable to those seen commonly in ordinary blood smears.

2. All cells contained in a given specimen of cerebrospinal fluid should be demonstrable.

3. The procedure should be simple and uncomplicated.

A study of the old methods has proved that no further improvement of results can be achieved by mere modification of those available. We therefore have developed an entirely new method which, in its basic concept, differs markedly from the ones used before. We have evaluated the possibility of catching all the cells contained in a specimen of spinal fluid by means of a net much as one would catch fish. In this procedure all cells are caught in a net of fibrin while the fluid is expelled by a simple mechanical process. The different phases of coagulation of blood and retraction of clot which can be observed in vitro have served as basis for our experimental studies. Fibrinogen and thrombin were added to a given specimen of spinal fluid in the presence of calcium ions and resulted in the formation of a fine meshwork of fibrin in which the cells were trapped. This artificially produced net was then placed on a glass slide and another, siliconized glass slide was placed upon it, causing the remainder of the fluid contained in the meshwork of fibrin to run off. The flattened net then adhered to the siliconized slide as the two slides were slid apart and then the specimen was stained.