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CHEMICAL STRUCTURE OF CYTOPLASM

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IN a recent note written as a supplement to a symposium on the structure of protoplasm, K. H. Meyer¹ summarizes Seifriz's view of the structure of protoplasm as follows: "the ultimate structural units of the living substance are probably linear molecules or micellae so arranged as to form a framework" and "the living substance is composed of a true network of primary valence chains which at several points are tied together by chemical bridges held by molecular cohesion (to-day one would say residual valences or hydrogen bonds)." If Meyer had substituted in the first statement the word "some" for "ultimate" and left out the framework which requires further definition, and in the second statement had substituted the word "contains" for "is composed of" this

¹ K. H. Meyer, "The Structure of Protoplasm," Iowa State College, p. 267, 1942.

would be acceptable to the majority of students of cell structure. X-ray diffraction and birefringence studies have brought convincing support to the conception of structural constituents in protoplasm which Seifriz² with so much genius and foresight advanced a decade and a half ago.

This theory, however, interprets only some of the properties of protoplasm. These as listed by Seifriz³ are: "contractility, elasticity, cohesiveness, rigidity, and tensile strength." All these may be possessed by non-living systems. Protoplasm on the contrary respire, excretes, performs complicated chemical operations, uses or liberates energy and reproduces its own substance in kind. This metabolism is mediated by a multitude of intracellular enzymes and carriers and

² W. Seifriz, *Brit. Jour. Exp. Biol.*, 1: 431, 1923-4.

³ W. Seifriz, *Am. Nat.*, 63: 410, 1929.

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