in a sense, solid not liquid; but as it is made up of atoms joined into the molecular meshwork only by their mutual chemical affinities, it is possible for various physical agents to interrupt the continuity of the mass and to make it act somewhat in the manner of a liquid, to become subject to surface tension laws, etc. The solidity is not that of cohesion, but only the result of the chemical attractions that tend to hold together the elements in the complex molecular net against forces that might tend to disturb the continuity.

A cell is a continuous net work made of molecules joined in chains; the members of the chains are different within the nucleus from those outside the nucleus, but there is no break in continuity from one region to the other.

Approaching the problem from the physiologist's point of view, the author devotes his discussion chiefly to phenomena of nerve, muscle, and electrical organ. A nerve is conceived as containing rows of living, conductive molecules surrounded by various liquid and emulsive substances. Each component molecule is joined to its fellows in the row by the affinity of some of its atoms. Progressive chemical action between successive molecules in the chain and the environing materials constitutes the change that travels as a nerve impulse.

In muscle similar chains of conducting molecules have connected with them, as additional mechanisms, special contractile molecules, which owe their change of shape to chemical rearrangements.

Electrical organs easily lend themselves to an application of similar diagrammatic formulations.

Strange as it may seem the phenomena of the active flowing of protoplasmic streams in those exceptional water-plants, Stoneworts, are made foundation stones in the author's attempt to realize protoplasm as a solid, continuous, gigantic molecule. His previous valuable contribution to the physiology of these plants (Studien über die Protoplasmaströmung bei den Characeen. Jena, Gustav Fischer. 1898) resulted in the discovery of marked agreement in the conductive mechanisms in nerve, muscle and the cells of *Nitella syncarpa*. The motor mechanism in the last, however, he concludes, is different from that in muscle. Both the constant rotation of the moving layer of protoplasm and the very remarkable separate rotation of separate chlorophyll grains, which the author is sure he has seen, are conceived of as results of successive making and breaking of chemical union along the surface of contact of moving and non-moving protoplasm.

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A Dictionary of Birds. By Alfred Newton, assisted by Hans Gadow. Cheap issue, unabridged. London, Adam and Charles Black. 1893–96. Pp. xii + 1088. Price, $5.00.

Good wine needs no bush and Newton's Dictionary of Birds needs no recommendation, the more that it was fully reviewed in Science upon its first appearance.

There are, however, many who will welcome this edition, not only for its greatly reduced price, but for its convenient size, since without sacrificing a word of the text the use of thin, but good paper, makes this book a compact volume. Few there are who have Professor Newton's wide acquaintance with the literature of ornithology and the bibliographical references alone are sufficient to make the work a necessity, not only in the library of the working ornithologist, but of the general reader, while the contributions of Dr. Gadow constitute a text-book on the anatomy of birds. Our younger ornithologists will do well to keep this book within reach and consult it often, if only to fully appreciate that scientific facts may be presented in the best literary form.

F. A. L.

BOOKS RECEIVED.

A Treatise on Crystallography. W. J. Lewis. Cambridge, England, University Press. 1899. Pp. xxii + 612. 14s.

The Strength of Materials. J. A. Ewing. Pp. xii + 246. Cambridge, England, University Press. 1899. Pp. xxii + 612. 12s.

Electric Wiring, Fittings, Switches and Lamps. W. Perren Maycock. London, Whittaker & Co.; New York, The Macmillan Co. 1899. Pp. xv + 446. $1.75.