tion of epistemology to metaphysics, in so far as it crops out, seems to me to be of a distinctively dogmatic character; dogmatic in the pre-Kantian sense. But this criticism, as Dr. Smith, and everybody else must be aware, depends greatly on point of view. And for myself, I am unable to see how epistemology and metaphysics can be disjoined as they appear disjoined here; especially, I must demur strongly to Dr. Smith's pronounced tendency to substitute epistemology for metaphysics in relation to some fundamental problems. I am aware that this is a popular direction at present; but this only emphasizes its temporary character.

The central portion of the work consists of a plain, straight-forward consideration of what might be called the law of homology, in some of its psychological aspects. 'Like is known by like,' and therefore, 'sympathetic imitation' must be regarded as the main and most adequate method of knowledge. Throughout this discussion the proper problem of epistemology, that of the relativity of human knowledge, is submerged, and a factor in experience, which no one would seek to deny, but which falls essentially within the purview of psychology, is put forward as if it furnished at once the ideal and the method. Knowledge is defined as "the presence in the mind immediately, or in copy of that which constitutes objects" (35), evidently on the tacit understanding that this position does not involve dualism, with its resultant scepticism. Just before enunciating this definition, Dr. Smith sums up the merits and defects of other theories of knowledge, without suspecting, however, that the emphasis on the one hand, between subject and object as different, and on the other, the stress on self-knowledge can be traced to an ultimate relativity, a *datum*, if you please so to call it, which is at once the justification of the existence of epistemology and the source of its problem. The dualistic implications of Dr. Smith's standpoint make themselves felt, and naturally, all through. Towards the close they at length become quite explicit. "It is the function of knowledge to equate itself with its object" (266); and on the next page, Dr. Smith quotes, with apparent approval, Mr. Spencer's declaration, "the perception of relations is not the perception of the things themselves." Provided 'perception' be taken in the same sense in both clauses, can such a form of words be said to express anything thinkable by man? Just because epistemology *is* a science with a problem and a solution for it, things cannot be set over against relations and apart from them in this airy fashion.

Although the book is not an epistemology and even illustrates a kind of philosophical backsliding, sporadic now, it presents its good points. The chapter on 'Sympathetic Imitation in Art' contains some admirable reflections; the fatality of hurried systematization is pressed home well, and the entire argument is marked by the presence of an all-round culture very refreshing in these days of one-eyed specializing. As has been indicated, Dr. Smith has not embraced the inviting opportunity to contribute an authoritative work in English to epistemology. He has done appreciable service, nevertheless, by entering a series of *caveats* which some eager spirits would do well to bear in vivid remembrance.

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Die Kontinuität der Atomverkettung ein Strukturprinzip der lebendigen Substanz. By DR. GEORG HÖRMANN. Jena, Gustav Fischer. 1899. 3 M.

That such structures as nerves, or even an entire animal, might be regarded as single, huge, chemical molecules was an hypothesis advanced by E. Pflüger a quarter of a century ago. Observation and speculation since have almost unanimously tended toward the prevalent morphological conception of living matter as an aggregate of separate units, while Pflüger's idea has lacked support. In the present essay we find an interesting attempt to extend and to develop Pflüger's hypothesis by logical reasoning illustrated by diagrams.

The author would have protoplasm a net work composed of living matter, with its meshes filled by the various liquids, etc., that go to make up the complex whole.

This network is molecular, invisible, purely hypothetical. The living part of organisms is,

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.