grasp the most important point brought out by Brauer. He says (p. 175) that one of the chief characters on which Brauer bases his system is the existence or absence of wings ; and later (p. 176) he says "Thus it (Brauer's classification) begins by a division of Insecta into winged and wingless ; but the winged division is made to comprehend an enormous number of wingless Insects, whole subdivisions of Orders such as Mallophaga being placed in the winged series, although all are without wings." Now the fact is Brauer does not use the existence or absence of wings as a character distinguishing the two groups into which he divides the Insecta. Brauer believes that the wingless condition of the Thysanura and Collembola is due to their generalized condition ; that none of their ancestors had wings. On the other hand he believes that the wingless condition of all other wingless insects is a secondary condition, that they have descended from winged ancestors. In other words that existing insects represent two distinct lines of descent ; in one, the primitive wingless condition has been constantly retained ; in the other are found only descendants of a common-winged ancestor. This distinction is clearly indicated by the names he proposed for the two groups, Apterygogenea and Pterygogenea. The fact that many of the Pterygogenea have lost their wings does not militate in the least against this distinction. The only indication that our author has understood Brauer's position is a statement that "This first division is entirely theoretical." But if we give him credit for understanding Brauer we must blame him for stating the case in a very misleading manner.

As a rule, however, the work is written in a clear, simple style. The illustrations are abundant and are excellent ; and the pages present an attractive appearance. It is a work that no entomologist can afford to be without.

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Traité de Zoologie Concrète. By Yves Delage and Edgard Hérouard. Tome 11, 1re Partie, Mésozoaires, Spongiares. Paris, Schleicher Frères. 244 pages 15 colored plates and 274 text figures. 1899.

In the most recent volume of their 'Concrète Zoology' Delage and Hérouard present, from the teacher's standpoint, one of the most difficult branches of Invertebrate Zoology, and only praise is due them for the excellent manner in which the subjects are treated.

The group including the two families Dicyemidæ and Orthonectidæ, to which Van Beneden gave the name Mesozoa as indicative of their supposed intermediate position between the Metazoa and the Protozoa is considerably enlarged by the addition of a number of forms which show less evidence of degeneration than do Van Beneden's original types. The classification, however, is only provisional, for in most cases the life history is not known and it is recognized that future investigations may show the forms in question to be only larval stages of other animals. With this in mind the authors make four classes of the Mesozoa as follows, the name of each class indicating the nature of the sub-ectodermal structures : (1) Mesocoelia.—Forms having a digestive cavity with no other cellular boundary than the ectoderm (Frenzel's *Salinella salve*). (2) Mesenchymia.—Forms having a parenchymatous tissue within the ectoderm and without a digestive cavity (*Trichoplax* and *Treptoplax* (Monticelli)). (3) Mesogonia.—Forms without digestive cavity and with one or several cells beneath the ectoderm which are destined for sexual reproduction (Dicyemidæ and Orthonectidæ). (4) Mesogastria.—Forms having a digestive tract like the archenteron of a gastrula, the walls being separated from the ectoderm by a coelomic cavity in which there is no intermediate tissue (*Pemmatodiscus*, a parasite on *Rhizostoma pulmo* (Monticelli)). In addition to these classes, Haeckel's Physemaria, the 'urn' forms in the cavities of the Sipunculidæ, and the curious form described by Caullery and Mesnil under the name *Siedleckia nematoides*, are included as appendices.

In the second part of the volume the authors put into their subject an intimate knowledge gained only by personal investigation and continued research upon the structure and the development of the Sponges. The result is a clear and concise presentation of the numerous complicated Sponge-structures. The canals, inhalent and exhalent, with their many con-

fusing branches and chambers, are admirably portrayed and their mode of origin from the simple condition of an hypothetical rhagon-type is clearly shown. The spicules have received especial attention and the confusing nomenclature is presented in a table where ninety-eight different types of spicules are described and named in accordance with the views of Sollas, Lendenfeld, Stewart, and Schultze. With only eight exceptions a figure of the spicule accompanies each description and with this table, an average student for the first time, can classify Sponges while the admirable schematic figures of the organisms will help him to understand their structure.

The Sponges are divided as usual into two branches, CALCARIA and INCALCARIA. The former is subdivided into two orders, Homocœlida and Heterocoelida (both adapted from Polejaef); the latter is further divided into two sub-classes, Triaxoniæ (F. E. Schultze) and Demospongiæ (Sollas). The first sub-class includes two orders, Hexactinellida (Zittel, Lendenfeld) and Hexaceratida (adapted from Lendenfeld); the second sub-class includes three orders, Tetractinellida (Marshall) Monaxonida (Ridley and Dendy) and Monoceratida (Lendenfeld). The further divisions are made in accordance with the nature and disposal of the spicules. An improvement in the editing of the volume, although of minor importance, is noted in the presence of the name of the family to which the various genera belong and this cannot fail to help the student.

As with the previous volumes disputed questions are clearly stated and the arguments on both sides are fairly presented, the authors in most cases taking a decided stand upon one side or the other. If a critic wished to hunt for defects in the work he might be successful in the section which treats of the physiology of nutrition; this portion of the volume is not complete enough.

In connection with the taxonomic position of the Sponges, the authors maintain with Hatschek, Perrier and Parker and Haswell that they represent a phylum entirely distinct from all other types. In their opinion one character is sufficient to justify separation from the Coelenterata and from all other groups. This feature is the fact first made out by Delage, that the germ layer which corresponds to the ectoderm of other Metazoa, passes during gastrulation to the interior, where it forms the choanocytes in the walls of the ciliated chambers, while the endoderm layer becomes superficial and forms the definitive external covering. They also state that ontogeny throws no light at all upon the relationships of the group.

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A Memoir on the Palæzoic Reticulate Sponges constituting the family Dictyospongidæ. By JAMES HALL in collaboration with JOHN M. CLARKE. (Memoir II, State Museum New York, 1898 [October, 1899], pp. 350, plates I–LXX, royal 4to. A portion of this work also appeared simultaneously with the same title, in the Fifteenth Annual Report of the State Geologist for the year 1895, Vol. II, pp. 743–984, plates 1–47.)

This volume is practically a continuation of the 'Paleontology of New York,' and had its inception in 1884. In 1890, but 42 species of *Dictyospongidæ* were known, and there are now described and figured all the paleozoic representatives of the living 'glass sponges,' of which there are 128 species. "This wonderful increase is not especially a matter for congratulation, save that it serves to show the amazing diversity of these silicious sponges in late Devonian and early Carboniferous faunas." All but 6 species are American. When the fact is noted that most collections contain but few specimens of these sponges, it is a surprise to learn that 70 species alone are found in the Upper Devonic of New York and Pennsylvania. It is mainly in New York that the great fossil 'sponge plantations' occur, and these have been and continue to be worked by Mr. Edwin B. Hall of Wellsville, to whom belongs the credit of having by far the largest collection of these extinct forms. From some of the New York localities several hundred specimens of a kind have been taken, but usually a single species is found in each or this may be even restricted to one colony.

Conrad (1842), was the first to record these