

valves are dorsal and ventral, like the two parts of a cabriolet in relation to the animal within, instead of lateral (wing-like) as in Lamellibranchs. Valves joined by hinge or not; never with elastic spring. When not hinged, the valves imperforate; when hinged, one, the larger, is perforate for the transmission of an anchoring ligament, in the non-hinged the ligament passes out between the valves. The class is divided into two orders or subclasses,—the Articulate and the Inarticulate. The Articulate, of which Terebratula is type, have usually curious shelly processes developed from the inner surface of the imperforate valve for the support of the arms, and have in the adult condition no anus; the Inarticulate, of which Lingula is type, have no arm-supporting processes and have no anus."

The account given of the vertebrate skeleton, and especially of some disputed questions of homology, is not so satisfactory as most other parts of the Syllabus. It may be doubtful whether it is desirable to introduce into elementary lectures the difficult subject of the representatives of the tympanic bones in the lower vertebrata; but if so, it is quite useless for men to learn to repeat the "views" of Owen, Huxley, Peters, Parker, and Humphry, and to assign the right view to the right man, unless they are familiar with the facts of embryology, on which alone a judgment can be formed. Now, whether the incus belongs to the first visceral arch, as here stated (p. 113), or to the second, as is believed by some original observers, makes all the difference as to the correctness or incorrectness of the statements which follow. Again, whatever doubt still remains as to the homologies of the pelvis and shoulder girdle, surely no one who has read Prof. Flower's paper on the subject and his subsequent remarks in the "Osteology of the Mammalia," can accept the correspondence of the pubes with the clavicle. The former may very probably answer to a procoracoid, as Gegenbaur and other anatomists suppose, but its mode of development its position in reptiles, and its relation to the great nerves and vessels of the hind limb, are all conclusive against the homology given in p. 116, and more fully in p. 146. No reason is assigned for the query affixed to the statement (p. 171) that the elephant's placenta is deciduous and zonary, which zoologists have hitherto accepted on the testimony of more than one careful and independent observer. The statement as to the number of the cervical vertebræ in mammalia (p. 172) is not exact. No Cetacean has yet been found in which the full number cannot be distinguished, however much fused together the vertebræ may become. On the other hand, the manati has never more than six, and the same appears to be true of one species of *Cholopus* (not *Cholcepus*).

No mention is made of the order Dipnoi in the classification of fishes taken from Müller (p. 117), or again in the characters of the orders (pp. 133-135). So remarkable a form as *Lepidosiren* should not have been omitted, even if Dr. Ord accepts the conclusion which Dr. Günther has very lately stated in these columns (vol. iv. Nos. 99 and 100). The new genus *Ceratodus*, now that its anatomy has been so fully investigated, forms no doubt a very complete link between the Ganoids and the Dipnoi, and many zoologists will agree with the classification proposed in the admirable paper just referred to; but books intended for students should scarcely pursue the "latest views" so closely.

In conclusion it is only fair to repeat that these Notes

deserve commendation for their general accuracy, and contrast very favourably with some other manuals for students on the same subject. They will, if well used, be valuable to learners, and perhaps still more so to teachers.

P. H. PYE-SMITH

#### OUR BOOK SHELF

*Note-book on Practical Solid or Descriptive Geometry, containing Problems with help for Solutions.* By J. H. Edgar, M.A., Lecturer on Mechanical Drawing at the Royal School of Mines, &c., &c., and G. S. Pritchard, late Master for Descriptive Geometry, Royal Military Academy, Woolwich. (London and New York: Macmillan and Co., 1871.)

WHEN our Civil and Military Engineering Examinations are daily making larger demands for geometrical proficiency a new and exceedingly lucid Note-book on Descriptive Geometry comes well-timed. Though much has been done to expand this collateral offshoot of geometrical science since M. Monge, of the Ecole Polytechnique, first started it, the co-ordinative characteristic of a science has hitherto been wanting; it has contained, doubtlessly, all the abstract principles of orthographic projection, but principles, to be available, must be interdependent and derivative. Messrs. Edgar and Pritchard have felt this deficiency, and have done much to remove it. Their book, unlike the majority of cheap hand-books, is neither "patchy nor scrappy," but a continuous and coherent whole. "Elementary Explanations, Definitions, and Theorems" come first, followed by twenty-eight problems on "The Straight Line and Plane," to these succeed Solids, first singly, and then in "Groups and Combinations." In like logical order we next have "Solids with the inclinations of the plane of one face, and of one edge or line in that face given," and then "Solids with the inclinations of two adjacent edges given," and, lastly, in this category, "Solids with the inclinations of two adjacent faces given." So far we have the principles of projection in a much more perfectly co-ordinated arrangement than we have hitherto found them in, and we must say that the mere act of mentally assimilating this interdependence of principles would be wholesome discipline, even if it did not, as it unquestionably does, facilitate each successive step in progress, and, most of all, conduce to an integral entertainment of the subject. Again, as naturally derivable from the consideration of the inclined faces of solids, we arrive at "Sections by oblique planes," and "Developments," or the spreading out in one plane of the adjacent faces of such solids; and, finally, the development of curved surfaces. "Miscellaneous Problems" now have place, and amongst them we notice one from the "Science Examinations" of last year. The sequence of the four next chapters is judicious. "Tangent Planes," "Intersections of solids with plane surfaces," "Intersections of solids with curved surfaces," "Spherical Triangles." A short chapter on Isometric Projection (quite as long as it deserves) ends the work, the authors of which we rejoice to find (in these days of "result-seeking") much more desirous of results actual than results visible, and accordingly, foregoing a somewhat too popular profusion of diagrams, which, while it undoubtedly facilitates the bare apprehension of subject-matter, by no means enforces that comprehension of the subject which attends upon the act of accomplishing a mental diagram for ourselves. In this expression of their conviction the authors, we observe, are at one with Mr. Binns, who, with the same sincerity, and for like reason, resisted the systematic use of models in the teaching of "mechanical drawing."

Messrs. Edgar and Pritchard have produced an inexpensive, but a well-digested, comprehensive, lucid, and typographically attractive *vade mecum*.