

$\beta$  constituent, on the other hand, dissolves lead appreciably above 470° C., and hence at the temperature of hot rolling the  $\alpha + \beta$  alloys do not contain liquid lead and are not hot short.

H. C. H. CARPENTER.

PENCIL AND PEN IN SYSTEMATIC ZOOLOGY.

- (1) *Catalogue of the Amatidae and Arctiidae (Nolinae and Lithosianae) in the collection of the British Museum.* By Sir G. F. Hampson. Plates i-xli. (London: British Museum (Natural History) and Longmans, Green and Co., 1915.) Price 33s. 6d. net.
- (2) *A Revision of the Ichneumonidae based on the Collection in the British Museum (Natural History), with Descriptions of New Genera and Species. Part iv., Tribes Joppides, Banchides, and Alomyides.* By C. Morley. Pp. x + 167. (London: British Museum (Natural History) and Longmans, Green and Co., 1915.) Price 6s.
- (3) *The Syrphidae of the Ethiopian Region based on Material in the collection of the British Museum (Natural History), with descriptions of New Genera and Species.* By Prof. M. Bezzi. Pp. 146. (London: British Museum (Natural History) and Longmans, Green and Co., 1915.) Price 6s.
- (4) *British Museum (Natural History): British Antarctic ("Terra Nova") Expedition, 1910. Natural History Report. Zoology, vol. i., No. 3, Cetacea.* By D. G. Lillie. Pp. 85-124. (London: British Museum (Natural History) and Longmans, Green and Co., 1915.) Price 7s. 6d.
- (5) *Catalogue of the Fresh-Water Fishes of Africa in the British Museum (Natural History). Vol. iii.* By Dr. G. A. Boulenger. Pp. xii + 526. (London: British Museum (Natural History) and Longmans, Green and Co., 1915.) Price 2l. 5s.
- (6) *The Fauna of British India, including Ceylon and Burma. Mollusca (Fresh-water Gastropoda and Pelecypoda).* By H. B. Preston. Pp. xix + 244. (London: Taylor and Francis, 1915.) Price 10s.
- (7) *British Museum (Natural History): British Antarctic ("Terra Nova") Expedition, 1910. Natural History Report. Zoology. Vol. ii., No. 4, Mollusca. Part i., Gastropoda Prosobranchia, Scaphopoda, and Pelecypoda.* By E. A. Smith. Pp. 61-112. (London: British Museum (Natural History) and Longmans, Green and Co., 1915.) Price 4s.

MODERN researches provide a well-trained army of naturalists with an almost overwhelming supply of material. A vast literature has

to be examined to make sure that species apparently new to science have not been already described. Assistance is afforded by elaborate monographs of separate groups, such as Sir George Hampson's monumental catalogue of the Lepidoptera Phalænæ, in thirteen volumes. But there is no finality in these obliging auxiliaries, for, as usual, while Sir George's catalogue was being issued between 1898 and 1913 other workers were industriously making it incomplete, so that already the monographer has had to provide a supplement, beginning with a first volume of nearly 900 pages. Some complication in descriptive work is also unavoidable, when several independent expeditions make their way to the same goal, as within the last few years has been the case with ships visiting the antarctic region and exploring the marine fauna at stations along the route.

To meet the initial difficulties in investigation of species nothing is more time-saving to the naturalist than trustworthy illustrations of the group he is studying. Faithful colouring is in some parts of the animal kingdom an additional boon of great value. The drawback is the initial costliness of production, and, consequent upon this, prohibitive prices forcing the student in many instances to rely upon borrowed copies or occasional visits to distant libraries. During the last two centuries the extreme desirability of well-illustrated zoology has been evidently fully appreciated though very variously provided for. Among individual efforts none is more remarkable than that of the Dutch physician, Albert Seba, who in the first half of the eighteenth century must have spent a fortune over the production of his 450 large folio plates, many of which are double. Latreille in 1830 commended them as excellent, though he condemned the "Accurata Descriptio" as worthless. At the same period Cuvier and his colleagues paid the plates an extraordinary compliment by re-issuing the whole mass with a brief revision under the editorship of Guérin. Just then, also, the French Government was issuing 198 rather larger and much more refined plates, illustrating the voyage of the *Astrolabe*, to which Mr. Edgar A. Smith makes several references in his recent memoir.

As the accomplished authors whose works are mentioned at the head of this notice must all be acutely conscious of the expediency of doing unto others as they would that others should do unto them, it is interesting to compare the different ways in which they have dealt with the supply of illustration. (1) The forty-one plates of Hampson's supplementary volume are filled with delicately coloured representations seemingly of all the species recorded in the supplement which have

not been previously figured. An economy now commonly practised, and no doubt very necessary, shows the wings only of one side. This should redeem from heartless ridicule the proverbial pig with only one ear, but by depriving the moth or butterfly of its bilateral symmetry it makes it somewhat of an artistic failure. A carcinologist is apt to find variation in colour-marking very untrustworthy for specific distinction. The entomologist, on the other hand, appears to rely upon it with considerable confidence.

(2) This is further exemplified in Mr. Claude Morley's revision of the Ichneumonidæ, although, so far as illustration goes, that work is in striking contrast to the generous treatment of the Lepidoptera. For Part iv., with more than forty new species, has only a single figure. This one example, however, is furnished with the full complement of wings, antennæ, and hexopodal appendages, and is to some extent suggestive of the "remarkable grace and beauty, combining delicacy of outline with both fine and brilliant, not infrequently metallic, coloration," which Mr. Morley claims for the objects of his study. It is rather unfortunate that the plate unmistakably shows an insect in which the wings have each a brown band and brown apex, while the *Joppa nominator*, Fabricius, which it is said to represent, is described by Fabricius as having "alis omnibus fascia apiceque nigris" ("Ent. Sys.," vol. ii., p. 158, 1793). Mr. Morley reveals without explaining the discrepancy.

(3) Prof. Bezzi's work on the African Diptera of the family Syrphidæ is less abstemious in the matter of illustrations, and, besides a useful explanatory diagram, furnishes very full and important keys for the discrimination of the genera and species. Mr. C. J. Gahan's verdict may well be accepted that the present treatise "greatly advances our knowledge" of the group. There are said to be about 2300 described species, and the difficulty of dealing with them is attested by E. Brunetti, who some years ago said of the genus *Syrphus*, "this genus I do not touch upon at present in view of the large number of supposed species described from Oriental regions, and their close affinities" ("Records Ind. Mus.," vol. ii., p. 57, 1908).

(4) Passing now from the air to the water, it will be found that Mr. D. G. Lillie gives as many illustrations of the Cætacea as could be expected from his opportunities, seeing that he starts with the acknowledgment that the *Terra Nova* "did not succeed in capturing any specimens of this group." He mentions the belief of whalers that humpback whales rub themselves against rocks to get rid of the Balanid *Coronulæ*. To this

opinion there are two objections: one, that with the *Coronula* once fixed in the whale's soft skin, more irritation would probably be caused by rubbing it off than by leaving it alone; the other, that the soft-stalked Lepadid *Conchoderma* so curiously and prominently planted on the Balanid implies that the *Coronula* is a place of exceptional security.

(5) Dr. G. A. Boulenger's fine catalogue of fresh-water fishes of Africa is now continued in a third volume, with promise of a fourth. The species described are 394, and there are 351 text-figures, 45 of them species not in the British Museum collection. It is pleasant to observe that for the *Muraena anguilla* of Linnæus Dr. Boulenger accepts the name *Anguilla vulgaris*, Turton, in place of the barbarous tautology in which some authorities delight. In dealing with the Cichlidæ, which occupy three-fourths of the present volume, he is forced to admit that Nature is sometimes very ill-natured to the conscientious systematist, spoiling the best-laid schemes of classification by a very inconvenient interlacing of characters. This appearance, however, of what our distant cousins call *Schadenfreude* is not due to a pure delight in mischief, but is the simple result of that universal consanguinity in which the sincere evolutionist is bound to believe. In a synopsis of 41 genera, and a further synopsis of a genus with 94 species, there are pretty sure to be some entanglements. To lovers of odd fishes, *Psettus sebae* may be commended, with its "body deeper than long," a species figured life-size by Seba as *Chaetodon quadratus*. The mouth of *Corematodus shiranus*, Boulenger, must be useful for hygienic mastication, but disagreeable to its prey, as its massive jaws are fitted with "extremely broad bands of innumerable minute club-shaped teeth."

(6) In Mr. Preston's treatise, "wherever possible, illustrations of hitherto unfigured species have been given." The author regrets that he "can, in most instances, only deal with the shells of the species quoted," material for anatomical work not being available. But in his Introduction he is able to give several interesting bionomic notes, and for the anatomy of one species, *Mulleria dalyi*, Smith, he has a sad satisfaction in quoting largely "from the late Mr. Martin F. Woodward's invaluable Paper on the subject." In some of his references Mr. Preston leaves the student rather in the dark. Thus he cites:—"Theodoxis, de Montfort, Conch. Syst., ii., 1810, p. 350; *Neritina*, Lamarck, 1822 [*Neritine*, 1809]. Type, *T. lutetianus*, de Montfort (*fluviatilis*, Linn.)", without saying whether *Neritine* is French or Latin, or where it is to be found, and without showing that p. 350 in de Montfort is only a plate,

while the description of genus and species on p. 351 gives the authoritative spelling in the name *Theodoxus lutetianus*.

(7) The numerous new species described in Mr. E. A. Smith's treatise are illustrated in two excellent plates. Mr. Smith's mastery of the subject almost forbids criticism, but may still excuse inquiry in regard to his use of the generic names *Rissoia* and *Panope*. In the "Discovery" *Gastropoda*, 1907, he transferred without explanation his *Rissoia adarensis* to *Rissoia*. Under *Rissoia adarensis* (Smith) he now adds a note: "A synonym of *Rissoia* is *Apanthausa*, Gistel ('Naturgesch. Thierreichs,' 1848, p. x)," without explaining what is the relationship of *Apanthausa* to *Rissoia*. In 1850, Gistel in the "Handbuch der Naturgeschichte," p. 554, declares that *Rissoia* must be changed (though he does not say why) into his *Anatasia*, the date of which is given by Scudder as 1848. Neither Gistel in 1850 nor Scudder later on makes any mention of *Apanthausa*. A further perplexity is caused by Mr. Smith's change of *Panopaea zelandica*, Quoy and Gaimard, into *Panope zelandica*, without any reference to show that *Panope*, as the name of a molluscan genus, antedates its use in 1813 by Leach for a genus of Crustacea. Les "Panopes," Lamarck, Ann. du Mus. Paris, vol. x., p. 394, 1807, is a French term.

T. R. R. STEBBING.

#### CHIEFLY MONGIAN GEOMETRY.

- (1) *Descriptive Geometry for Students in Engineering Science and Architecture. A Carefully Graded Course of Instruction.* By Prof. H. F. Armstrong. Pp. vi+125. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) Price 8s. 6d. net.
- (2) *Geometry of Building Construction: Second Year Course.* By F. E. Drury. Pp. xii+226. (London: G. Routledge and Sons, Ltd., 1915.) Price 3s. net.
- (3) *Practical Science and Mathematics.* By E. J. Edwards and M. J. Tickle. Pp. viii+175. (London: G. Routledge and Sons, Ltd., 1915.) Price 1s. 6d. net.

(1) THE geometry of Monge, in which three-dimensional bodies are represented by plan and elevation, is one of the most educative branches of mathematics; and yet it is taught in this country only as a technical subject for engineering and architectural purposes. The secondary school is unaware of its existence. Hence the pleasure with which we find a Canadian writer on the subject reckoning that his book will be used in high schools. Let us hope that the good

traditions of Canada will be adopted by England. The book covers the usual ground. The problems are based on the usual conventional figures. The book is beautifully got up, the text and figures both being admirable.

(2) This book is also on Mongian geometry. In place, however, of the conventional subjects, it treats real problems of building construction throughout. It is, in fact, intended as a builder's text-book. Just on that account it forms a suitable book for any student of Mongian geometry. The propositions of the subject presented in the abstract are too difficult for the majority of students. The treatment of the propositions as inductions from concrete problems makes them much easier to grasp and to retain. This distinction is realised by the author and forms the basis of the book, as indeed it does of the whole series. The book is certain to have a wide sphere of usefulness.

(3) This book also belongs to the excellent series edited by Mr. Udney Yule. It is concise and clear, the style simple and direct. The inductive method is wisely followed, a number of particular cases being followed by a generalised statement. It is a useful book, and avoids confusing the mind by excess of abstract reasoning. There is a generous use of graphs, and the only fault we find is the failure to emphasise the fact that the "algebraic law of the relation between two quantities"  $y=ax+b$  is only one among many possibilities.

#### ELECTRICAL ENGINEERING TEXT-BOOKS.

- (1) *A Treatise on the Theory of Alternating Currents.* By Dr. A. Russell. Vol. i. Second Edition. Pp. xiv+534. (Cambridge: At the University Press, 1914.) Price 15s. net.
- (2) *Electrical Engineering.* By Dr. T. C. Baillie. Vol. i. Introductory. Pp. vii+236. (Cambridge: At the University Press, 1915.) Price 5s. net.
- (3) *Electrical Instruments in Theory and Practice.* By W. H. F. Murdoch and U. A. Oswald. Pp. viii+366. (London: Whittaker and Co., 1915.) Price 10s. 6d. net.
- (4) *Alternating-Current Electricity and its Applications to Industry.* First Course. By W. H. Timbie and Prof. H. H. Higbie. Pp. x+534. (New York: J. Wiley and Sons, Inc.; London: Chapman and Hall, Ltd., 1915.) Price 8s. 6d. net.

(1) A NEW edition of Dr. Russell's book will be welcomed both by physicists and electrical engineers, particularly by those who