

For these reasons the student of the Tunicata cannot be otherwise than grateful to the Ray Society for the publication of this work, and especially for the liberality with which it has been illustrated. The coloured figures representing many of the authors' species must rank among the best figures of ascidians extant, and the numerous collotype reproductions of Hancock's drawings of the branchial sac, &c., will greatly facilitate the task of identification.

The first volume, which we hope may soon be followed by the remainder of the work, contains (1) the authors' introduction (a historical summary of British records of Tunicata up to the year 1870), (2) a reprint of Hancock's paper "On the Anatomy and Physiology of the Tunicata" (published by the Linnean Society in 1867), and (3) an account of thirty British species referred by the authors to the genus *Ascidia*. Two of these so-called species are now described for the first time, viz. *Ascidia amoena* and *Ascidia Morei*.

It is no discredit to the memory of the distinguished authors of this monograph, whose general accuracy of observation has long been established, if we express a conviction that no modern expert in this group of marine animals will be prepared to recognise the claims of half Alder and Hancock's "species" to specific rank. It is not improbable that the thirty forms described in the monograph will be ultimately referred to some ten or twelve "good species" at most.

Excluding *Ascidia canina*, the relations of which to *Ciona intestinalis*, L., appear, strangely enough, to have been overlooked by Hancock, the remaining twenty-nine species of *Ascidia*, as described by the authors, would in these days be referred to the three genera *Phallusia* (with the single species *mamillata*), *Ascidia* and *Asciidiella* of Roule. Adopting for the moment Alder and Hancock's specific names, and confining our attention to the forms dealt with in their monograph, we may say that each of the genera *Ascidia* and *Asciidiella* includes three main types. To *Ascidia* (s. str.) belong (1) *mentula*, with which *robusta*, *rubicunda*, and *rubrotincta* are probably synonymous; (2) *mollis*, with *crassa*, *plana*, *Alderi*, and possibly *rudis*, as allies; and (3) *plebeia* (= *conchilega* of Müller), with which *producta*, *inornata*, and *depressa* are closely related or synonymous. To *Asciidiella* belong (1) *obliqua* (= *prunum* of Müller), to which the new species *amoena* appears to be related; (2) *venosa*, and (3) a large series of very variable forms referable in the main to the types *sordida* (= *virginea* of Müller), *scabra*, and *pustulosa* (= *aspersa* of Müller), of one or other of which the authors' "species" *elongata*, *aculeata*, *Morei*, *Normani*, *affinis*, *elliptica*, *pellucida*, *orbicularis*, and *vitrea* appear to be merely varieties or local forms.¹

There is probably no group of animals in which external conditions exert a greater influence upon the size, shape, and structure of the body than in the case of the ascidians, owing to their permanent

fixation under the most diverse natural conditions, their mode of feeding, and the plastic character of the test which serves them for a skeleton. Differences in the supply of food alone—and no factor is liable to greater extremes than the amount of phytoplankton in littoral waters—must influence the development of an ascidian's body in so many different ways that great variability must be the rule rather than the exception. In these circumstances it is doubtful if the natural history of this group can be adequately treated in any monograph until much additional work has been done, not only in the systematic observation of the nature and extent of local variations, but also in direct experiments concerning the effect of different conditions upon the growth of the progeny of selected parents. Until such work has been done, any attempt to define specific limits within (e.g.) the *virginea-scabra-aspersa* group must remain a mere expression of personal opinion.

In the meantime the publication of the present work is likely to lead to the clearing up of many uncertainties, provided it is regarded mainly as a repository of facts, and not as an authoritative guide to the classification or nomenclature of the group.

This aspect of the work has been fortunately retained under the editorship of Mr. Hopkinson, who has restricted his notes to the addition of such bibliographic and distributional records, published prior to 1871, as were necessary for the completion of the authors' MSS. up to the date of Hancock's latest work. The editorial footnote "on the intimate relationship existing between the Tunicata and the Polyzoa," on the first page of the authors' introduction, conveys just the right touch of archaic suggestiveness.

We notice a couple of misprints: Weigmann for Wiegmann (pp. 7 and 12), and Mongula for Molgula (p. 46); and may point out that Figs. 8 and 9 on plate xi. represent not "probably a variety of *Corella parallelogramma*," but Hancock's own species, *Corella larvæformis*, which we presume will be described in the second volume of the monograph.

W. GARSTANG.

THE METALLURGY OF IRON AND STEEL.

Elementary Practical Metallurgy, Iron and Steel. By Percy Longmuir. Pp. xiii+270+13 plates. (London: Longmans, Green and Co.) Price 5s. net.

WORKS on practical metallurgy have generally consisted of descriptions of series of experiments suitable for performance in an ordinary laboratory possessing the usual equipment with small assay furnaces; but this book is an elementary work on the metallurgy of iron and steel, written with the view not only of serving the needs of the ordinary beginner among students, but of attracting the severely practical man to the study of metallurgical literature, and thus helping him ultimately to the position of being able to throw the light of new discoveries on his daily work, and to make application of suitable results—evidently a practical apostle of the methods of the British Science Guild. The writer thoroughly agrees

¹ For a fuller discussion of the relations of particular species special reference should be made to Prof. Herdman's paper in *Jour. Linn. Soc.*, xxiv., 1893, and Hartmeyer's "Holosome Ascidien" in "Meeresfauna von Bergen," 1901.

with the author that "Such a work should not be overloaded with detail, but the facts presented should be accurate and the matter reliable," for nothing more certainly repels the very specially practical man than a mass of finical hedgings, which are only fit for discussion among philosophers, but do not affect the main present issues. While this is so, looseness of expression is the last thing to permit oneself, as no type of man more appreciates accurate statements if they are simply expressed. While the author has in the main succeeded in his ideal, there are some points which the writer would change. Thus, p. 7, "Elasticity . . . is the length to which . . ." Similarly, tenacity, breaking load, ductility, and ductility as applied to wire-drawing are not satisfactory. Interesting and simply written chapters on refractories, iron ores, and the blast furnace follow. The author's wide practical experience in foundries lends a special interest to his chapters (vi. to ix.) on pig- and cast-irons, for in the works he was daily brought into contact with the adjustment of those properties of cast-iron to the fulfilment of the orders on hand, and this may account for his almost bitter treatment of the enemy, sulphur, which is perhaps not quite so black as he has painted it.

These chapters should also show why there is such a fascination in the study of this complicated material. Next comes a good chapter on malleable cast-iron, but a statement on p. 128 is a little confusing. British malleables are said to contain something like 0.3 per cent. S, which agrees with the writer's experience. Then it is stated that grey hæmatite refined is used, but this would really contain less than 0.1 per cent. S. The fact seems to be that a material called refined hæmatite, but really white hæmatite re-cast into small pigs, is used, and the old refined grey pig is not obtainable on the open market.

In comparing the Siemens and Bessemer processes, the important point of the much smaller percentage of loss in the open-hearth seems to have been omitted. The crucible, Bessemer, and open-hearth processes are described in considerable detail, and p. 227, on the production of sound steel, is excellent, while it was only to be expected from the author's researches that the influence of casting temperature would be adequately dealt with. Chapters xviii. and xix., on the metallography of the heat treatment of steel and of hardened steels, are profusely illustrated, and deal with the subject from the carbonist's point of view, with the intimation that there are other theories, a wise decision, as whichever of the many theories may prove to be the correct one, that given is the easiest to understand, and the reader may search out the others if so minded. The author, in using for illustration microsections of articles he has used, such as hack-saw, table-blade, razor, and file, sets the seal on his desire to attract the practical man, and if on examining similar tools he should find different structure it ought to stimulate inquiry. The final chapter on special steels, while good in itself, will impress on the reader that there is much—very much—more beyond. The work, which is printed on matte surface paper, most agreeable to the eye, with

thirty-one of its sixty-four illustrations printed on smooth paper to bring out the required detail, can be recommended to the beginner as a "book which will primarily awaken interest."

A. McWILLIAM.

OUR BOOK SHELF.

Glue, Gelatine, and their Allied Products. By Thomas Lambert. Pp. xii+153. (London: Chas. Griffin and Co., Ltd., 1905.) Price 5s. net.

THIS is a handbook intended for the use of glue manufacturers, agriculturists, and students of technology. It describes the preparation and properties of glue and gelatin, and also of certain side-products, such as size, cements, and fertilisers. The description is written chiefly from the practical standpoint, though some notes on the chemistry of the products are included. Diagrams of plant and machinery illustrate the working of the various processes mentioned in the text.

While the book contains much trustworthy information, there is some confusion in its arrangement. Thus the first chapter purports to be "historical," but it deals principally with matters quite other than historical; as, for example, "chondrin and its properties," "railway accommodation," "water supply," and so on. Moreover, it would, we think, have been better if the author had written either specifically for manufacturers or specifically for the manufacturing chemist, instead of addressing himself sometimes to the one and sometimes to the other. The manufacturer, for instance, hardly wants a detailed description of Kjeldahl's method of determining nitrogen; on the other hand, the chemist might well be spared the statement that "all crops contain certain mineral matters in their ashes."

The book would form a good nucleus for better things. With some re-arrangement of its subject-matter, and a less superficial treatment of the chemistry involved, it might develop into an excellent manual of the technology of glue and gelatin.

C. S.

Webbia-Raccolta di Scritti Botanici pubblicati in occasione del 50° anniversario della Morte di Filippo Barker Webb. Edited by Prof. U. Martelli. Pp. xi+393. (Florence: S. Pellas, 1905.)

PHILIP BARKER WEBB, in whose honour this volume has been compiled, lived in the first half of last century; during his career at Oxford he developed a taste for the classics and natural history which a substantial patrimony allowed him to cultivate. In the course of his travels he visited Spain, Portugal, the Canary Islands, and other countries, combining botany and geology with pleasure. He resided generally in Paris during the intervals between his journeys, and there he directed and carried out the work in connection with the "Phytographia Canariensis"; also he accumulated a large herbarium, including several French collections. At his death his botanical treasures were lost to France, as he bequeathed all his plants and books, together with a sum of money for their maintenance, to the Grand Duke of Tuscany.

This volume contains a number of original papers that have been contributed by Italian botanists as a token of gratitude for the stimulus which these collections have given to Italian botany. Most of the papers are concerned with systematic botany. Prof. O. Beccari, writing about palms, contributes an account of the Indian genus *Trachycarpus*, allied to *Chamærops*; a list of species from New Guinea, in-