

ought to be. In describing the tests for barium it is said that the bead "can be flamed," but no explanation is given of the process of flaming. The capital test for bismuth with potassium iodide and sulphur is entirely ignored.

I now come to the third part, which treats of quantitative assays. Mr. Attwood's plan of making a check assay in every case with a small quantity of the pure metal is certainly calculated to give the operator confidence in his results. The author adopts $1\frac{1}{2}$ grain as the amount of ore to be taken for an assay. I think he would have done better to have followed Plattner and used the French weights, because there is less chance of making errors where each milligramme means 1 per cent.

For the silver assay Mr. Attwood employs pieces of ordinary charcoal instead of the far more convenient and portable charcoal crucibles designed by Plattner. He also describes a crucible assay for silver ores, which does not appear to possess any advantage over Plattner's scorification method.

There is one most unfortunate error in the book to which I feel bound to call attention. Mr. Attwood gives some tables for calculating the number of ounces of gold or silver per ton from the results of assays of $1\frac{1}{2}$ grain of the ore. In an unlucky moment he forgot that gold and silver are weighed by troy weight, and calculated his tables for *avoirdupois* ounces. The consequence is that these tables are not only valueless, but also highly misleading. Let us take one case as an example. Suppose that $1\frac{1}{2}$ grain of ore had yielded 0.01 grain of fine metal. We look down the table (p. 117), and find, according to Mr. Attwood, that the yield would be 238.93 oz. per ton; in reality the yield should be 217.77 oz.

Some neat little retorts have been designed by the author for distilling ores of mercury and amalgam, but he does not mention Küstel's assay.

On coming to the tin assay we have the peculiar statement that silica may be separated from tin ore by boiling it with hydrochloric acid. "The assay being finely powdered, the silica is dissolved." "The dissolved silica is decanted off" (p. 158). Cornish mine agents will be surprised when they are told that, in order to obtain correct results, it is necessary to wash or van as much as 5 lbs. of an ordinary tin ore (p. 159).

Under the head of nickel no mention is made of the valuable ores from New Caledonia.

Small mistakes are numerous. The size of a box is said to be "twelve inches square" (p. 3); we note also: "a most useful addenda" (p. 24); "chloride of ammonia" (p. 33); "manganite" instead of manganate (p. 53), and permanganate (p. 54). The term "raw iron" is used frequently instead of "pig iron," and shows that the author has copied Cornwall's translation blindly. Coal, anthracite, and graphite are said to "volatilise" when heated in the platinum spoon (p. 82). Sieves are made with 2000 holes per "linear" inch (pp. 100 and 137). In the description of cupellation (p. 106) we read: "The lead parts with portions of its oxygen to the copper and other base metals."

In conclusion I think that the value of the book would be increased if a list of *errata et corrigenda* were inserted, correcting some of the errors which, I regret to say, impair its general usefulness. C. LE NEVE FOSTER

OUR BOOK SHELF

Über die von den Trichopterenlarven der Provinz Santa Catharina verfertigten Gehäuse. Von Dr. Fritz Müller. *Archivos de Museu national.* Vol. iii. pp. 99-134, and 209-214. Rio de Janeiro, 1880. (Aus dem Portugiesischen übersetzt von dem Bruder des Verfassers, Dr. Hermann Müller in Lippstadt.)

DR. FRITZ MÜLLER has for some years been engaged upon an investigation of the habits of the Caddis-flies of Santa Catharina, and has shown extraordinary skill in breeding these insects, a matter always difficult, and especially in the case of those that inhabit running water. The results of his researches were foreshadowed in various notes published in the *Zoologischer Anzeiger* and in the *Transactions of the Entomological Society of London* for 1879. But it was well known that the extended information and figures would be given in the Rio de Janeiro *Archivos*. As this publication is somewhat difficult to obtain, and as most of us are not familiar with Portuguese, Dr. Hermann Müller has conferred a great boon by publishing a translation of the paper (accompanied by the two folded plates) in the *Zeitschrift für wissenschaftliche Zoologie* for the present year (pp. 47-87, plates iv. and v.). It is needless to state that the details are of the greatest interest, and we have here the most important contribution to the natural history of *Trichoptera* that has appeared since the publication of Pictet's "Recherches" on the species of Geneva, and worked out in a far superior manner. We cannot here even allude to most of the many marvels of insect-architecture and habits that Dr. Fritz Müller has revealed. Some of the most interesting are the numerous forms of *Helicopsyche*, which build little sand-cases so like shells that they have been described as such; those *Dentalium*-like cases, originally noticed by Aug. St. Hilaire as *Grammicha*, which name our author retains; those instances of parasitism (or worse) in which a larva of one species dispossesses that of another of its house and converts it to its own purposes; those very numerous forms of *Hydroptilida*, the most minute of all *Trichoptera*, with cases of the most varied and wonderful structure; above all, that most interesting fact that the rain-water which collects at the bases of the leaves of some *Bromeliaceæ* has a special fauna of its own, including at least one Caddis-worm. The descriptions of these and many others will be read with delight by every biological student; and we hope Dr. Müller will follow up the paper by records of further discoveries, for here, as in all his works, the evidences of superior powers of observation strike one on every page.

The plates are excellent, and aid much in a realisation of the descriptive portion. Dr. Müller's artistic powers are so marked that we cannot but regret he has not furnished details of the form and structure of the perfect insects also, which would have greatly aided systematists; in fact the perfect insects are only alluded to in a casual manner.

Voyages of the Elizabethan Seamen to America. Thirteen Original Narratives from the Collection of Hakluyt, Selected and Edited, with Historical Notices, by E. J. Payne, M.A. (London: De La Rue and Co., 1880.)

WE do not quite understand Mr. Payne's reason for publishing this selection from Hakluyt's classical collection of voyages. The selection is, however, judicious, and cannot fail to be interesting, and at the same time instructive, to those who desire to become familiar with the first beginnings of English conquest in America. Mr. Payne's familiarity with the subject of British colonisation, as exemplified in his excellent little "History of European Colonies," specially qualifies him for making such a selection as the present. His brief Historical Introduction enables the reader to understand the special significance of the voyages contained in this volume. He