

worthy of the name, and the wealth of fresh material that the author has collected from far and near. Among the interesting plates, we may refer to those illustrating symbiosis, protective coloration, wild geese, the courtship of capercaillie and blackcock, cave animals, and phosphorescence.

As we pass from this valuable treasury of bionomics, many reflections rise. We recognise the impossibility of understanding details of structure apart from details of environment—a commonplace, of course, but illumined by some of the subtle instances that Doflein gives. We appreciate the light that the manifold inter-relatedness of organisms throws on the value of even small variations. The selective process has to be envisaged in relation to the web of life. We realise afresh the importance of the organism's active agency. It is modified by its environment and it is adapted to its environment; but there is more, it actually adapts the environment to itself. And, finally, we are filled once more with wonderment at the vision of life slowly creeping upwards through unthinkable ages, asserting itself insurgently amid a callous physical nature. All that the author of this fine work has told us confirms the impression of a deep tendency to inter-linking and systematisation—the Darwinian *systema naturae*—which is more than a mere image of what obtains increasingly, in spite of all rendings of the web, in the progress of mankind.

J. ARTHUR THOMSON.

ASSAYING AT THE ROYAL SCHOOL OF MINES.

Assaying in Theory and Practice. By E. A. Wraight. Pp. xi+323. (London: Edward Arnold, 1914.) Price 10s. 6d. net.

THIS book will be welcomed by all assayers who appreciate the value of the teaching at the Royal School of Mines, and is of special interest to old students of the School, for the reason that it gives an account of the methods of assaying which have been taught there during the last few years. Almost all the notes issued to the students in the laboratory are contained in the book, and, in addition, besides other matter, the author gives some general remarks which will be of use to mine assayers and prospectors. Mr. Wraight is well equipped for the task of reminding his former students of what he has taught them. He was for some years the senior demonstrator in the assay laboratory of the Royal School of Mines, and in that capacity has been able to command the attention and affectionate respect of all who have come under his guidance.

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His work has only recently passed into other hands.

Mr. Wraight has made no attempt to write a complete book on assaying. The number of methods given is comparatively small and the gaps are considerable. For example, no mention is made of the volumetric methods of assay of silver bullion, or of the dry method for antimony, or of any method at all for platinum. The author observes that he has some thoughts of preparing a second volume containing analyses of ores, slags, etc., and of iron and steel. It may be hoped that he will include in it much besides these important sections.

As might be expected by those who know the author's work, there are few mistakes to be found in the book, and none of much importance. The method of determining silver in gold bullion given on p. 153 is an untrustworthy one, which is becoming obsolete. The method of parting with cadmium is not given. On p. 182 it is stated that graphite is not attacked by basic oxides. On p. 297, in the estimation of protective alkali in cyanide solutions, a decinormal solution of nitric acid is recommended instead of the usual oxalic acid or the fairly satisfactory sulphuric acid. The book certainly deserves a place on the shelf of works assayers. As a concise and clear statement of well-tried methods, it could scarcely be improved.

T. K. R.

JAPANESE MATHEMATICS.

A History of Japanese Mathematics. By D. E. Smith and Yoshio Mikami. Pp. vii+288. (Chicago and London: The Open Court Publishing Co., 1914.) Price 12s. net.

NOW that Europeans are becoming acquainted with the history of mathematics in Japan, it is possible for them to form a kind of general opinion about the work of Japanese mathematicians. Unless future research bring to light works of a calibre superior to those now known, we must acquiesce in the conclusions stated in the terminal pages of the present work. Briefly, they are that Japan has not originated any great and far-reaching theory, such as the infinitesimal calculus, or function-theory, or group-theory; while on the other hand, native methods of great ingenuity, applied to particular problems, did lead to equivalents for such things as Horner's method in solving equations, the general rule for computing a determinant, and a large number of ways of calculating π , some including the use of infinite series.

Another thing in which the older Japanese mathematicians excel is in dealing with a set of