

(2) *Elementary Calculus*. By C. H. P. Mayo. (With answers.) Pp. xx+345+xxxix. (London: Rivingtons, 1919.) Price 10s.

(3) *Mensuration for Marine and Mechanical Engineers*. (Second and First Class Board of Trade Examinations.) By John W. Angles. Pp. xxvii+162. (London: Longmans, Green, and Co., 1919.) Price 5s. net.

(4) *School Mechanics. Part 1. School Statics*. By W. G. Borchardt. (Without answers.) Pp. viii+266. (London: Rivingtons, 1919.) Price 6s.

(1) **T**HIS text-book by three American authors is best described as an elementary mathematical *mélange*. It ranges over a variety of topics, but does not deal explicitly with the calculus, though the fundamental process of the latter is used. Great pains have obviously been expended on the compilation, but it can scarcely be described as an inspiring volume, and is not likely to find favour in British schools and colleges. The authors state in the preface that they desire to emphasise the fact that mathematics cannot be artificially divided into compartments with separate labels, and that they aim at showing the essential unity, harmony, and interplay between the two great fields into which mathematics may properly be divided—namely, analysis and geometry. It is to be feared that those who are to become competent mathematicians must continue to study the subject in compartments, carrying on, of course, several sections simultaneously, leaving familiarity and time to show the inter-relationship. None but the finished scholar can fully appreciate and realise the inter-twining of the branches. Only those who reach the hill-tops see the harmony of the landscape and the trend of the watercourses. There are several interesting diagrams and historical references, and also a number of good examples. The volume is well got up and printed.

(2) Mr. Mayo's well-printed and finished book is meant for beginners, for general use in schools, to be within the capacity of the average boy, and also to meet the first requirements of those who intend to specialise in mathematics. That the book will realise all these aspirations is unlikely. So early as p. 6 it presents the beginner with the expression $\lim_{x \rightarrow 1} \frac{x^2 - 1}{x - 1} = 2$, and discusses arith-

metical approximations and negligible quantities. The introduction to the subject is of that kind which always leaves the student with the uneasy feeling that the calculus is not quite all right, and gives results just a little out. It is the belief and experience of the reviewer that the opening pedagogics of the calculus must be simple and not over-refined. The easy processes of finding the

gradients of chords of curves of the system $y = x^n$ and of deducing therefrom the gradients of the tangents are about all that the average boy can grapple with for a considerable time. The notation can be explained concurrently, and a few easy steps lead on to simple integration and easy applications. Geometry and intuition must be relied on to give the start. The philosophy of the limit is beyond the ordinary pupil. From the school point of view the book covers a fairly wide range, including triple integrals, singular points, partial differentiation, and differential equations. There are many good examples in it, derived from geometry, physics, mechanics, etc., all likely to stimulate a smart boy. In fact, it will probably succeed much better as a second than as a first course.

(3) This is a book on mensuration intended for the use of engineering students of various kinds, as, for example, marine engineers preparing for the First and Second Class Board of Trade Examinations and for the Extra First Class Examination. It deals in a thorough way with the ordinary elementary areas and volumes, such as those of the rectangle, circle, ellipse, sphere, cone, and cuboid, refers to the planimeter, explains Simpson's Rule, and discusses valves, specific gravity, flow of water, etc. It includes also some calculus and the theorems of Pappus. There is an abundance of good examples in the book, both worked and to be worked, so that any student who goes through it conscientiously should conclude his examinations successfully.

(4) Mr. Borchardt's book is part 1 of a *School Mechanics*, and deals with statics. It is intended for the use of pupils preparing for the higher mathematics, for entrance to Woolwich and Sandhurst, and for the Senior Cambridge Local Examination. The matter is arranged under the following heads, according to the sequence given: the lever, the parallelogram of forces, friction, work and machines, centres of gravity, couples, and general equilibrium. Then follow laboratory problems and test papers. There are plenty of illustrative examples in the text, and a copious supply for the exercise of the student, mostly of a numerical type. If the treatment of the subject presents no fresh or original features, the book is one which can safely be used. J. M.

Our Bookshelf.

The Romantic Roussillon: In the French Pyrenees.

By Isabel Savory. Pp. xii+214+xxvi plates by M. Landseer Mackenzie. (London: T. Fisher Unwin, Ltd., 1919.) Price 25s. net.

THE author of this excellently printed work will not mind our saying at the outset that one of its chief charms is the series of pencil drawings by

M. Landseer Mackenzie. In architecture they give exactly what the trained eye would have us see; in landscape, as in "The Harbour at Callioure," an exquisite sense of atmosphere is conveyed—and, unfortunately, this is the only landscape in the book. The travellers had no high aim in art, history, or geography. They went to this inlet of the eastern Pyrenees because it appeared romantic at a distance. They found it less romantic, but full of charm, the charm that is rarely absent in provincial France. They wandered on foot, and made a spirited ascent of Canigou; but their real interest lay in the old-world villages, the hospitable reception at inns that treat the visitor as a friend, and the general air of remoteness in a land where Catalan is common speech. In history the Roussillon has had no special voice as to whether it should belong to France or Spain. To-day it may well be proud that its lot has lain with France. Was not Marshal Joffre, *le grand-père*, born at Rivesaltes; where the wind blows in across a great lagoon upon the frontier, a relic of the Pliocene sea that once stretched up among the hills? From Roussillon also came Commandant Raynal, the hero of the Fort de Vaux at Verdun, and many a stout defender of the northern lines.

The author, however, is not concerned with such modernities. We gather that her pleasant pilgrimage was made before the war turned all minds to other fields in France; but now the land lies once more open to adventure, and conditions of travel, as we are assured by high authority, are already settling down on their old attractive lines. Naturalists are also artists, and they may well practise their art among the eastern spurs of the Pyrenees.

G. A. J. C.

The Journal of the Institute of Metals. Vol. xxii. No. 2. 1919. Edited by G. Shaw Scott. Pp. xii + 428 + 31 plates. (London: The Institute of Metals, 1919.) Price 31s. 6d. net.

THE new volume of this journal opens with a report of the May lecture delivered by Prof. Soddy dealing with the subject of radio-activity. The remainder consists of the papers read at the Sheffield meeting of the institute. Of these the most discussed was one by Dr. Hatfield and Capt. Thirkell on season-cracking, in which a different view is taken from that recently put forward by Rosenhain and Archbutt, and experiments are made to determine the intensity of the internal stress in the case of cold-worked brass. The conclusion is drawn that such stresses approach very closely to the maximum stress which the material is capable of resisting. The mercury salt method has been found very useful for revealing the presence of internal stress. Some very remarkable alloys are described by Dr. Stead. Alloys of tin, antimony, and arsenic, within certain limits of composition, have the habit of forming spherical segments of striking regularity. Dr. L. J. Spencer gives a summary of the information as to the occurrence of strongly curved crystals

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in minerals, but no satisfactory explanation has yet been given of the conditions under which such curved growth takes place.

The second report to the Beilby Committee on the solidification of metals describes the isolation of crystal grains from certain metals, and a comparison of their form with that of foam cells, the facts pointing to the importance of the share taken by surface tension in determining the grain boundaries. The remaining papers deal with the early history of electro-plating, the properties of standard silver, and the structure of bearing metal, Britannia metal, nickel silver, and duralumin, and the characteristics of moulding sands for non-ferrous work.

C. H. D.

Applied Botany. By G. S. M. Ellis. Pp. viii + 248. (London: Hodder and Stoughton, 1919.) Price 4s. 6d. net.

THIS book is one of a "New Teaching Series" of which the publishers state: "The Series has been written by Teachers possessing valuable practical experience and gifted with the inspiration of the hour's occasion." The "secrets of plant life" are said to be "the substance of this extraordinarily interesting volume." On p. 84 the author informs us that "clover is liable to clover-sickness. Turnips suffer from the finger-and-toe disease. These diseases are caused by bacteria"; and later we learn that Desmids and Conjugate Plants are without chlorophyll. Treating of the enemies of plants, the author writes: "Bacteria turn the living tissue to a slimy and often smelling pulp. The effect is very similar to decay." The problems of potato blight have apparently been solved, for we are told that the hyphae "penetrate the stem and reach the tubers," and "during the winter resting spores of the fungus remain in the ground and attack the next season's crop." Wart disease is a simple matter, infected soil merely being "treated with sulphur and gas lime." Potato-leaf curl is still due to *Macrosorium solani*, and winter rot to *Nectria solani*.

These are but a few of the "secrets of plant life" which are "the substance of this extraordinarily interesting volume." In addition, however, there are many sentences such as the following: "Free-swimming plants, like Chlamydomonas, must have water in which to swim"; and it is with a sorrowful interest that we read: "Very attractive and useful work may be done by studying the development of fruit, and how the seed is in the end successfully disseminated. The student who undertakes this kind of inquiry becomes at last a worthy biologist." The rest of us must learn to bear our cross with resignation.

W. B. BRIERLEY.

Rückläufige Differenzierung und Entwicklung. By Adolf Cohen-Kysper. Pp. 85. (Leipzig: Johann Ambrosius Barth, 1918.) Price 3 marks.

This book is a further attempt to reduce all life phenomena to mechanical principles. It announces an "ontogenetic law" worded as follows: "The part returns to a phase from which the whole is developed anew."