

Électriques de Charleroi, more commonly known as the A.C.E.C., and he is also professor of hydraulics at the University of Charleroi: two outstanding qualifications which should admirably equip him for the preparation of a manual of sound practical value.

The translator's preface claims that Prof. Defeld has made a life-study of the problems connected with centrifugal pumps. So much, indeed, may be readily conceded, and the volume is welcome as the contribution of an acknowledged expert. It is received as a standard work in Belgian universities. At the same time, without being unduly captious, perhaps we may be permitted to suggest that, as a treatise, the treatment is somewhat uneven and the style concise to the point of abruptness. The book, in fact, may not inaptly be described as a specialised note-book, better suited for reference purposes to the expert and advanced student than for guidance to the beginner, despite the fact that the leading principles of the subject are demonstrated, though somewhat summarily, in the early chapters. As might be expected (though the feature has obvious drawbacks), the illustrations, which are very profuse and not free from redundancy, are chiefly drawn from the products and installations of the A.C.E.C. The translator has provided what seems to be a very satisfactory rendering, and the publishers have produced an attractive volume.

B. C.

*Grundlagen der Analysis (das Rechnen mit ganzen, rationalen, irrationalen, komplexen Zahlen): Ergänzung zu den Lehrbüchern der Differential- und Integralrechnung.* Von Prof. Edmund Landau. Pp. xiv + 134. (Leipzig: Akademische Verlagsgesellschaft m.b.H., 1930.) 9-80 gold marks.

MANY books on analysis have an introductory chapter on the elementary theory of number, but it is rarely sufficiently detailed to provide a complete logical account based on a few clearly stated axioms. The present work by the eminent professor of mathematics at the University of Göttingen occupies a unique position in so far as it aims at giving a rigorous and complete deduction of the properties of numbers, up to and including complex numbers, from the five axioms of Peano, and that, too, by elementary methods, such as a student should be able to understand at an early stage of his university course.

There are five chapters, dealing in succession with natural numbers, fractions, sections (*Schnitte*), real numbers, and complex numbers. Each chapter gives, in strictly logical order, the definitions and propositions requisite for the proofs of the theorems concerning the application of the fundamental arithmetical operations of ordering, addition, and multiplication to the numbers with which it is concerned. The last chapter, in addition, gives the definitions and theorems relating to subtraction and division and to sums, products, and powers of complex numbers. The book undoubtedly fills a gap in the list of mathematical books, and should prove exceedingly useful to every reader who feels the need of a clear and rigorous foundation for mathematical analysis.

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*Systematic Crystallography: an Essay on Crystal Description, Classification and Identification.* By T. V. Barker. Pp. xi + 115. (London: Thomas Murby and Co., 1930.) 7s. 6d. net.

It is clearly desirable, whether one looks forward to the use of goniometric methods as an everyday means of identification or not, that a research worker in one laboratory should issue the results of his study in exactly the same form as an independent worker in another. But in the anorthic system, the odds against an identical treatment, even in relatively simple cases, are at least fifty to one. Yet it requires only a little care in the choice of the simplest possible indices, aided by a few rules and conventions no more unreasonable or difficult to remember than the convention that the axial angle  $\beta$  of a monoclinic crystal is the obtuse angle, and the odds may be reversed. The necessary rules, and the method of their application, Dr. Barker has set forth clearly. Once given the uniformity of description which would be consequent on a universal adoption of this system, the preparation of determinative tables of crystals, classified by their angles and symmetry, is relatively simple, and a specimen of such a table is given, covering some hundred substances. That such tables are of practical value is shown by Dr. Barker's successful identification of nine substances chosen from this hundred, by their aid alone. It is perhaps not too much to suggest that it is the duty of every crystallographer to study and adopt the proposed conventions—or to put forward better ones instead.

*Air Ministry: Meteorological Office. British Rainfall 1929: the Sixty-ninth Annual Volume of the British Rainfall Organization. Report on the Distribution of Rain in Space and Time over the British Isles during the Year 1929, as recorded by over 5000 Observers in Great Britain and Ireland.* (M.O. 325.) Issued by the Authority of the Meteorological Committee. Pp. xix + 298 + 4 plates. (London: H.M. Stationery Office, 1930.) 15s. net.

THIS volume, the sixty-ninth of a valuable series, gives a full account of the rainfall of the year 1929 on the basis of records from 5180 stations. It includes maps, tables, and descriptive matter showing the distribution of rainfall each month and for the whole year and its relation to the average, together with studies of heavy falls of rain on particular days, of the number of days with rain, and of well-marked spells of wet and dry weather during the year. There are also records of evaporation and of percolation through the soil.

The period from January to September was drier than any similar period in the last sixty years; but that from October to December was the wettest on record for the period. In fact, an enormous quantity of rain fell during this period in the south-west of England and South Wales.

A short article at the end of the volume deals with the rainfall of Pembrokeshire, and there is another special article on the shielding of rain-gauges.