SCIENTIFIC BOOKS

Numerical Mathematical Analysis. By JAMES B. SCARBOROUGH, Ph.D. xiv + 416 pp. Johns Hopkins Press, Oxford University Press, 1930.

THE following statement in the preface characterizes the treatment of the subject almost perfectly: "The treatment of all topics has been made as elementary as was consistent with soundness, and in some instances the explanations may seem unnecessarily detailed. For such detailed explanations no apology is offered, as the book is meant to be understood with a minimum of effort on the part of the reader." Owing to this character the book will have friends who love it for its simplicity and lack of obscurities, and will hardly be useful to those who prefer to do some independent mathematical exploring.

The arrangement of the material is that of a textbook, with numerous completely treated examples in the text and problems for exercise at the end of each chapter. These examples and problems show a remarkable and pleasant versatility.

The subject of interpolation, numerical differentiation and solution of differential equations occupies over one half of the book. The formulas are all derived with elementary algebraical processes without any use of symbolic operators. It is especially in this part of the book that a somewhat higher mathematical standpoint would have saved pages of tedious elimination and would have brought out the mathematical beauty of the subject. Very illuminating are the discussions and examples pointing out the limitations of the formulas and processes. This part of the treatment probably surpasses that in any other existing treatise.

The other chapters deal with numerical methods of solving algebraical and transcendental equations, the theory of errors, empirical formulas and harmonic analysis.

In Article 106 the author objects to the frequently used method for computing the probable error of the result of the combination of different sets of measurements of the same quantity of which the probable errors are given. In the discussion he does not mention the circumstance that usually each set is affected by systematic errors of some kind which were not eliminated, so that the internal probable errors of each set are not a satisfactory indication of the accuracy of the result. This fact justifies and almost necessitates the usual practice of using the deviations of each set from the final result for the determination of the probable error.

The chapter on harmonic analysis deals exclusively with the cases of 12 and 24 ordinates. The efficiency of complete computation schemes which reduce the analysis to mechanical application of simple operations is not too strongly emphasized. In common with other presentations of this subject this chapter has the defect of not mentioning the use of a scheme for synthesis, and of not dealing with the case that arises most frequently; namely, the one in which only two or at most three harmonics are of interest, even though the number of data is much greater than twice the number of harmonics.

The book is beautifully printed; very few typographical errors were noticed.

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The Organization of Knowledge and the System of the Sciences. By HENRY EVELYN BLISS, with an introduction by John Dewey. Henry Holt & Co., New York, 1929. $5.00.

THE reviewer was taught in his youth that science was organized knowledge of whatever kind. According to this definition, the book under review is thoroughly scientific. It is an instance of what can be done in the way of converting into a useful volume of reference what otherwise might have been an unreadable wilderness. The reviewer has attempted to read more than one treatise which might have profited by this good example.

The author, as a librarian, has had to do with the organization of knowledge of many kinds, as contained in books and deposited in libraries. In order to make this deposit available without undue loss of time, classification is necessary. It appears that in attempting to extend and improve this classification the author reached a limit set by the lack of a scientific classification in the various branches of knowledge themselves. The librarian is thus led to magnify his office and, like Lord Bacon, to take all learning for his province.

As instances of the breadth of the field into which the author's quest has led him, we may mention his discussion of the national and international organization of scientific men, of social, political and economic organizations, and their intellectual cooperation.

Not the least interesting feature of the book is the author's review of attempts to classify and systematize knowledge from Plato and Aristotle to Comte, Spencer and Wundt. An excellent bibliography with comments and summaries is given.

The work as a whole may be heartily recommended to those who are (or should be) interested in the relations of their own field of knowledge to the fields of others.

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