Review
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In the chapter on Calculus the usual topics (up to volumes of revolution) are treated, for powers of $x$ only. Most of this section seems to be adequate, but it is a pity that it should be tacitly assumed, without precise statement, that the derivative of the sum of several functions is the sum of their derivative and that the derivative of a constant is zero.

Amongst smaller points the following may be noted. A wrong formula is given for the sum of a geometric progression and the symbolism " $n \to \infty$ " is introduced without any explanation. In the section on series the result for $\sum_1^n r^2$ is given, with the note that a proof appears in Ex. 21 e. This seems to be a false clue, as is also the hint given for the summation of $1^2 + 3^2 + 5^2 + \ldots$ in this exercise. A similar flaw occurs later where the discussion of maxima and minima introduces the $d^2y/dx^2$ rule, a proof being promised in Ex. 26 d (which should read Ex. 26 e). The section on integration introduces the symbol $\int$ but no reference is made to the connection of integration with summation.

The printing and arrangement throughout are excellent and there is no shortage of examples. G. L. P.

**Examples on Practical Mathematics.** Third Year (Senior Course) for technical colleges. By L. Turner. Pp. 112. 2s. 1937. (Arnold)

This is the third of Mr. Turner's excellent collections of examples for students taking practical mathematics in technical colleges; this collection is intended for the year in which they sit for the ordinary national certificate examination. The type and variety of the examples could hardly be improved. I do feel, however, that the proportion of fifty pages on the calculus to twenty-four on algebra and trigonometry (of which three are on complex numbers and four are revision of the second year) presumes a standard which is a good deal higher than the average throughout the country. The same tendency was noticeable in the first two volumes but it is more pronounced in this one and the student is expected to acquire in this course a better working knowledge of the calculus than the university Intermediate student who has a far better knowledge of fundamentals. The introduction, in the second volume, of graphical examples leading to the calculus was a sound step but it should have been accompanied by the postponement of some algebra and trigonometry to the third year. This would have avoided overcrowding the second year and necessitated cutting down the calculus in the third year, but surely it is sufficient in this year if the student masters the differentiation and integration of powers of $x$, $\sin x$ and $\cos x$ and their applications.

At the end of the book there are three test papers of national certificate standard, a complete set of answers to all the examples including the test papers, and eight useful pages of mathematical formulae.

H. V. Lowry.

**Continued Fractions*.** (In Russian.) By A. Y. Khinchin. Pp. 104. 1936. Roubles 1.30. (Moscow)

Modern Russian textbooks on mathematics for secondary as well as those for high schools ignore almost completely all the questions which belong to the theory of continued fractions. Meanwhile the apparatus of these fractions, being one of the most powerful tools in many branches of mathematics (in the theory of numbers, the theory of probability, theoretical mechanics and cal-

* The Editor is indebted to Mr. Highdooc for offering this account of a modern Russian treatise on mathematics in the hope that it may interest those readers of the *Gazette* who would like to know something of the progress of mathematics in the U.S.S.R.

culus), should be mastered by every student intending to specialise in any of those branches.

The present monograph, which has been written in a masterly way by Dr. A. Y. Khinchin, a well-known professor in the Moscow University, is devoted to fill up the mentioned gap in Russian mathematical literature.

The book is divided into three chapters. The first chapter deals with the formal structure of the algorithm of continued fractions—that is, with such of their properties which do not depend on the assumption that the elements of fraction are integers. This anticipated discussion of all the formal points enables the author to treat further the essentially arithmetical part of the subject without making any digression because of formal considerations. The second chapter, entitled "The Representation of Numbers by Continued Fractions", gives a good account of the subject treated in it, the fundamental importance of continued fractions by studying the arithmetical properties of irrationalities being particularly emphasised. The material of the mentioned two chapters gives all the necessaries for the applications of the theory and does not demand from the reader any special knowledge save some acquaintance with infinite series.

The contents of the third and final chapter is devoted to the more modern and more advanced questions of the theory, viz. to the fundamentals and the simplest applications of the *metrical theory* of continued fractions. The latter theory may be considered as a natural introduction to the so-called *metrical arithmetic of continuum* whose object is to determine the measures of sets of real numbers possessing any given arithmetical property (for instance, the property to admit a certain approximation by rational fractions). In spite of its juvenility the metrical arithmetic numbers already a lot of profound and elegant results (some of them may appear surprising at first sight) and, combining the ideas of such popular branches of mathematics as the theory of numbers and the metrical theory of sets of points, it cannot fail to be of interest for a rather wide circle of students. Therefore, the initiative of the author who gives for the first time in world literature such a comprehensive introduction to the new subject, is to be warmly welcomed.

To understand the contents of the third chapter the reader must have some knowledge of the theory of sets and calculus.

The reviewer is sure that Prof. Khinchin's original and stimulating book (the only fault of which is the lack of bibliography) will find many readers—and perhaps not only among Russians. G. H.

**Heaviside's Operational Calculus as applied to Engineering and Physics.** By E. J. Berg. 2nd edition. Pp. xv, 258. 18s. Electrical engineering texts. (McGraw-Hill)

Professor Berg intends his book mainly for electrical engineers; it would, however, serve to introduce the Heaviside operator to anyone who fears to tackle the more satisfactory but more severe expositions depending on Bromwich's contour integrals or Carson's infinite integrals and integral equations. There are twenty-seven short chapters taking the reader from the simplest kind of electric circuit as far as elementary cable problems; there is a long chapter on Graeffe's method of computing roots of an equation, for use with the expansion theorem, a chapter containing a list of formulae, and an account of Heaviside's work by B. A. Behrend, reprinted from an American technical journal. The main new matter in the second edition appears in an appendix of forty-four pages containing additional problems and solutions. The pace is easy, the engineer need not be frightened by the mathematics nor need the mathematician fear the technicalities, since these are reduced to the bare mini-