are limited by space and are frequently not critical or analytical enough—often in the original as well as the abstract—for the limitations to be adequately appreciated. There are some surprising lapses, however, in the editing. On p. 14 there is a phase reverser that does not reverse phase, and on p. 47 an overvoltage relay which has no operating circuit, both being faithfully copied from the originals, probably by using the same blocks. Casual examination showed that Brunetti and Greenough, represented by a useful circuit on p. 28, are not in the author index.

The handbook may be recommended for what it is—a collection of practical circuits among which an engineer with a particular problem may find a ready solution, but is more likely to gain ideas which will lead to a solution.

T. H. Flowers
J. R. Tillman

MATHEMATICS FOR THE ENGINEER

Applied Differential Equations

By Prof. F. E. Relton. Pp. viii+264. (London, Glasgow and Bombay: Blackie and Son, Ltd., 1948.) 20*s*. net.

AT the joint session of Sections A (Mathematics) and G (Engineering) of the British Association meeting, held last September, it was stated in a discussion on "Applicable Mathematics" that "Mathematics is an integral part of engineering science evolved to satisfy the demands of the science, and should be used by the engineer as one of the tools of his trade"; and later in the discussion the point emerged that "the engineer's main difficulty lies in the translation of his engineering problem into mathematical terms, and then, on finding a solution, in translating that solution into an engineering solution". Commenting upon this, a later speaker stressed the desirability of the enlightened teacher of mathematics being able to speak the engineer's language. There should be very little difficulty about this, for the modern trend of much mathematical literature is to produce books having a practical bias. Thus the old artificial barrier between academic mathematics and the more modern mathematics applied to the sciences is gradually being broken down.

Probably few subjects have more applications than differential equations, for they enter into the foundations of most sciences, especially engineering in all its branches. In the volume before us, we have an introduction to the subject, characterized "by a frankness of expression unusual in text-books". This readable text quite lucidly covers equations of the first order, linear equations, miscellaneous theorems and methods (devoted chiefly to geometrical considerations and first-order equations of a degree higher than the first), simultaneous equations, Fourier series, partial equations, the method of isoclinals, numerical methods of solution, equations in three variables and equations with variable coefficients. While each of the eleven chapters is well provided with exercises and illustrative problems, the book ends with a good set of miscellaneous exercises, hints and answers with an index.

If it is asked: How does the book justify its title?, the answer will vary with the point of view. Quite frankly, the number of real practical applications seemed at first to be disappointing, but on going through the exercises set for the student, it was discovered that many standard applications were included. These, with the hints given later, should prove very valuable. The text throughout is excellently written, and the author's style is to be commended. The subject seems to be treated with just as much rigour as is essential for a practical student's intelligent use. The book should certainly be useful to a conscientious student and seems to form a good introduction to the same author's "Applied Bessel Functions".

F. G. W. Brown

SENSE OF TASTE

The Taste Sense and the Relative Sweetness of Sugars and other Sweet Substances

By Prof. A. T. Cameron. (Scientific Report Series, No. 9.) Pp. ix + 72. New York: Sugar Research Foundation, Inc., 1947.) Free.

INTEGRATION of knowledge relating to the chemical senses is hampered not only by an extremely scattered literature but also by the rarity of the synthesist who is a specialist in all the different fields of science involved, and who is able to appreciate the presence and significance of the lacunæ which mark stages in the process of integration. A monograph on the sense of taste, written by a distinguished biochemist versed equally in physiology and chemistry, is therefore of exceptional interest, by no means lessened by its special reference to sweetness. The applications of Prof. A. T. Cameron's investigations are of particular value to food technologists, and it is fitting that this work should have been published in the noteworthy Scientific Report Series of the Sugar Research Foundation.

Following a summary and brief introduction, the author admirably surveys the anatomy and physiology of taste, and then proceeds to a discussion of the variability of taste perceptions in different individuals, the relationship between the chemical constitution and tastes of organic compounds, and the taste sensations other than those of sweetness. The second part of the memoir deals with early work on the sweetness of sugars, and includes, in more detail, a discussion of the results of Dahlberg and Penczek (New York State Agric. Expt. Sta. Tech. Bull. No. 258; 1941) as well as of the author's own experimental research.

Finally, Prof. Cameron directs attention to a number of problems needing investigation: possible histological differences in the taste-cells corresponding to the four primary tastes, the relationship of the sour taste to chemical acidity, the sweetness of mixtures, and cognate subjects for inquiry. A new suggestion resulting from his own work is that the intensity of taste-perception due to stimulation of 'sweet' taste-cells by a sweet solution may be modified by other, even tasteless, stimuli.

The value of this monograph is further enhanced by an author index and by a bibliography which, though by no means exhaustive, provides 118 useful references. It is sad to reflect that Prof. Cameron did not live to see the publication of his outstanding contribution to the science of taste, or to derive satisfaction from the further investigations it will undoubtedly engender.

J. H. Kenneth