

cutaneously, and an account of the pathology produced; with the oedema provoked by injection of peptides and its comparison with burn oedema fluid. The toxicity of burn oedema fluid for other animals is confirmed, and this is related to protein fractions, particularly the euglobulin part of the exudate. The whole process is said to be triggered-off by the activity of skin and other proteases after burning which, by the splitting of tissue and other proteins to polypeptides, induce local oedema; the exudation of plasma proteins follows, some of which become altered and are toxic on absorption.

The author tries to account for the renal, gastrointestinal, adrenal and other changes after burning on the basis of a peptide-induced toxæmia, but the argument is weak. He greatly underestimates the parts played by oligæmia in producing the acute illness of burns, and also of bacterial infection and septicæmia. The monograph contains useful material on the biological properties of proteins and their split-products, much of which is relevant to the recent work of Miles, Wilhelm, Spector and their colleagues in Britain on the role of blood proteins and polypeptides in the pathogenesis of acute inflammation. The book is well produced; it has a summary in English and regard is paid to the work of others, including British workers.

S. SEVITT

DIFFERENTIAL EQUATIONS FOR INSTRUMENTATION ENGINEERS

Ordinary Differential Equations

By Dr. Wilfred Kaplan. (Addison-Wesley Series in Systems Engineering.) Pp. xv+534. (Reading, Mass.: Addison-Wesley Publishing Company, Inc., 1958.) 8.50 dollars.

THIS book can be used as a standard text-book on differential equations, for it covers much the same ground as, for example, Piaggio's well-known work; but it is intended particularly for students of instrumentation engineering, so that applications to servo-mechanisms, computers and controls are emphasized, and technical terminology is frequently employed. Thus for the linear equation $F(D)x=f(t)$, the function $f(t)$ is termed the input, and if the complementary function (the solution for zero input) tends to zero with the time, the equation is said to be stable, the complementary function is a transient, and the complete solution is effectively represented by a particular integral, termed the output. This phraseology is probably more graphic and so more easily appreciated by the student of control engineering than the familiar but flat language of the pure mathematician. It also emphasizes the role of the differential equation as a functional transform from input to output, and so links up with the modern transform calculus. The author keeps well in view the idea that the proper question to ask about a differential equation is not whether it can be solved but how much does it tell us about the function which satisfies it.

Existence theorems are not ignored, but are placed at the end of the book and so need not obstruct a first reading. Much of the material is classical and need not be specified here, but for more recent work there is a good section on matrices and their connexion with linear differential equations, and a most helpful introduction to the phase-plane method for

non-linear equations. The student who is daunted by the concentrated stimulus of Lefschetz or the high abstract precision of Coddington and Levinson might do well to play himself in through these chapters in Kaplan's book.

In a book of 500 pages, to devote only 14 to numerical methods is derisory; there should be either a great deal more, or nothing save the half-page of references. Simultaneous linear equations with constant coefficients occupy much space, but the methods given seem to be generally more awkward than Routh's efficient procedure. There is nothing about modern operational or transform methods, save two or three pages on the application of the Laplace transform to constant-coefficient linear equations, too sketchy to be of value either to the ignorant or to the informed. But this omission is fully explained by the author's promise of a speedy appearance of his companion volume on operational methods for linear systems.

T. A. A. BROADBENT

FERROELECTRICITY

Ferroelectricity in Crystals

By Helen D. Megaw. Pp. xi+220. (London: Methuen and Co., Ltd., 1957.) 27s. 6d. net.

FERROELECTRICITY is a subject of relatively recent origin, which is, at the moment, developing with exceptional rapidity. The number and range of original papers are a constant strain on the time of investigators in the field, and must be bewildering to beginners. These circumstances call for a skilful review of the subject, and this has been admirably accomplished by Dr. Megaw in "Ferroelectricity in Crystals". This is a short book (only 220 pages), but by careful selection, logical arrangement, and lucid exposition the author has produced a volume which can be both a 'source book' to the expert and an introduction to the beginner.

The first chapter gives a brief outline of the subject, with clear definitions of the new terms involved. The following six chapters summarize the experimental data on Rochelle salt, potassium dihydrogen phosphate, barium titanate, other perovskite materials, and miscellaneous structures such as cadmium niobate and guanidine aluminium sulphate hexahydrate. The remaining three chapters expound the present theoretical position, including the thermodynamic method of correlating observed properties, and the basic features of current theoretical models of ferroelectrics.

The approach to the problem is essentially crystallographic, and the object of bringing out the close correlation between the structure, and the intrinsic electric properties of the single domain is successfully achieved. The treatment gains in clarity by making only brief reference to domain dynamics, with its murky problems of failing memories and fictitious surface layers.

The book has a short, well-chosen index, and a most useful glossary of crystallographic terms. There are copious references to original papers throughout the text, which are listed at the end of each chapter.

Altogether this is a book of exceptional merit, and it is only to be hoped that demand proves sufficient to allow further editions to be produced at not too long intervals.

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