Weierstrass approach to function-theory through power series. Part 2 (110 pages) gave a fairly full account of elliptic functions, including modular functions and transformation theory. Part 3 (150 pages), due to Courant, supplemented the Hurwitz development by chapters in the geometric spirit originated by Riemann.

Even in the first edition Part 3 was largely independent of Parts 1 and 2, and in the second edition (1925) Courant expanded Part 3 into a self-contained presentation. In the third and fourth editions this tail has outgrown the dog, and I shall suggest later that two well-proportioned creatures could with advantage replace the one which has grown in an uncontrolled way.

Part 3 now fills nearly 300 pages and is an account, mainly of interest to the specialist, of the development of topological function-theory. There are other important branches of function-theory (for example, integral and meromorphic functions) for which one must look elsewhere.

The preparation of this new fourth edition is due to Prof. H. Röhrl, of Minnesota. He has revised and brought up to date the text of the third edition and has added an appendix of 150 pages (in two chapters). The additions expound the theory in the more abstract setting in which the work of the past two decades has placed it. Chapter 1 of the appendix deals with some problems of conformal representation, in particular new knowledge about prime-ends (introduced by Carathéodory in 1913) and quasi-conformal mappings. The 1–1 conformal representation of Riemann surfaces leads to a discussion of the Fuchsian groups involved. Chapter 2 of the appendix contains a clear account of selected recent investigations of compact and non-compact Riemann surfaces.

I suggest that the book, which has become unwieldy and costly, should, in future editions, become two. Parts 1 and 2 would form an excellent presentation of Weierstrass's theory for the undergraduate. Actually he would be unlikely to need so much of the detail of elliptic functions and a radical surgeon could excise some sections of Part 2. Only exceptional undergraduates would find time to read Part 3, and the others should not have to buy a large book for the sake of a small part of it. Any research worker interested in Part 3 will know what is in Parts 1 and 2 and would not refer to them except perhaps as a model of style.

J. C. Burkill

AN ADVANCED THEORY OF VIBRATIONS

Vibrations

By Prof. D. K. Magnus. Pp. xi+299. (London: Blackie and Son, Ltd., 1965.) 65*s*.

VIBRATIONS certainly differs from other books about the same subject, inasmuch as it classifies the vibrations according to the mechanism from which they originate. This is reflected in an identical mathematical treatment and similar final solution. According to this classification the subject-matter is sub-divided into the following groups: (i) natural vibrations; (ii) self-excited vibrations; (iii) parametrically excited vibrations; (iv) forced vibrations; (v) coupled vibrations. This classification enables the author to deal with a variety of problems both in the mechanical and the electro-technological field in a relatively small and inexpensive book, and it seems astonishing that the subject-matter covered should form the syllabus of only one term (about four months) in a German university or technical university.

Throughout the book the emphasis is on as thorough and general a treatment as possible. For example, the section on "Damped Vibrations" covers viscous, Coulomb and square-law or turbulence friction and also non-linear vibrations. Later in the book the response of linear systems to non-periodic inputs is dealt with, making use of Duhamel's integral. Statistically distributed excitations are also considered.

Wherever possible, exact mathematical methods are used. Extensive use is made of the phase-portrait (velocity-displacement diagram), thus, as in other ways, providing a link with control systems analysis. However, powerful and frequently indispensable approximation methods, such as the method of small oscillations, of harmonic balance (known as the describing function method in control systems analysis), the Ritz, the Rayleigh and the Van der Pol method of slowly varying amplitudes, are not ignored.

Most of the book is devoted to single-degree-of-freedom problems and the most important methods are demonstrated on them. The treatment of systems with several degrees of freedom then offers no major difficulties.

Systems of an infinite number of degrees of freedom involving partial differential equations are only touched on in the few final pages (except the taut string which was considered at the beginning of the book), but at this stage the intelligent reader should already have grasped the most important aspects of vibrations, enabling him to embark on further problems with relative ease.

Vibrations includes carefully selected exercises for each chapter and their solutions, this making it a suitable text-book for use in English-speaking universities. The translation is competent, although the translator adheres in places too closely to German wording and phrasing. It would have been helpful if, when quoting books of reference, English equivalents or existing English translations of German standard works were used, and in the case of books which had been translated from English into German, if the original titles (instead of back-translated one) were given. To sum up, it can be said that *Vibrations* is a valuable complement to existing treatises on vibrations and it can be highly recommended to all who want to penetrate more deeply into the field of vibrations.

K. R. Weiss

VIBRATION PROBLEMS IN ENGINEERING

Vibration

By Prof. R. E. D. Bishop. (Based on Six Lectures delivered at the Royal Institution, London, December 1962.) Pp. 120+20 plates. (London: Cambridge University Press, 1965.) 30*s*. net; 5.50 dollars.

VIBRATION is a lightheartedly written, completely non-mathematical book which arose from Christmas Lectures given at the Royal Institution to a mainly young audience. The primary purpose of the book is to explain what is involved in the profession of an engineer, and vibration was chosen as a particularly suitable field to do this. An introduction of this kind into the wide and complex field of vibrations could only be successful if supported by a number of experiments and demonstrations; these in fact accompanied the lectures, which must have been extremely interesting (and certainly sometimes amusing). The spirit of the lectures is reflected in the book, although experiments have to be described, aided by numerous plates and figures. Prof. Bishop covers many important aspects of vibrations such as: the effect of vibrations on the human body; the resistance of metals to vibration (fatigue, Wöhler diagram); free vibrations; modes of vibrations (for example, demonstrated on the air-liner '*VC* 10'); imposed vibrations including random vibrations; self-excited vibrations; shocks and waves.

The problems chosen as examples underline the importance of vibrations in engineering with their sometimes