

The final chapter by Polonnikov, Chapter 8, deals with the power stage of the amplifier and the power supplies, since these frequently constitute a continuous whole. Enumerated are the primary requirements for the output stage which must be taken into account when selecting and designing the power stage of the servo-amplifier. These requirements are then illustrated by a closer inspection of the different circuits employed for power amplifiers.

A useful addition that brings the text up to date is Chapter 9 on transistor servo-amplifiers by the technical editor of the translation, A. K. Godden of the Northampton College of Advanced Technology. This is written in the same style and illustrates how the use of the transistor eliminates certain problems associated with the thermionic valve but introduces others into the circuit design.

Comprehensive information is not available on generalised experience of the research into the methods of designing electronic servo-amplifiers and this book helps to satisfy this need and should be of assistance to the servo-amplifier designer and user of either limited or wide experience.

K. F. GILL

ROCKET DISPERSION

The Flight of Uncontrolled Rockets

By F. R. Gantmakher and L. M. Levin. Translated by O. M. Blunn. Translation edited by W. G. Hughes. (International Series of Monographs on Aeronautics and Astronautics. Division 7: Astronautics, Vol. 5.) Pp. xiii+379. (London and New York: Pergamon Press, 1964.) 100s. net.

THE Flight of Uncontrolled Rockets is chiefly concerned with the motion of unguided rockets during powered flight, which is the portion of their trajectories where disturbing factors other than gravity have their greatest effect. After all-burnt the motion is similar to that of a shell and ordinary ballistic theory is applicable. The effects of asymmetries of design, manufacture or operation during burning are mainly responsible for the high dispersion of rockets compared with shells; a mathematical formulation of the effects of these asymmetries is therefore an essential prerequisite to the improvement of rocket accuracy.

The book is an edited and revised translation stemming from the investigation of rocket dispersion in the U.S.S.R. during the Second World War. Chapter 1 contains a derivation of the general equations of rocket motion, while Chapter 2 is devoted to the approximate calculation of trajectories during powered flight, and Chapter 3 gives a general discussion of dispersion. The next three chapters present a detailed treatment of the dispersion of finned rockets, attention being directed to both rotated and unrotated rockets and also to short-range rockets of the type mainly used as anti-tank weapons.

Approximate results for the computation of dispersion are derived for a simplified system in which the motion is taken as two-dimensional, the concept of the 'critical section' and its use being of particular interest. The usefulness of these results is greatly enhanced by the numerous tables which give values of the various functions occurring in the equations. Chapters 7, 8 and 9 deal with three-dimensional motion, spin stabilization and the effects of wind. A brief account of the aerodynamic forces acting on a rocket is given in an appendix.

It is evident from the work of Gantmakher and Levin that an extensive theory has been developed in the U.S.S.R. to describe the motion of uncontrolled rockets during powered flight. It should be noted that corresponding Western treatments give similar results; differences occur mainly in the detailed application of the results rather than in the basic theory. Originally no account

was taken of Western work, but for this translation an additional appendix giving a brief survey of similar work done in the United Kingdom and the United States has been written by E. T. J. Davies of the Royal Armament Research and Development Establishment. This appendix adds greatly to the value of the book and justifies its claim to give the reader a better overall understanding of the subject. It also indicates some small defects in the main text.

Since a high standard of mathematics is not expected of the reader, the book should be of particular value to engineers, although some may prefer the more rigorous and detailed treatise by R. A. Rankin. G. E. COOK

GLOUCESTERSHIRE PLACE-NAMES

The Place-Names of Gloucestershire

Part I: The River- and Road-Names; The East Cotswolds. Pp. xiii+268. Part II: The North and West Cotswolds. Pp. xiii+264. Part III: The Lower Severn Valley; The Forest of Dean. Pp. xiv+272 (1964). Part IV: Introduction, Bibliography, Analyses, Index, Maps. Pp. xv+274. (English Place-Name Society, Volumes 38, 39, 40 and 41.) By A. H. Smith. (London: Cambridge University Press, 1965.) 42s. net; 8 dollars, each part.

WITH the publication of yet another set of county volumes, the English Place-Name Society and their general editor, Prof. A. H. Smith, once again place us heavily in their debt. The four volumes on Gloucestershire, compiled by Prof. Smith himself, contain an immense amount of material, concerning both the interpretation of individual names and also more general matters relating to the county as a whole.

The problem of trying to recover the original meaning of a specific name forms the core of place-name study, and the authoritative, though not necessarily final, interpretations of the place-names of Gloucestershire are given in the details included in the first three parts. But in many respects Part IV, containing the introduction and various analyses, forms the most stimulating part of the work. In the introduction, Prof. Smith uses the place-names of the county as aids to help illuminate many themes—the early organization and extent of the shire and its hundreds; the geographical division of the county into the three main regions of the Cotswolds and upper Thames valley, the valley of the Severn and its tributaries, and the Forest of Dean; the settlement of the area, particularly by the Anglo-Saxon peoples; the distribution of various categories of place-names, such as those which include personal names and those field names that indicate good and poor land. The names and elements in many of these categories are listed in full in the later sections of the volume where, for example, nicknames for poor land are shown to be about four times as numerous as those for productive land. An understanding of the distribution of many of the elements is greatly helped by a study of the admirably drawn and clearly reproduced maps. These are printed on transparent paper so that the various distributions can easily be compared with each other or with the geological map that has been similarly reproduced.

Though always of a high standard, the volumes of the English Place-Name Society have become increasingly thorough over the past forty years. This is clearly shown by a comparison of the Gloucestershire material with the first county volume (for Buckinghamshire) published in 1925. In area, Gloucestershire is nearly twice the size of Buckinghamshire, yet the amount of place-name material published is three and a half times as great. These latest county volumes certainly reflect great credit both on the editor and on the publishers. I. S. MAXWELL