

like this, the Parliamentary and Scientific Committee has something to contribute to this educative function of Parliament. It is partly a means of informing Parliament, and professional men should be careful to use it responsibly and imaginatively to the maximum extent; but it is also a means through which Parliament can exercise that function in a wider if specialized field.

BALLISTIC MISSILE AND SPACE TECHNOLOGY

Ballistic Missile and Space Technology

Proceedings of the Fifth Symposium held at Los Angeles, California, August 1960. Edited by Donald P. LeGalley. Vol. 1: Bioastronautics and Electronics, and Invited Addresses. Pp. xiii + 494. Vol. 2: Propulsion and Auxiliary Power Systems. Pp. x + 439. Vol. 3: Guidance, Navigation, Tracking, and Space Physics. Pp. x + 450. Vol. 4: Re-entry and Vehicle Design. Pp. x + 422. (New York: Academic Press, Inc.; London: Academic Press, Inc. (London), Ltd., 1960.) 9 dollars per volume; 36 dollars per set.

A SERIES of symposia on ballistic missile technology was started in June 1946 by the Ramo-Wooldridge Corporation and the Ballistic Missile Division of the United States Air Force; the fifth symposium was held in August 1960 at the University of Southern California in Los Angeles. To those who know the extensive campus of this University and the enormous size of the United States missile industry it will be no surprise to learn that more than one thousand scientists and engineers from all parts of the United States attended this symposium, at which seventy-four unclassified and fifty-one classified papers were presented after selection from two hundred and fifty-five manuscripts submitted. It has become a feature of the United States' so-called 'aerospace' programme that huge gatherings of scientists come together at frequent intervals for the presentation of papers covering a field so vast that it is obvious that no single participant could appreciate more than a small fraction of the specialized subjects involved. Since most of the time at symposia is spent in discussion outside the formal sessions, this plethora of papers is perhaps of little importance. Another feature is, however, of more serious significance, and the four volumes which report in full the proceedings last year exhibit it only too clearly. The frequency and size of these gatherings are now so great that there are just not enough papers of good quality to go round; difficulties with military security no doubt also play a part. The result is a number of contributions of limited interest, which explore in detail some byway which only the author really wishes to tread.

Nevertheless, the present volumes of proceedings are, in total content, of considerable interest and value to workers in missile and satellite technology. This is especially so as the editor and publisher succeeded in producing them within a very few months of the actual conference, thus allowing us to gain an up-to-date view of the extremely varied topics which are the concern of the industrial, government and university research laboratories and development teams engaged in U.S. ballistic missile

and space activities. The emphasis throughout is towards space topics; this is shown by the fact that only twenty-two out of the seventy-four papers deal with subjects which have any significant relevance to non-space missile applications. Few of the authors take a basic approach to their subject although here and there one finds interesting items such as the study reported in Vol. 1 of an experimental investigation of gyro spin-axis bearing lubrication; or the careful theoretical treatment of the equations of motion of a satellite in a gravitational field with particular reference to attitude stabilization and control system analysis in Vol. 3. Vol. 1 is devoted to bioastronautics and electronics and includes also the general addresses given to the symposium by such prominent speakers as Dr. T. Keith Glennan, John H. Rubel, General Bernard Schriever and Dr. Simon Ramo. A topical note is struck by Ramo, in a style familiar to all who have known him during the past fifteen years in the missile business, by his paper on "The Life and Times of the Crash Program". This diverts attention from missiles to the great and growing need for improvements in United States' educational methods, the shortage of teachers and the potential applications of electronic teaching devices for technical subjects; one awaits the howl of protest from protagonists of the humanities against this further indication of the narrowness of scientific educational methods. Vol. 2 covers propulsion and auxiliary power systems; Vol. 3 guidance, navigation and space physics. Re-entry and vehicle-design problems are dealt with in Vol. 4.

The text is reproduced by the photo-lithographic process; illustrations and diagrams are clear and graphs are particularly well reproduced with scales which allow accurate interpolation. W. H. STEPHENS

TECHNOLOGY OF CHEMICAL PROCESSING

Encyclopedia of Chemical Technology

Edited by Raymond E. Kirk and Donald F. Othmer. Second Supplement Volume edited by Anthony Standen. Pp. xi + 970. (New York: Interscience Publishers, Inc.; London: Interscience Publishers, Ltd., 1960.) 175s.

CHEMICAL technology preserves its position at the spearhead of advancing standards of living. Not only has man distinguished himself as a tool-maker, but also he is an enthusiastic converter of the materials in his environment. Chemical reaction, chemical plant and processing are all basic to this vast enterprise of our era.

The very range of chemical technology makes it extremely difficult for a worker to find readily information related directly or indirectly to his pursuit. Established work in physics, chemistry, applied mathematics and even biological science is of interest to him. Knowledge of these is likely to result in unexpected innovation. For example, the theory of turbulent diffusion has enabled those concerned with the dynamics of chemical reactors to refine the calculations for their designs. Often such refinements lead to simpler methods of operation, better yields and improved quality of products.

As a compendium of information for chemical technologists, the Kirk-Othmer encyclopaedia is maintaining its traditional calibre, with the appear-