The whole position is, in fact, admirably illustrated by Prof. G. A. Miller's Granada Lecture in October 1964, now published in *The Advancement of Science* (21, 417; January 1965). Under the title "Computers, Communication, and Cognition", Prof. Miller, professor of psychology at Harvard University, discusses sensitively and imaginatively not merely the issues directly involved in the use of computers, their advantages and limitations, but their wider implications in all areas of the biological, psychological and social sciences. His address should not only dispel some false ideas as to the functions of computers but also stimulate new ideas as to the immense possibilities if once we accept the idea that there are some things that machines can do better than men and other things that men do better than machines. Equally important, he indicates the price that has to be paid in the way of forethought about the redistribution of labour and provision for attendant social stress. Above all, the lecture challenges exactly that clear thinking, imaginative as well as resolute, which is the prerequisite of any solution to the problems of choice or priorities and to ensuring that technological change serves the public interest and is appropriately supported by the necessary modifications in our social, economic and educational institutions.

STRESS–STRAIN AND THE EARTH'S CRUST

State of Stress in the Earth's Crust
Edited by William R. Judd. (Proceedings of the International Conference, June 13 and 14, 1964, Santa Monica, California.) Pp. xiii + 732. (New York, London and Amsterdam: American Elsevier Publishing Company, 1964.) 115s.

*S*TATE *of Stress in the Earth's Crust* contains twenty papers presented at an international conference organized by the Engineering Geology Division of the Geological Society of America and sponsored by the Rand Corporation and others. Abstracts are given in English, French and German.

The subjects covered are relatively new and relevant to present-day ideas on the evolution of the Earth's crust and mantle. The book is mainly concerned with the behaviour of materials under various conditions of stress, and several contributors recognize the difficulties in ascertaining stress–strain relationships applicable to the Earth's crust. The crux of the problem lies in the fact that the materials of the Earth's crust and mantle obey neither Hooke's Law nor the laws of a Newtonian fluid but unknown laws of 'visco-elasticity'. This makes for many uncertainties, and it is immediately disappointing to find how little progress has been made in the all-important field of visco-elastic behaviour.

The *Proceedings* are divided into four parts. Part 1 (three papers) deals with the scope of the subject; Part 2 (six papers) with fundamental concepts and principles; Part 3 (five papers) with laboratory measurements; and Part 4 (six papers) with applications to engineering. A discussion is given at the end of each part.

Part 1 contains an introduction to laboratory, field and statistical problems in rock mechanics by the editor, W. R. Judd. This is followed by a paper of interest to geophysicists by Francis Birch on "Megageological Considerations", which deals with fracture, plastic flow, melting, recrystallization, alteration and the importance of the time factor. It also discusses the shape of the geoid, the fluid-like behaviour of the mantle, thermal history and convection, and the separation of the iron and silicate phases of the core and mantle which Birch describes as

"the principal event of Earth history". The third paper is by G. C. Werth and discusses the potentialities of nuclear explosions in the study of rock mechanics.

After an introduction by J. W. Handin, Part 2 contains papers on "Brittle Fracture of Rocks" (W. F. Brace), "Visco-elasticity of Rocks" (E. C. Robertson), "Strain Energy in Rocks" (C. L. Emery), "Strength Variations and Deformational Behaviour in Anisotropic Rock" (F. A. Donath), "Failure of Homogeneous Rock under Dynamic Compressive Loading" (G. B. Clark and R. D. Caudle) and a review of work in South Africa by E. Hoek. The paper on visco-elasticity describes how experimental data on creep at room temperature and pressure can be fitted by empirical equations combining elastic and inelastic moduli. It also discusses rheology and mechanism of creep, providing a good review article.

In Part 3, R. H. Merrill describes "*In situ* Determination of Stress by Relief Techniques", J. C. Jaeger and N. G. W. Cook discuss the "Theory and Application of Curved Jacks in Stress Measurement", and E. L. J. Potts describes "*In situ* Measurements of Rock Stress based on Deformation Measurements". A paper by D. D. Wantland describes "Geophysical Measurements of Rock Properties *in situ*" and is mainly concerned with the determination of elastic constants using seismic methods. The section ends with a large review (51 figures and 177 references) of petrofabric techniques and the statistics and interpretation of petrofabric measurements. Most of Part 3 emphasizes one problem—the difficulty of knowing exactly what is being measured.

The final part gives applications to problems of engineering such as dam building (J. L. Serafim), open pit mines (J. A. Talobre) and rock slopes (L. Muller). H. L. Brode discusses the problems associated with underground protective structures for nuclear explosions and S. G. A. Bergman the design of protective construction in hard rock for nuclear surface bursts. The section ends with a review of "Residual Stress Effects in Engineering" by D. F. Coates.

This large tome is not so highly specialized as it first appears. It contains many useful summaries and extensive reviews of wide fields ranging from classical stress–strain theory to petrofabrics and seismic refraction. It will be valuable for both students and research workers, and should find a place in libraries for engineers, geophysicists and geologists. R. W. GIRDLER

APPROXIMATION OF FUNCTIONS

Theory of Approximation of Functions of a Real Variable
By A. F. Timan. Translated by J. Berry. English translation edited and editorial preface by J. Cossar. (International Series of Monographs on Pure and Applied Mathematics, Vol. 34.) Pp. xii + 631. (London and New York: Pergamon Press, 1963.) 100s. net.

*P*ROF. A. F. TIMAN'S *Theory of Approximation of Functions of a Real Variable* forms Volume 34 of the *Series on Pure and Applied Mathematics*, published by the Pergamon Press. It is a translation of the Russian book, *Teoriya priblizheniya funktsii deistvitel nogo peremennogo*, published in 1960. It deals mainly with recent Russian work, but some of the classical theory is also included. It will be a valuable text for postgraduate courses either on approximation or on the theory of functions.

Chapters 1 and 2 are concerned with Weierstrass's theorem and the theory of best approximation, including the work of Chebyshev and De la Valée Poussin. Chapter 3 relates some classes of functions to their structural properties, and Chapter 4 deals with polynomials and with transcendental integral functions of exponential type. Some theorems of the constructive theory of functions