compared with the velocity of the free stream and its dynamic pressure, but are not small compared to the velocity of sound and static pressure respectively, as is generally assumed in the conventional linearized theory. This chapter ends with a brief section on unsteady hypersonic flow and deals particularly with what is now generally known as 'piston theory'.

Chapter 3 is devoted to Newtonian theory and various modifications of it by Busemann, Lees and other writers. The theory is applied to two-dimensional and axi-symmetrical bodies and to the determination of optimum shapes. Shock layer structure and cross-flow phenomena are discussed, and a theory for unsteady Newtonian flow is developed. As first approximations to more general solutions based on the assumption that the shock layer is moderately thin, constant-density solutions are obtained in Chapter 4 which give information beyond that obtained from Newtonian theory. Cases considered include the wedge, the cone, the circular cylinder and Lighthill's solution for the sphere.

Chapters 5, 6 and 7 consider respectively the theory of thin shock-layers, blunt-body flows and shock-expansion theory, while Chapters 8 and 9 discuss hypersonic viscous effects. Chapter 10 deals briefly with free molecule and rarefied gas flows.

I would strongly recommend this book to students and research workers who wish to study hypersonic flow phenomena. W. P. JONES

GEOCHEMISTRY

Methods in Geochemistry

Edited by A. A. Smales and Prof. L. R. Wager. Pp. vii+464. (New York: Interscience Publishers, Inc.; London: Interscience Publishers, Ltd., 1960.) 13.50 dollars; 94*s*.

IN V. M. Goldschmidt's definition of geochemistry (1933) are implicit quantitative composition of the Earth and its parts, discovery of laws controlling distribution of elements, and comprehensive analytical data on rocks, meteorites, waters, atmosphere, to include geophysical evidence on the nature of the Earth's interior. This considerably extends the more restricted scope as originally enunciated by F. W. Clarke in his classical "Data of Geochemistry" (1908), where the solid crust of the Earth is the chief object of study. B. Mason, in his "Principles of Geochemistry" (1952), brings evolution of the subject to more recent times, when he defines the tasks of the geochemist as "the determination of the relative and absolute abundances of the elements and of the atomic species (isotopes) in the Earth" and "the study of the distribution and migration of the individual elements in the various parts of the Earth (the atmosphere, hydrosphere, crust, etc.), and in minerals and rocks, with the object of discovering principles governing this distribution and migration". Thus over the years both theoretical and analytical phases of geochemistry have expanded enormously, so, likewise, have the various methods of attack on the problems involved. In the present volume the authors, with collaboration of a team of specialists, describe modern techniques at the disposal of the geochemist which go far beyond traditional chemical and geological approaches to secure desired analytical data. "It is a long way from the geologist's hammer to the mass spectrometer and the nuclear reactor which are now sometimes the tools the analyst uses", as the authors naïvely remark in their introduction; what follows in this book gives all concerned a clear indication of how that gap is bridged to-day.

Modern geochemical methods include collection and preparation of material for analysis, here contributed by L. R. Wager and G. M. Brown. E. A. Vincent discusses gravimetric and volumetric analysis, flame photometry, colorimetry and related techniques. Spectrochemical analysis is dealt with by S. R. Taylor and L. H. Ahrens; fluorescent X-ray spectrography by H. I. Shalgosky; stable isotope geochemistry and mass spectrographic analysis by K. I. Mayne; mass spectrometric isotope dilution analysis by R. K. Webster; radiochemical methods by S. Moorbath; radioactivation analysis by D. Mapper; polarography by S. Moorbath and modern chemical separation methods by F. W. Cornish.

Of the above techniques, two comparatively recent procedures of remarkably high sensitivity have been added to the geochemist's weapons of attack available in geochemical analysis. One is the mass spectrometer isotope dilution method, which owes much to development of thermal ionization source mass spectrometers, also to present availability of separated isotopes of many elements; the other method is that of radioactivation analysis. Both procedures are adequately described in this book.

"Methods in Geochemistry" is a new departure in this science in that it is not only an up-to-date exposition of what the authors term "an almost embarrassingly wide choice of techniques for any given problem", but also because it brings together in one volume so much current information on geochemical research which chemist, geologist or physicist alike would have to seek in an otherwise voluminous international literature. The book is highly commendable, both in presentation and purpose. H. B. MILNER

MOISTURE IN TEXTILES

Moisture in Textiles

By Dr. J. W. S. Hearle and Prof. R. H. Peters. Pp. ix+203. (Manchester: The Textile Institute; London: Butterworths Scientific Publications; New York: Textile Book Publishers, Inc., 1960.) 40*s*.; 6.50 dollars.

THE adsorption of moisture by fibres is such an unobtrusive phenomenon that it is, perhaps, not generally thought of as being a reaction in the usual sense of the word. The interaction of the two is, however, of very great practical significance, not only because of associated changes in weight, which are economically important, but also because of dimensional changes in yarns and fabrics consequent on fibre swelling. The mechanism of moisture adsorption is complex and the many theories which have been evolved are admirably surveyed in this book, which is based on a series of lectures given at the Manchester College of Science and Technology.

The book is arranged in thirteen chapters, written by seven contributors. Chapter 1 (P. S. H. Henry) deals with water in the atmosphere and the relevant definitions; seasonal and diurnal variations; and the insulating effect of buildings. This is followed by