

lites, alkali ultrabasic rocks, as well as ultramafic and mafic nodules, are included, although not all are considered in the same detail or with the same authority. Thus some hundred pages are devoted to the alpine type ultramafic rocks, their deformation and petrogenesis, compared with sections on other ultramafic regimes which vary between twenty and fifty pages. In addition to the more environmental studies of the ultramafic rocks, the volume contains a section on their geochemistry, including the trace element contents of these rocks, stable isotope studies and  $^{87}\text{Rb}$ - $^{87}\text{Sr}$  and K-Rb ratios. In the final chapter the petrogenesis of the ultramafic and ultrabasic rocks in relation to possible mantle compositions and the mineral paragenesis of the ultramafic rocks are considered. Of necessity the volume contains a substantial element of the descriptive petrology of the ultramafic rocks, but this is leavened by the inclusion of subsections devoted to the stability ranges of the individual minerals of these rocks, particularly in relation to their pressure-temperature equilibria in the presence of water or water vapour and to experimental studies in the system  $\text{CaO-MgO-SiO}_2\text{-CO}_2\text{-H}_2\text{O}$ .

Many sections of the volume certainly attain the aim stated in the preface, and the teacher will find an excellent account of the major types of ultramafic intrusions and the research worker a clear statement of many of the problems that still await solution. For the enthusiastic advanced student the various sections provide an excellent basis, and there is a more than ample bibliography of the more important original papers for further reading. The volume is clearly printed and the diagrams are well drawn and add to the general efficiency of the presentation. The work is an essential for all earth science libraries, and in spite of its high price will be equally an integral part of the equipment of all teaching petrologists.

W. A. DEER

## LOW DENSITY FLOWS

### Introduction to the Dynamics of Rarefied Gases

By V. P. Shidlovskiy. Translated by Scripta Technica Inc. Translation edited by J. A. Laurmann. Pp. xvi + 168. (New York, Amsterdam and London: Elsevier, 1967.) 130s.

IN spite of the extremely rapid growth of interest in this field during recent years, this is the first text-book to appear for some time which can claim to be entirely about low density flows, though several books on gas dynamics have dealt briefly with the subject. Consequently, the book fills an obvious gap in the literature and is doubly welcome since it contains a number of references to Russian work before 1965, when the book was first published in the Soviet Union. The translation editor has helped considerably by including footnotes on relevant research which has been published subsequent to this date. Although the translation is no doubt accurate in a literal sense, it is somewhat pedestrian. There are a number of minor syntactical errors and misprints.

It is stated that the book is aimed at graduate students, presumably those coming to the subject after an intensive training in conventional fluid mechanics. The treatment is theoretical; experimental methods lie outside the scope of the book and no detailed comparisons with experimental data are given. In fact, the author says that his aim is to introduce the subject without giving a complete survey of the whole field. Perhaps for reasons of continuity the author has put considerable emphasis on specific problems, for example, Couette flow in all its various guises. It is debatable whether it is ideal to include in an introductory text a large amount of detail on particular problems, rather than to concentrate on more fundamental aspects. It does, however, enable the student to follow closely the practical application of some

of the mathematical techniques used in non-continuum flow theory.

Occasionally the arguments used to justify the approximate methods seem rather tortuous and are not always very clear; for example, the statement on page 86 that "If  $R_{e_0}^{-1/2}$  is not negligible but  $R_{e_0}^{-1}$  can be neglected in comparison with unity then the Navier-Stokes equations yield simpler equations for the boundary layer" is at best misleading.

Nevertheless, this is undoubtedly a useful book. It is one which most graduate students will wish to read. Whether they can afford to buy it is another matter.

P. A. BLYTHE

## ANOTHER JOURNAL

*International Journal of Mass Spectrometry and Ion Physics* Vol. 1, No. 1, April 1968. (Amsterdam: Elsevier, 1968.) Annual subscription £10 7s. 6d.

THE title of this new journal is somewhat lengthy. It is, however, quite explicit and shows that it is seeking to gather, into one set of covers, papers which at present are spread over many publications. If successful, this will be a great convenience to those wishing to keep up with the growing number of papers in this field, though any increase in the number of periodicals to be taken may not be so enthusiastically regarded by librarians and library committees.

The first issue includes papers concerned with essentially practical considerations of design and operation of equipment, with results illustrating their success. These embrace a sample inlet system, an ion source using monoenergetic electrons, a mass spectrometer collecting positive and negative ions simultaneously and an improved ion detector. There are other papers concerned with the detailed interpretation of mass spectra in which electron impact ionization, photoionization and field ionization are all represented, besides direct coupling to a gas-liquid chromatography column. A theoretical paper on field configurations complements the experimental accents.

Some "short communications" are included in this first number, as well as more lengthy papers. No author has yet taken the option of writing in French or German, nor has a review article appeared, although these possibilities are apparently in view.

In summary, a good start has been made in launching a journal which will be very worthwhile if it can maintain its initial promise.

P. F. KNEWSTUBB

## LEARNING SYSTEMS

### Automation Theory and Learning Systems

Edited by D. J. Stewart. Pp. xi + 215. (London and New York: Academic Press, 1967.) 63s.

THE papers in this book are of various levels of sophistication. The mathematics, for instance, range from simple arithmetic to the rigours typified by the Bourbaki series, making it difficult to imagine how the engineers, psychologists and other behavioural scientists, for whom the book is partly intended, will cope. This is not to say that the individual papers themselves are anything but excellent; the list of distinguished contributors ensures that the material is first-class and that "a complete spectrum (in the field of learning) is covered, from the mechanical procedures of algorithms and the set theory of mechanisms and homeostasis through to the design of learning machines".

Shepherdson's paper, in a sense, is the odd man out for it only hints at learning systems. Finite and infinite machines, both deterministic and probabilistic, are discussed together with a mention of theorem proving by