of ephemeris time and the adopted secular acceleration of $-22.44''$ (century)$^{-2}$ in the Moon's mean longitude.

In his book R. R. Newton rediscusses the ancient observations and comes to the conclusion (in the opposite sense to Adams) that they support an average value of almost double the currently adopted value. There can be no question either of the importance and value of Newton's contribution or of the impetus that it will give (and, since preprints were widely circulated in September 1968, has given) to research in this field, particularly the analysis of both ancient and modern observations.

The basic unresolved problem is geophysical in respect of the medium term behaviour of the Sun–Moon–Earth system: can the dissipative effects have changed by a factor of 2 in the past 2,000 years, or are either the ancient or modern observations (or analyses, or both) suspect? The question throws doubt on the efficacy of the determination of ephemeris time from observations of the Moon in indicating possible cosmological differences from atomic time. Newton only touches this matter lightly in his final chapter, being otherwise content to present the evidence.

The main part of the book is devoted to a detailed investigation into the records of ancient eclipses and their interpretation. This is a specialist field, much aided now by precise predictions, but involving scholarship of high order and judgment; Newton is very critical of the methods of his predecessors who, in his view, tended to introduce bias by forcing identification. Not all will agree with his interpretations, however; and his methods of analysis are not always as precise as might be desired. But he provides very full information of his sources, his arguments and his treatment; he reviews critically most modern investigations, and he gives a valuable digest of the many confusing notations that have been used. It is a quite invaluable contribution and one that no research worker in either the astronomical or geophysical fields concerned can afford not to have.

D. H. SADLER

Peculiar Stars

Stellar Spectroscopy : Peculiar Stars. By Margherita Hack and Otto Struve. Pp. 317. (Observatorio Astronomico di Trieste: Trieste, 1970.)

THIS book is the second part of the updated revision of a text originally written about ten years ago but not published at the time because of Otto Struve's death in 1963, and it fills a substantial gap by providing a detailed survey of the results of stellar spectroscopy from a chiefly observational point of view. Normal stars were dealt with in the first part of the series.

The concept of peculiar stars is relative: some unusual stars are merely extreme cases of processes in stellar evolution or stellar atmospheres that are believed to be fairly well understood, while other groups of quite frequent occurrence are more or less baffling in the present state of knowledge. Furthermore, it is convenient to group together stars of widely differing evolutionary status having common characteristics such as emission lines. This book accordingly concentrates on three broad classes: hot stars with emission lines; novae and other explosive variables (which also have emission lines); and magnetic, metallic-line and related stars. Other groups like T Tauri and symbiotic stars are mentioned only in passing. The text is partly expository and partly composed of skilfully blended quotations from review articles.

The task of providing a coherent survey of these diverse and only partially understood types of stellar spectrum is difficult, and Mrs Hack has done remarkably well in making the material coherent and reasonably up to date. There are gaps: for example, the possibility of collisional excitation in nova spectra has been ignored and there is no reference to the important work done on non-dipolar fields in magnetic stars. Also some of the arguments used do not have a clear physical basis, particularly on the rather fiendish problems involved in interpreting the behaviour of magnetic spectrum variables. However, the book is a good summary of the observational data in its chosen fields and will provide an excellent starting point for students embarking on an investigation of peculiar stars.

BERNARD PAGEL

Chemical Texts

Physical Methods of Chemistry. Edited by Arnold Weissberger and Bryant W. Rossiter. Part 1A: *Components of Scientific Instruments.* Pp. xi+433. £9.50. Part 1B: *Automatic Recording and Control, Computers in Chemical Research.* Pp. 330. £8. (Techniques of Chemistry, Vol. 1.) (Wiley-Interscience: New York and London, May 1971.)

"TECHNIQUES of Chemistry" is the replacement for the well-known series "Techniques of Organic Chemistry" and the first volume, *Physical Methods of Chemistry,* succeeds *Physical Methods of Organic Chemistry.* Part 1A, *Components of Scientific Instruments,* contains chapters on mechanical and electronic components, the latter being preceded by a chapter on basic electrical principles. Finally, there is a chapter on the generation and modulation of waves (both electromagnetic and acoustic).

The standard of presentation is variable, and in some cases the rate of progress from an elementary start to more sophisticated matter is alarming. Thus, much of the material must appear to be either far too elementary or too difficult for any particular reader. This volume is therefore unlikely to be attractive to individuals and will only find a ready sale to libraries. Even here it would seem that, for a good proportion of the material, likely users will find other specialized texts (not necessarily more advanced) more valuable. It is particularly irritating to find, in a volume as expensive as this, much wasted space. While this is clearly a personal view, I find it difficult to believe that pages of photographs devoted to "view of typical printed circuit card, card rack, hand-wired circuit board, typical multi contact connectors", and such like, can be justified.

Part 1B, *Automatic Recording and Control, Computers in Chemical Research,* contains four chapters. The first, on detection, is principally concerned with various transducers for converting in most instances a change in a particular physical property into an electrical signal, and related matters. I found this chapter interesting and believe that it could be helpful to many. The next very short chapter on automatic recording reads like a collection of technical specifications for various recorders. Such information is freely available, indeed it is difficult to avoid receiving much of it, from manufacturers.

The third chapter, on automatic control, discusses linear feedback control networks, the ways of obtaining data and applications of basic principles to specific systems and the use of feedback for some typical controllers used in chemical apparatus. For those concerned with designing apparatus for chemical research this chapter could be valuable and should enable them to talk sensibly with their senior electronics technicians. The title of the final and longest chapter, "Computers in Chemical Research", is misleading: nearly sixty pages are devoted to Fortran. Surely nobody wishing to learn this language will turn to a book of this type. Similarly, although they make quite easy reading, the history, basic principles and a long and elementary discussion of binary arithmetic and Boolean algebra are out of place in a book about techniques of chemistry. Part of the relatively small fraction of this chapter on digital computers has some real value in the context of this volume. I can imagine very few individuals buying this volume, for more than half of the material is readily available elsewhere at considerably lower cost.

H. M. FREY