and Gas-bearing Basins, Tectonics of the Tibetan Plateau, Progress in Quaternary Research, Mineralization Associated with Granites, Metamorphism and Tectonics, and Exploration Potential of Hydrocarbon Distribution in Basins. Atmospheric–Hydrospheric subjects include Tidal Corrections to Levelling, the Moist Baroclinic Atmosphere; Storm Surge Research and Predictions; Glaciology, Cryopedology and Mount Hazards, Marine Physical Chemistry, Large-scale Disturbances and Interaction with Mean Flow in a Rotating Barotropic Atmosphere, and Tidal Friction in a Shelf-Sea. Also included are Chemical Composition of Iron Meteorites and Chondrites; Investigation of Extraterrestrial Materials, Elastic Wave Properties and Lithospheric Structure, Frequency of Acoustic Emission during Rock Fracturing, and Earthquake Predictions.

A perusal of many of these papers suggests that they are high-quality and useful reviews especially for those interested in gaining an insight into recent developments in China. There are few people that will have such a broad eclectic interest in so many diverse subjects and thus the volume may not appear on the shelf of many individuals. However, I recommend that all libraries should invest in this coming book series, and they should begin with this review of the Earth Sciences.

B. F. WINDLEY

OCEANOGRAPHY - A VIEW OF THE EARTH (4th Edition), edited by M. Grant Gross, Prentice-Hall International Editions, 1987. No. of pages: 406. Price: £17.95 (paperback).

The editor sets out his objectives for this volume in the Preface: '... to introduce students to the ocean and how it works', and secondly 'to introduce students to science ... and the ocean as an example of science in action'. I believe that these aims are achieved. To cover historical, geological, chemical, physical, and biological oceanography, is a mammoth task! Such a broad base inevitably leads to rather a basic level, and indeed, the book is aimed at high school graduates in the U.S., and probably at 1st year undergraduates taking oceanography courses in the U.K., although it may indeed be of more use to A-level science students.

The illustrations are excellent, simple and clear, and a number of colour plates add to the interest. On the whole, the text is well written and concise, although at times, the large number of subheadings act as a distraction rather than a help.

Whilst I am undoubtedly biased, I did feel that the chapters on chemical oceanography (chapters 5 and 12) are the weakest. The overlap between chemical and biological processes in, for example, control of the carbonate cycle, were not adequately covered. No doubt the editor would argue that it is impossible to go into any depth, however, it is questionable whether such a treatment of the subject is of any value at all, even at the most basic level. I was also somewhat surprised that there is no chapter on pollution, a subject which is of particular interest and relevance to the Ocean Sciences at present.

The book is nonetheless worthwhile, and I would recommend it to those people who have an interest in Ocean Sciences, and would like to study it further (although £18.00 might put them off!)

G. WOLFF

PHYSICAL GEOLOGY, by B. J. Skinner and S. C. Porter, John Wiley & Sons, New York, 1987. No. of pages: 750. Price: £15.95/$23.95.

This is a lovely book. It has a dramatic mountain colour photograph on the cover, a theme that is continued through its 750 large pages. Up to six beautiful full colour pictures, small but not too small, and carefully chosen to be relevant, are interspersed in the two-column text. The diagrams, too, are superb. Like the photographs they vary from page, two-thirds page, and column width as appropriate and, unusual for a book of this sort, are in full, pastel colours. They, too, are relevant, clearly and carefully drawn, and are nearly all original. The text is similarly pleasing to the eye; we are spared the horrid colour washes and boxes of similar textbooks and instead headings use type size, italic, and bold for variation, and new terms within the text are emphasized in bold and defined in italic.

Is similar care and attention paid to the content? It is. The text is clear, no frills, no unnecessary gobbledegook, just plain English, which is just what is needed in a student text. I found no editorial errors either. The content is somewhat similar to Arthur Holme's classic *Principles of Physical Geology*, but right up-to-date. Part 1 covers earth materials in six chapters: introductory materials, mineralogy, and petrology. Part 2 covers geological time and stratigraphy in two chapter and there then follow six chapters on geomorphology. Part 3, The Dynamic Earth, consists of six chapters covering structural geology, some geophysics, plate tectonics, landscape evolution, and climatic changes. Part 4 is two chapters on Earth resource. Part 5 is one chapter on lunar and planetary geology. There then follow five

appendices and a glossary. These appendices are very useful: A covers basic physical chemistry — atoms, tables of elements, bonding, and radioactive decay; B describes the identification of minerals and includes a very comprehensive table; C does the same for rocks; D is all about maps; E gives units and conversion factors, including the conversion of multiples and submultiples into scientific notation. Glossary and index, too, are comprehensive.

Physical geology is not much taught as a subject in Britain. Nevertheless, this book, like Arthur Holmes' in its day (and still today), can be usefully utilized by a wide range of students of geology and related sciences. Indeed, I am so enamoured with this book, and particularly pleased with the care which has obviously gone into its production, that it comes as an agreeable surprise to see that it costs only £15.95. Buy one and get the library to buy two.

PAUL A. SELDEN

RESEARCH IN TERRESTRIAL IMPACT STRUCTURES, J. Pohl (Ed.), Friedr. Vieweg Braunschweig/ Wiesbaden, 1987. No. of pages: 141. Price: £38.20.

A short preface is followed by a collection of seven original papers and a review. Roughly half of the book consists of four important papers on the Rochechouart, Reis and Sudbury structures and it is these that could justify its place on library shelves. The remaining papers would be more at home in specialist journals. The book contains material that will be of interest to a wide spectrum of geologists and advanced students of geology. The papers include; Bischoff, L. and Oskierski, W. *Fractures, Pseudotachylite Veins and Breccia Dikes in the Crater Floor of the Rochechouart Impact Structure, SW-France, as Indicator of Crater Forming Processes*, 5–29. A detailed study of the deeply eroded 25 km Jurassic crater which has impact melts, suevite, clastic polymict breccia, and monomict breccia but neither concentric structure or structural evidence of central uplift. The impact produced semi-random fracturing near the impact area as well as movement along existing fractures. Flat-lying shear zones occur just below the crater floor and are commonly coated by pseudotachylite. Five varieties of breccia dykes are considered to have been formed during different phases of the cratering.

Some of the faults and breccia zones were subject to hydrothermal alteration shortly after impact with the introduction of silica, carbonates, iron and sulphur. An important contribution only slighly marred by unidiomatic English.

Crosta, A.P. *Impact Structures in Brazil*, 30–38. A complication of information on the six possible Brazillian impact structures: Araguainha Dome, Serra da Cangalha, Colonia, Sao Miguel do Tapuio, Riachao and Vargeao Dome.

Dressler, B.O., Morrison, G. G., Peredery, W. V. and Rao, B. V. *The Sudbury Structure, Ontario, Canada*, 39–68. A detailed review of the geology of the Sudbury basin as an impact structure. Among the features recognised are ring fractures, an overturned crater rim, shatter cones, low grade shock metamorphism, pseudotachylite shock breccias and impact melts. The history is illustrated using a set of seven crustal sections. The stratigraphy is compared to that of the Reis structure. It is argued that the Sudbury igneous complex is the result of impact remelting and then contamination of a large mafic body at depth. A list of 65 references is given.

Ostertag, R. and Gasse, W. *Continuous Deposits of the Reis Crater, Germany: Sedimentalogical and Micropalaeontological Investigations of NASA Drill Core D*, 69–93. A complete study of NASA drill core D from 25 km south of the centre of the Reis crater. This penetrated 52·3 m of the Bunti Breccia which represents impact ejected material from the crater. It is shown that about 10 per cent of the groundmass is crater derived and the rest is local material. This is consistent with the hypothesis of secondary cratering and mass wasting involving turbulent deposition and mixing of crater and locally derived material.

Reimold, W. U. and Oskierski, W. *The Rb–Sr-Age of the Rochechouart Impact Structure, France, and Geochemical Constraints on Impact Melt–Target Rock–Meteorite Compositions*, 94–114. A particularly thorough use of the Rb–Sr method on impact glass gives an impact age of 185·5 +/- 4·41 (1) Ma. The impact melt is a subophitic intergrowth of pure high-sanidine with low-calcium pyroxene, the interstices containing a mesostasis partially altered to saponite or montmorileonite. Sodium was removed with the impact-generated gas phase during early excavation. Use of the HMX mixing program indicates that the impacting body was of chondritic composition. The first dyke breccia to form was produced by the injection of local, but not in situ, material before complete homogenization of the impact melt, the second by gravitational emplacement of the impact melt, the third by emplacement of fragmented in situ basement rock, and the last by emplacement of local material plus crater wall debris.

Theilen-Willige, B. *The Use of Airborne and Spaceborne Radar Images for the Detection and Investigation of Impact Structures*, 115–130. Demonstrates the application of SLAR (side looking airborne radar) images and spaceborne SAR (synthetic aperture radar) L band images to the search for impact craters. The former is useful in tropical areas and is demonstrated using the Araguinha structure of Brazil. The latter is useful in more arid areas and can penetrate a thin cover of dry sediments. It is demonstrated by finding circular features in Syria, Algeria and Saudi Arabia.

Milton, L. Wiberg. *The Hico Impact Structure of*