Value of Fossils (D. L. Dineley); Limitations of Radiometric Dating (H. Badsgaard, G. L. Cumming, R. E. Folinsbee, J. D. Godfrey); Palaeomagnetism as a Means of Dating Geological Events (L. W. Morley and A. Larochelle); Principles of Time–Stratigraphic Classification in the Precambrian (C. H. Stockwell). Another group of papers is concerned with application of the methods to selected areas in Canada, ranging in age from Precambrian to Recent; the titles are: Age and Correlation Problems in the Appalachian Region of Canada (W. H. Poole, D. G. Kelley, E. R. W. Neale); Historical Geology of the Devonian System in Western Canada (R. de Wit); Geochronology of Plutonic Rocks in Two Areas of the Canadian Cordillera (H. Gabrielse, J. E. Reesor); Notes on the Pleistocene Time-Scale in Canada (A. Dreimanis). The volume does *not* offer a comprehensive review of the geochronology of the Canadian Shield or of its bordering regions.

The different contributions are variable in quality, spanning the range from chatty, generalized discourse to detailed and interesting research reports. It appears from those papers on the application of isotopic dating methods that the geological interpretation of measured mineral ages is sometimes beset with major uncertainties. The discussion of the Canadian Appalachian region will be of particular interest to those British geologists struggling to elucidate the finer points of the chronology of the Caledonian orogenic belt in the British Isles. Clearly, there are many detailed similarities between opposite sides of the Atlantic, though this is outside the scope of the book.

The volume contains some rich examples of North American imagery, of which 'surfaces of equi-time' (p. 62) and 'feed-forced indiscriminately into the maw of the time-machine' (p. 23) are notable.

The aims and achievements of this book are modest, but several of the contributions provide useful summaries of specific topics that should appeal to time-minded geologists. There are numerous excellent tables and diagrams, and plenty of references. S. MOORBATH

PETTIJOHN (F. J.) and POTTER (P. E.). *Atlas and glossary of primary sedimentary structures*. Berlin (Springer) 1964. xv+370 pp., 117 plates.

This book contains a collection of plates, most of them full-page, illustrating a great variety of sedimentary structures. The collection is clearly not intended to be comprehensive, a deficiency compensated for by appending a lengthy (80 pages) and thoroughly documented glossary. The whole is preceded by a short preface and general introduction and

a notable feature is that all sections, including the plate captions, are repeated in English, German, French, and Spanish.

The introduction sets out the basic scheme of classification that has been followed in arranging the sequence of structures illustrated. The basic scheme is: I. Bedding, external form; II. Bedding, internal organization and structure; III. Bedding, plane features; IV. Bedding, disturbed and deformed.

Inevitably, in view of the immense complexity of the nomenclature of sedimentary structures, the classification adopted here is open to certain objections. The most serious one is the inconsistency in assigning essentially three-dimensional structures to either an internal (within-bed) or external (bedding-plane) group. Thus plates which reveal the internal structure of ripple-marks are included under bedding-types (termed flaser bedding etc., plates 17, 18), within cross-bedding types (plates 38B, 39), but only one illustration is included in the section on ripple-mark (plate 82A). A few words added to some of the captions would be sufficient to link these two aspects into a three-dimensional model. As it stands this divorcing of plan from profile can only serve to confuse those students to whom the entire subject is new and for whom the book is intended, as the Preface expressly states.

In a similar fashion the inclusion of plates illustrating sand-waves in plan and view within a section devoted to internal bedding characteristics is clearly inconsistent with the adopted plan of classification; the initiate might draw the inferential relationship with the cross-bedding illustrated in the next section but the novice could not be expected to do so.

The quality of the 129 illustrations is of a high standard and the choice and scope of the structures illustrated is generally good. One might cavil at the inclusion of limestone–dolomite interbedding, nodular structures, or gypsum–anhydrite enterolithic folding in an Atlas devoted to *Primary* structures and this reviewer can think of several features which could have been included with more justification than *roches moutonnées* or glacial striae. More serious is the lack of balance in the apportioning of illustrations dealing with specific structures. Thus, a total of eleven plates devoted to ball-and-pillow deformation structures (most of which do not reveal the critical internal lamination) seems excessive when there are only four depicting the great variety of convoluted laminations occurring in sands and silts and fourteen illustrating the even wider spectrum of cross-bedding types!

Mistakes in spelling appear to be rare (at least in the English text).

Those noted include 'Castlemarine' for Castlemartin, 'Moehave' for Mohave and 'Whin' for Thin in the captions to plates 4, 25, and 11B respectively. There are a few more serious errors in the captions. Thus in plate 93A the current is flowing from left to right and not the reverse as stated in the caption. In plate 61 (which appears to illustrate the same excellent specimen as in Pettijohn, 1957, plate 3) the current is from top to bottom, not from right to left as the caption has it. Moreover the core-specimen in plate 17B appears to be upside down. Finally, the authors claim in the Preface that they have not repeated any illustrations from their earlier volume on paleocurrents and basin analysis. In the interests of veracity this claim must be contested since plate 106A in the Atlas is merely a somewhat enlarged version of plate 30 in the previous book.

The glossary is useful and well compiled, and represents the best and most comprehensive attempt yet made to define the more common sedimentary structures.

In summary, if this book is to be assessed on the authors' criteria, as set out in the Preface, then it must to some extent be regarded as deficient since this reviewer's recent experience is that the Atlas is not entirely satisfactory in use as an independent vehicle for introducing students to sedimentary structures. On the other hand, when used in combination with existing texts, and especially with the authors' earlier volume, the inherent value of the Atlas is fully realized. In this context the book is to be recommended both to the student who wishes to see structures that may not be readily accessible to him, and also to the teacher who requires good illustrations to illuminate his course. From either point of view the Atlas is a thoroughly worthwhile investment.

G. K.

MILLAR (C. E.), TURK (L. M.), and FOTH (H. D.). *Fundamentals of soil science*. New York (Wiley), 1965. 526 pp. Price: $7.75.

This is the fourth edition of a text-book for agricultural students in American colleges. It has been considerably redrafted and brought up to date and is well written and illustrated. It has one chapter on mineralogy, which is adequately dealt with, and in the rest of the text, properties of the soils are always brought back to their mineral content. The book is primarily a teaching text for agricultural students and so is not of great interest to mineralogists.

H. G. M.

New Book

EICHHOLZ (D. E.). *Theophrastus: De Lapidibus*. Oxford (Oxford University Press), 1965. 141 pp. Price: 45*s*.

T. W. B.