BOOK REVIEWS

DEER, W. A., HOWIE, R. A. & ZUSSMAN, J. 2001. *Rock Forming Minerals. Volume 4A. Framework Silicates: Feldspars*, 2nd ed. xii + 972 pp. London, Bath: Geological Society of London. Price £115.00 (hard covers). ISBN 1 86239 081 9.
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This monumental work replaces the first edition by the same authors which was published nearly 40 years ago. Because of the enormous increase in knowledge about the feldspars, the commonest and most complex of the silicate families, the text has grown from 178 pages in the first edition (which covered all the framework silicates) to 972 pages. There has been an improvement in the quality of the paper, typeface and the diagrams, and micrographs, mostly of good quality, are included for the first time. The references, of which there are around 4000, are up to date to the early months of 2000.

The authors state in the preface that the book is not written primarily for the feldspathologist, but 'for the rest of the mineralogical and petrological community who wish to obtain an overview of the current state of knowledge'.

The layout of the book follows that of the first edition, except that Twinning now has its own section in the Alkali feldspar chapter, rather than being part of the section entitled Morphology and Twinning, and Experimental Work is a separate section in both the Alkali feldspar and Plagioclase chapters, whereas it was a sub-section of Chemistry in the first edition. Although the layout presented no particular problems in a text of 178 pages, in the new edition it makes it very difficult to find one's way around. There are only three levels of (un-numbered) heading in most of the book, although a fourth, inset italics, creeps in occasionally. However, only the first- and second-level headings are included in the Contents list at the front of the volume (though the first-level headings Distinguishing Features are omitted). Neither is the organization of the sectioning always logical or informative. For instance the Alkali Feldspars chapter is split into seven major sections, the first of which is Structure. This, in turn, is sub-divided into four sections: Introduction, Potassium Feldspars, Sodium Feldspars and Alkali Feldspars, none of which is listed in the Contents. The Alkali Feldspar sub-section is further sub-divided into 13 sections, two of which are entitled K-feldspar and (Na, K) feldspars! The former of these is actually concerned with time-dependent ordering of Si, Al in sanidene and the latter with the stability of intermediate compositions determined by lattice energy calculations.

The approach the authors have taken is an historical one, with most past significant work being mentioned. This approach adds to the length of the book but also means that the reader is rarely given guidance as to which studies are regarded as definitive and which are obsolete. Occasionally important contributions have been missed out. One I noted is on page 80 where the equation for the coarsening of exsolution lamellae is given as $\lambda = \lambda_0 + kt^{1/3}$, as determined by Yund & Davidson (1978), rather than $\lambda^2 = \lambda_0^2 + kt$, as determined by Brady (1987), which fits the experimental data better. I would also like to have seen more explanation of the terms used, e.g. the 'diagonal association' on page 76 and 'spinodal decomposition' and 'coherent' on page 80 and elsewhere. These are terms that may not be familiar to all readers.

The book begins with a short Introduction to the feldspars in general before launching into the chapter on Alkali Feldspars. At the beginning of the latter is the useful summary of optical properties, twin laws and crystallographic data that characterizes all the books in this series. The vast Structure section covers the structures *per se*, ordering, variations of cell parameters with *P* and *T*, spectroscopic studies and exsolution. This last topic, among others, suffers from a great deal of repetition in the book: it is also covered in the Paragenesis section (in two places), in the Optical and Physical Properties section and under Experimental Work. More cross-referencing and/or rationalization would have been useful here.

Short sections on Morphology and Twinning are followed by the Chemistry section, which begins with a description of the newer methods of chemical analysis and contains the familiar and invaluable tables of analyses. The optical properties of each specimen are included in the captions, along with cell parameters, space group, etc., where known. New tables of minor and trace elements and REE analyses reflect the development of XRF techniques since the last edition. The Experimental section runs to 250 pages and is comprehensive in its scope. Phase diagrams, thermodynamic measurements, isotope chronology, diffusion and low-temperature dissolution are all covered.

The Optical and Physical Properties section, in addition to the diagrams of optical orientations familiar from the first edition, also includes modern physical techniques such as thermoluminescence, cathodoluminesence, infrared and Raman spectroscopy. It is followed by a one-page section on Distinguishing Features which is almost identical to that in the first edition. It still omits lack of cleavage as a feature that distinguishes quartz from alkali feldspar (though that feature is mentioned further on in the book as a way to distinguish quartz from plagioclase)!

The last major section in the Alakli Feldspars chapter deals with Paragenesis. The coverage is almost ten times as long as in the 1963 edition and includes several new sections, including one on Lunar Rocks and Meterorites which, along with Sedimentary Rocks, Metamorphic Rocks, Gneiss, etc., is, bizarrely, a sub-section of Igneous Rocks! I would not agree that 'the development of perthite begins with twinning in the Or-rich phase', as stated in the Introduction.

The layout of the Plagioclase chapter is virtually identical to that of the Alkali Feldspar chapter, with many of the shortcomings in the sectioning being repeated; for instance, Sedimentary Rocks and Metamorphic Rocks are sub-sections of Plutonic Rocks. The Structure section is very thorough, though I found the descriptions of the '*e*'-structure and its origin difficult to follow. What is the difference between 'Ca-rich and Na-rich regions' and 'albite-like and anorthite-like regions'? Exsolution in labradorite has its own sub-section, but is also covered under Optical and Physical Properties. The fascinating thing about the microstructures that produce iridescence in labradorites is that the interfaces between the two 'phases' are still diffuse, despite the lamellar spacing being some tenths of a micron. This is because the cell parameters of the two 'phases' are almost identical and

therefore the strain at the interface is extremely low; it is the strain that largely determines the interfacial orientation, not the ordering, as stated in the text. Also the microstructure is a classical example of spinodal decomposition. It is a pity that a micrograph was not included (there are two of iridescent peristerites). A mention of Δ_{131} on page 676 set me wondering where this was explained, but a search in the index drew a blank.

The three final chapters are relatively short and cover the rare phases Barium Feldspars, Buddingtonite and Reedmergnerite.

Most of the shortcomings I have described above are problems that have arisen because of inadequate editing and because it is a multi-author volume. These should not detract from the book's achievements as a comprehensive source of information on this mineral group. It has no rival.

P. E. Champness

IPCC 2002. *Climate Change 2001: Synthesis Report*. x + 397 pp. Cambridge, New York: Cambridge University Press. Price £75.00, US $110.00 (hard covers), £27.95, US $40.00 (paperback). ISBN 0 521 80770 0; 0 521 01507 3 (pb).

IPCC 2001. *Climate Change 2001: The Scientific Basis*. viii + 881 pp. Cambridge, New York: Cambridge University Press. Price £90.00, US $130.00 (hard covers), £34.95, US $49.95 (paperback). ISBN 0 521 80767 0; 0 521 01495 6 (pb).
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The first report of the Intergovernmental Panel on Climate Change, published in 1990, fitted comfortably within 400 pages. It is a measure of the success of that report in stimulating climate research that the synthesis volume alone of the IPCC's Third Assessment Report is around 400 pages long. The synthesis report is supported by three detailed volumes, each around twice that length, dealing with (I) *The Scientific Basis*, (II) *Impacts, Adaptation and Vulnerability*, and (III) *Mitigation*, the first of which has been reviewed here. Indeed, even within the synthesis report, the reader can choose between three successive levels of presentation. There is a 34-page Summary for Policymakers, the 110-page Synthesis Report itself, and then Technical Summaries from each of the three working groups. If this variety of formats were not enough to satisfy every part of its target readership, the Synthesis Report is available in Arabic, Chinese, French, Russian and Spanish, and also as individual brochures of some of its component parts. The English text of all four volumes is available on CD-ROM and on the web at http://www.ipcc.ch.

As in previous volumes from the IPCC, the material is up-to-date, authoritative, and powerfully presented. The inevitable repetition of material that arises from the multi-layered publishing approach is undoubtedly worth the resultant gain in accessibility to the increasingly urgent message of global change. So, the Summary for Policymakers is a readable update for all concerned about climate change, and would be an appropriate teaching resource for classes at introductory university or advanced school level. The Synthesis Report as a whole could serve as a timely and affordable textbook for university courses in Environmental and Earth Sciences. The three detailed reports of working groups provide essential reference material for researchers in climate change, and these volumes will be needed in appropriate libraries.

For all the admirable efforts of the IPCC to summarize the global threat of climate change, they will be aware that their increasing confidence in predictions of devastating human impacts are not being successful in provoking appropriate governmental responses on the right scale. The report now specifically predicts that adverse effects of climate will predominate over any beneficial effects, that these effects will fall disproportionately on developing countries and the poor, but that stabilizing concentrations of greenhouse gases would still be in time to reduce future impacts in a major way. Perhaps the most alarming warning, however, is that of 'large-scale, high-impact, non-linear, and potentially abrupt changes in physical and biological systems'. As with more gradual climate change, the geological record again provides the crucial examples of how the Earth can behave, and geologists are set for continuing involvement in the climate change debate.

Nigel Woodcock

HOLLAND, C. H. (ed.) 2001. *The Geology of Ireland*. viii + 531 pp. Edinburgh: Dunedin Academic Press. Price £85.00 (hard covers), £55.00 (paperback). ISBN 1 903765 04 8; 1 903765 07 2 (pb).
Geol. Mag. 139, 2002, DOI: 10.1017/S0016756802236791

Charles Holland's *A Geology of Ireland* (Scottish Academic Press, 1981) has, for two decades, served as a valuable one-stop guide to the island's geology. However, twenty years is a long time amongst geologists, if not in geology, and a new edition has increasingly been needed. Give or take a definite article, *The Geology of Ireland* is that second edition.

The organization and format of the new volume closely follow its predecessor, with sixteen chronological chapters bracketed by an introduction and an historical chapter. The chapter on economic geology has been replaced by one on offshore geology. The Cambrian and Ordovician have each now been awarded their own chapters, the Tertiary has been combined with the earlier part of the Quaternary, and the Dalradian is described along with earlier Precambrian rocks rather than as a prelude to the Grampian Orogeny. There have been rather more changes in the authorship of chapters. Stephen Daly has taken over from Adrian Phillips on the Precambrian, Peter Coxon and Richard Bradshaw have updated the Tertiary and Quaternary chapters formerly written by G. F. Mitchell, and David Naylor has written the new offshore geology chapter. John Graham has energetically taken on both the Ordovician and Devonian from Charles Holland and the Variscan Orogeny from George Sevastopulo. Other chapters retain their original authors – Holland, Phillips, Sevastopulo, Chris Stillman, Harry Wilson, Jack Preston, Tom Murphy and Gordon Herries Davies, though sometimes with an additional co-author.

Most chapters, except for the Introduction and the History of Geology, have been completely rewritten to incorporate advances since 1981, and all chapters now incorporate a full reference list rather than the selected bibliography of the earlier edition. The book is a full 60% longer now, with particular expansion of the chapters on the Precambrian, Ordovician, Lower Carboniferous and Tertiary, and on the geophysical and offshore evidence. The scientific quality of the writing is generally good, although individual authors may naturally emphasize interpretations that would not have wide support – a model of the Grampian Orogeny (Fig. 3.18) involving Iapetus closure is a case in point. The factual rather than model-driven

approach of the book results is a wealth of valuable information. However, a regional perspective does not emerge in every chapter and a summary chapter of the broad-scale plate-tectonic controls on Irish geology would have been a useful feature.

The Geology of Ireland is well illustrated. Most of the figures have been redesigned and redrafted. The reproduction quality is good, excepting only some of the line drawings in the Precambrian chapter. A number of chapters use photographs to good effect, and some survive from the first edition – I am pleased that the lady in the impractical white flare-trousered suit is still being pursued across Clogher Head by the gentleman in black (Fig. 6.13). However, one photo (Fig. 4.2) at least has been stretched by nearly 40%, shallowing dips in the cavalier way of book designers who constantly need reminding that proportions still matter in geology.

No multi-author book is going to be seamless and entirely consistent, and some fall victim to late or non-submission of chapters. I suspect that Charles Holland's editorial comment that 'Co-operative ventures of the present kind are notoriously difficult to draw to a conclusion' is said with understated feeling, and he is to be thanked for his perseverance with this volume. *The Geology of Ireland* should now prove to be valuable reference for another two decades.

Nigel Woodcock

NESSE, W. D. 2000. *Introduction to Mineralogy*. xiii + 442 pp. New York, Oxford: Oxford University Press. Price £27.50 (hard covers). ISBN 0 19 510691 1.
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Introduction to Mineralogy by William Nesse is a new undergraduate mineralogy textbook from Oxford University Press. The book aims to provide a comprehensive introduction to the chemistry, structure and properties of minerals for undergraduate courses in geology. The book is divided into three parts. The first, 'Crystallography and Crystal Chemistry', contains chapters on basic crystallography, crystal chemistry, crystal structure and crystal growth. The latter chapter is a simple, but very useful, introduction to the basic concepts of thermodynamics and kinetics. The second section, 'Mineral Properties, Study and Identification', contains chapters on physical properties, optical mineralogy, basic X-ray crystallography and the chemical analysis of minerals. The final chapter in this section is a short essay on strategies for the identification of a mineral, using the material covered in the proceeding chapters.

Part three of the book contains a group of 11 chapters in which descriptions of the 100 or so of the most common minerals are given. The minerals are grouped according to a Dana-like classification. The silicate minerals are treated first, with chapters for each of the major structural groups: framework, sheet, chain, disilicates and ring silicates, and orthosilicates. There are also chapters on the non-silicate oxysalt groups (carbonates, sulphates, etc.), the oxides, hydroxides and halides, the sulphides and related minerals and finally the native elements. The treatment of the major mineral groups is fairly extensive, 17 pages on the feldspar group for example. Details of structure, composition, physical and optical properties are given and there are generally clear morphological, optical orientation and structural diagrams, together with black-and-white photomicrographs of the mineral in thin section. The level of treatment is very good, similar in many respects to that in Deer, Howie & Zussman's *Introduction to Rock Forming Minerals*, 2nd ed., but without the tables of chemical analyses.

The book is well presented, with a clean crisp look, and given that the book is hardbound it is very well priced at under £30. Apart from some silly referencing errors in the Introduction the book seems largely free of errors. If I have one criticism, it is that the book gives barely a hint of the exciting and expanding field of modern mineralogy. It is a book for training geologists not mineralogists. The book is an excellent undergraduate textbook for geologists, it covers the basics in sufficient, but not excessive, detail and provides the basic mineral data on the rock-forming and ore minerals for petrology classes. I am sure that lecturers and students will find it a very useful book.

Allan Pring

MANUTCHEHR-DANAI, M. 2000. *Dictionary of Gems and Gemology.* x + 565 pp. Berlin, Heidelberg, New York, London, Paris, Tokyo, Hong Kong: Springer-Verlag. Price DM 298.00; Ös 2176.00, SFr 269.00, £103.00, US $165.00 (hard covers). ISBN 3 540 67482 9.
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This dictionary of gems and gemology aims to be a comprehensive dictionary for gemologists, mineralogists, geologists, gem dealers and hobbyists. The volume contains definitions of over 16 000 gemological and mineralogical terms. The entries range in length from three or four words to over 500 words and some 250 entries are augmented by diagrams. This book is not a cheap, mass-produced, lavishly illustrated, encyclopaedia–dictionary, with dozens of colour photographs, but rather a comprehensive technical dictionary that contains a wealth of information. In evaluating this volume I 'road tested' it with public inquiries at the museum where I am curator of minerals. I found this dictionary particularly useful for tracking down some of the trade names given to obscure gem materials, which are not in the standard comprehensive mineralogical compendia. One can find that angelite is a name applied to anhydrite of bluish-grey colour used as an ornamental stone; Transvaal jade is a fine-grained, light green grossular garnet found near Buffelsfontein, South Africa; and a magic carat is a cut diamond that weighs exactly one carat or slightly more. (Apparently cut diamonds which weigh exactly $\frac{1}{4}$, $\frac{1}{2}$ or 1 carat are much easier to sell in the jewellery trade.) The dictionary also has entries on many minerals, providing basic crystallographic, compositional and physical data; however, I noticed a number of entries for species that have been discredited.

Springer has printed the book on high-grade stock, the layout and typeface are clear and easy to read, and the binding is sturdy, a necessity for a reference book. This is a very fine technical dictionary and should be in the reference section of all major geological libraries. The price will unfortunately deter all but those in the trade from purchasing a personal copy.

Allan Pring

GREEN, O. R. 2001. *A Manual of Practical Laboratory and Field Techniques in Palaeobiology*. xiv + 538 pp. Dordrecht, Boston, London: Kluwer. Price Euros 125.00, US $135.00, £85.00 (hard covers). ISBN 0 412 58980 X.
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Virtually anyone who has ever worked with or collected fossils has had to look up a reference on this technique or that

methodology at some point in their efforts. Sometimes this is a fast process, resolved simply by going back to a well-thumbed reference lying cosily under a stack of reprints on your desk. Other times, it might take age-long trawls through ancient and mouldering volumes at your local library, much to the annoyance of any present librarians and allergy sufferers. Owen R. Green's *A Manual of Practical Laboratory and Field Techniques in Palaeobiology* will go a long way towards eliminating (or at least reducing) this problem for many of us.

Green's book is divided into three sections. Part I is short and includes introductory comments on palaeontological techniques and laboratory documentation. Part II consists of a considerably longer discussion on field techniques. Topics covered include: collection procedures and techniques; consolidation, stabilization and replication techniques; determination of calcite/dolomite/phosphate in the field; and documentation, packing and transportation.

The third section, which makes up the bulk of the book, deals with laboratory techniques. It is further divided into five subsections: an introduction, three sections on procedures (physical, chemical and analytical), and exhibition of fossil material. Each subsection contains numerous chapters, with physical and chemical procedures gaining the most attention. Topics covered under the heading of physical procedures include mechanical preparation, disaggregation of unconsolidated or partially consolidated sediments, preparation of acetate peels, fossiliferous amber, and several aspects of the handling of microfossils, among others. The discussion on chemical procedures deals almost exclusively with the extraction of microfossils from different matrices.

Part III continues with analytical procedures, in which electron microscopy and X-radiography techniques are discussed. This third section of the book ends with notes on the exhibition of fossil materials, including the preparation of replicas, photomacrography and photomicrography, and illustrating/exhibiting for displays and publications. This volume concludes with a series of eleven appendices, ranging from the contact addresses of equipment and chemical suppliers to the description of sedimentary rocks and fossils as well as various health and safety topics.

Clearly, this book attempts to cover a great deal of territory – and on the whole it succeeds well. I applied two simple tests while reading the chapters in this volume. One: did the topics I have experience with describe their subject matter well; and two: after reading the topics I have less (or no) experience in, did I feel I could responsibly carry out the tasks in question? In both cases, 'yes' was almost always the answer. This is aided by the extensive use of flow charts and an almost recipe-like style of outlining steps in many techniques (which did occasionally leave me feeling as if I were being spoon-fed – but as this book is intended for amateurs and students as well as professionals, simplicity is perhaps the best option at times).

The effectiveness of this book is also partly due to the fact that each chapter ends with an extensive list of references, providing an easy outlet for gathering further information if required. Some of this extra information is provided in a series of well organized tables and figures, providing extra technical information to accompany the techniques discussed. There is also very good cross-referencing between chapters, eliminating the need for excessive repetition between chapters (although there is, perhaps inevitably, some).

In the acknowledgements, Green thanks the editorial staff 'initially Chapman and Hall and latterly at Kluwer Academic Publishers'. This apparent switch in editors may be at least one reason for the biggest problem this book possesses: there is a truly horrendous number of errors throughout the text, particularly in Parts I and II. Spelling mistakes, incorrect punctuation, missing words, poor grammar – they all occur, sometimes with multiple mistakes occurring on a single page. In this day and age of intelligent word processors and strict publishing guidelines, it is truly hard to imagine how a book with so many errors could be published without anyone noticing!

Despite this, this is still a good volume that effectively sets out what it intends to do: provide 'an explanation and understanding of practical procedures' that may be of use to anyone working in palaeobiology. As would perhaps be expected for a technical manual, it is not an enthralling read, but it will be a useful volume to anyone new to palaeobiology or wanting to learn new techniques in the field.

Rod Taylor

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