BOOK REVIEWS

COE, A. L., ARGLES, T. W., ROTHERY, D. A. & SPICER, R. A. (eds) 2010. *Geological Field Techniques*. xii + 323pp. Wiley-Blackwell/Open University. Price £80.00, €96.00, US$150.00 (HB); £24.99, €32.90, US$59.95 (PB). ISBN 978 1 44433 061 8 (HB); 978 1 44433 062 5 (PB).
doi:10.1017/S0016756811000112

Field work has always been a central part of university geology courses. Without it, students can never hope to understand geological relationships at scales from metres to hundreds of metres, however many thin sections, hand specimens, aerial photographs or seismic profiles they see. Despite the dual threats of reduced financing and increased safety concerns for field work, most students spend many days in the field: a minimum of 60 days through a UK three-year course to qualify for professional accreditation. Traditional onshore field work has occupied geological researchers less over the past couple of decades, but it still survives, with sampling work predominating over geological mapping.

Since the 1980s, the standard books on geological field techniques have been the *Geological Field Guide* series led by Barnes & Lisle (2003) on *Basic Geological Mapping* and including companion volumes on sedimentary, igneous and metamorphic rocks, and on structures, field hydrogeology and field geophysics. Most of these volumes have gone through several editions, and are still reliable guides. However, the average student geological mapper might need at least two or three of these volumes, now at around £20 each, in the average mapping area. The new volume by Angela Coe and Open University colleagues Tom Argles, David Rothery and Robert Spicer, aims to combine much of the necessary information into one volume.

There are introductory chapters on field equipment and safety, making field observations, and on keeping a field notebook. Five central chapters then cover the recording of palaeontological and structural information, and the features of sedimentary, igneous and metamorphic rocks. Only then is there a chapter on making a geological map, before concluding chapters on instrumental observations, photography and sampling. There are seven appendices containing tabulated, diagrammatic and photographic reference material for the central and mapping chapters.

Overall, the content of *Geological Field Techniques* is excellent. The book is admirably suited to undergraduate students and amateur geologists, but research students and professionals will find much of interest. In the earlier part of the book, I particularly liked the chapter on keeping a field notebook. This is a skill as important as it is difficult to teach. Here some clear guidelines and copies of notebook pages from a variety of geologists are very effective. Similarly clear instructions on how to make a graphic lithological log are also welcome. I was nervous that geological mapping was not covered until two-thirds of the way through the book, the philosophy clearly being that by then the component observational skills had been taught. I was relieved to find that exposure mapping is encouraged in suitable terrain and that feature mapping is explicitly covered. I would have liked to see a section on using stereographic plots of structural data to tune up the mapping of major structures. I was also disappointed to see little guidance on mapping superficial deposits. Most of the solid rocks in temperate regions are covered in 'drift' which has its own fascinating geological story to tell, and which is often of more applied geological relevance than the bedrock. In more arid regions, distinguishing bedrock from regolith is one of the problems that students find most vexatious, and some guidance would have been helpful.

These criticisms, however, are minor in the context of a generally excellent book. It is highly informative, attractively designed and illustrated, reasonably priced and has its corners already rounded to survive in the rucksack. It deserves to be widely used.

Nigel Woodcock
University of Cambridge

Reference

BARNES, J. W. & LISLE, R. J. 2003. *Basic Geological Mapping*, 4th ed. Wiley. 196pp.

ZALASIEWICZ, J. 2010. *The Planet in a Pebble. A Journey into Earth's Deep History*. xvi + 234pp. Oxford University Press. Price £16.99, US$27.95 (HB). ISBN 978 0 19956 970 0.
doi:10.1017/S0016756811000148

Jan Zalaziewicz tells the story of an ordinary pebble of grey Silurian slate picked up from a beach in Wales, its components and history, going back as far as the Big Bang 13.7 million years ago. This is a wonderful book, in which hard science is explained in simple but effective terms. The prose is exquisite, and the starscapes and Earthscapes are conjured up with magical inward vision. Open a page at random, and read, as I have just done 'Field geology is the ultimate forensic science, the art of the possible, where one combines as much evidence as one can get hold of, with as much ingenuity as one can muster – and also with a keen sense of the limitations of one's deductions'. Who would not envy the ability to write like this? But purple prose is absent in this enchanting volume. This is all good stuff.

The first chapter takes us to the Big Bang and the formation of the elements now present in our pebble. Vast star systems originated, collisions of stellar bodies and young planets took place on an unimaginable scale. Our planet eventually stabilised, with convection currents below an evolving lithosphere (Ch. 2); quartz crystallised from granitic magma, to become an almost ubiquitous component of sedimentary rocks. Amongst the quartz fragments in a sediment we find rare minerals, including zircons (Ch. 3) that are often zoned, thereby recording events in their history as they grew.

So, the grains of our pebble, with their separate histories, came together in an oxygen-starved deep sea, off the Avalonian continent. On this deep sea floor mud accumulated, affected from time to time by turbidity currents and sea level changes, chiefly the result of glaciations (Chs 4 & 5), all neatly explained. Conditions were ideal for preserving the planktonic graptolites which rained down after death, to be preserved, unscavenged (Ch. 6). Their nature, biological relationships and stratigraphical uses are treated lovingly, as is their preservation, with fine drawings and colour plates.