Geology: A Self-Teaching Guide

Barbara Murck, 2001. John Wiley & Sons, Inc., New York; 328 pages, softbound, US$ 19.95; ISBN 0-471-8590-5

Like most geologists, even those who aren't teachers by profession, I have been faced with interested friends or family members who asked “How can I learn more?” I generally look uncomfortable and fumble for words because I really want to suggest they take a Physical Geology course and I know that isn't going to happen (usually because the questioner is way past college). I know I can't direct them to a typical textbook as even the best are not designed for independent learning, rather they depend on an instructor and lab exercises to make sense of the material. The average non-scientist diving into a Physical Geology textbook generally comes up overwhelmed with terms and gasping for breath. With this in mind, I jumped on *Geology: A Self-Teaching Guide* by Barbara Murke when it showed up on my desk. Perhaps here was the answer to my recurring dilemma?

Geology: A Self-Teaching Guide, as the title implies, is an attempt to provide an affordable introduction to geology that is accessible to anyone. The text is divided into short chapters that start with clearly stated objectives and end with study questions (answers provided). Key terms are highlighted in bold in the text and listed at the end of the chapter, but a glossary is not included. When writing a general text such as this, there is always a tradeoff between what to cover and what to leave out. An amazingly wide range of topics is included with many rather advanced concepts. A number of topics normally covered were either covered too briefly (e.g., mass wasting) or not at all (e.g., deserts) but there will always be winners and losers.

All introductory geology books are faced with the problem of what to teach first, rocks or plate tectonics. This book chose plate tectonics which is a good choice since most people find rocks and minerals slow going without some context. The second chapter discusses origin of the earth and minerals, a somewhat odd combination that works rather well. Rather than following this with rocks, Murke sidesteps into geologic time and dating techniques. For the non-geologist this is one of the most difficult concepts and Murke does an excellent job of presenting the case for the extreme age of the earth. The following section on the interior of the earth is also well done including more of science methodology (how do we know this?) than expected in such a short discussion.

The next four chapters cover rocks in the usual order (igneous, weathering, sedimentary, metamorphic). Rocks are very difficult for students even when they get the rocks in lab. Without a lab, rock names simply become words (granite, sandstone, etc.) with very little meaning. Given this handicap, Murck does a good job with rocks by spending most of her text on things related to rocks, like volcanoes, depositional environments and deformation, rather than on rock identification. However, the downside is a large number of topics that usually get entire chapters (e.g., glaciers, structural geology, mass wasting) are compressed into a few pages each. This often degenerates a simple iteration of terms unlikely to lead to any understanding. For example, outwash plain, eskers, drumlins and moraines are all covered in less than half a page without a single diagram. Mass wasting is given even less; the entire topic is just over one

page of text with one figure. Given the widespread human costs associated with landslides and slumps in many parts of the world, this skimpy coverage seems rather inappropriate.

The last four chapters of the book offer many topics not usually covered in physical geology. Chapter 9, on the hydrosphere and atmosphere not only discusses the water cycle (in great detail) but also includes tides, atmospheric circulation, climate and climate change. I was rather surprised to even see Milankovitch cycles and deep ocean currents. Chapter 10 purports, in a very small space, to present "The Record of Life on Earth!" Given the space limitations, it almost succeeds in this goal covering everything from the origin of life though the Cambrian explosion, evolution of land plants, animals and hominids, and finishing with mass extinctions. As you might expect, however, the result is too brief to generate real understanding of so vast a topic. Next is a rather predictable chapter on earth's resources with an emphasis on energy including alternative sources such as solar, wind and wave energy. The last chapter is a capstone discussion of earth systems and cycles with most of the space devoted to rock origins in plate tectonic settings. This section is well written but seems delayed since rocks and plate tectonics were covered much earlier in the book.

The writing is clear and easily understood with even the more difficult topics well covered. However, there is one major flaw in this book: the figures. There are way too few of them for a topic as visually oriented as geology. The figures included are well done (mostly line drawings with a few well-chosen photographs) but there simply aren't enough of them. I expect this was to keep the cost of the book down; at US$19.95 it is significantly cheaper than the usual US$50-100 for introductory textbooks. However, in my opinion, the publishers went too far—there just aren't enough figures to illustrate the topics covered. For example, how can anyone be expected to understand plate tectonics when there isn't even a world map showing plate boundaries! What makes plate tectonics come together for most people is seeing the remarkable correlation between plates, earthquakes and volcanoes—none of which are illustrated. In the end, the lack of adequate figures probably prevents the use of this book as the "self-teaching guide" it claims to be. The clear writing and concise coverage, however, would make it useful as a text in a course designed for non-scientists where the instructor can provide the missing figures.

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