Analytical Sedimentology

edited by **Douglas W. Lewis and David McConchie**, published by Chapman & Hall, 2-6, Boundary Row, London SE1 8HN, UK in 1995, ISBN 0-412-01216.

Review by **Christopher G. Kendall**

This book is like its companion volume that provides an overview on procedures and advice on how to go about describing sedimentary rocks in the field and in the laboratory. Emphasis is on field work but there are good sections describing laboratory techniques for describing sediments. It would be my guess that this book is aimed at advanced undergraduate and graduate students who are studying sedimentary geology and need a handbook to help them with their work.

The authors have created a cookbook approach to the analytical procedures of sedimentology. The book begins with an introduction including some discussion of safety considerations including, among other things, advice on not getting drunk in the field. It also discusses the utilization of personal computers, how to design the project, ethics, etc. It also describes the utilization of aerial photographs and maps, field equipment, how to make traverses, select units, describe units, determine age of units, describe coals, measure geological sections, use a compass, and how to go about survey. It explains the use of photography, and how to work in the base camp in evenings during bad weather. It explains how to conduct chemical analysis in the field. Then there is a discussion of sampling, sampling strategies, sample collection including cores, grab samples, explosives, sediment traps, how to sample coals, store samples and transport, and make peels, etc. The manual describes how to treat samples in the laboratory; how to split samples; determine water content and bulk density; how to disaggregate and disperse sediments; remove salts; how to remove different sediment components by chemical means; how to dry sediment; extract microfossils; mount loose grains for microscopy; impregnate material; embed grains; prepare thin-sections; polish sections; stain pores; streak prints; create acetate peels; rock crushing and grinding; to prepare for chemical analysis; and finally liquid and plastic limits. There is a short description of how to analyze sedimentary structures; how to enhance original structures; collect paleocurrent data and directional data for tectonic deformation; evaluate directional data; and present results. There is a chapter on textures; shape; methods for determining the size of detrital sediments; treatment of size data; texture of carbonate sediments; grain surface textures; fabric studies; and porosity and permeability. There is a chapter on mineralogy; common rock-forming minerals of sand size; optical microscopy; cathodoluminescence; reflected light microsopy; coal microscopy; heavy minerals; electromagnetic separation; miner's pan and superpanner; mineral staining methods; modal analysis of thin and polished sections and grain mounts; x-ray diffraction; differential thermal analysis and thermogravimetric analysis; infrared spectrophotometry; raman spectroscopy; and mössbauer spectroscopy. There is a chapter on chemical composition; loss on ignition; organic and inorganic carbon; total sulfur; total kheldahl nitrogen; oils and grease; ion chromatography; electrochemical methods; x-ray fluorescence; electron microprobe and EDAX; atomic absorption; flame photometry; ICP and ICP-MS; and spectrophotometry. There is also a chapter on the borehole environment; lithological drilling logs; geophysical logs; and correlation using geophysical logs.

As with its companion volume, Practical Sedimentology this is really an attempt to provide an overview. However in this case, this is on analytical techniques in the form of a self instructional manual which guides the analysis of sediments. As with its companion volume, I found that this book did not completely deal with the topics approached and I recognize that if

I needed to go any further with the description and information provided in this book, I would need to refer to other texts. For instance, while the section on the use of microscope to examine thin sections was helpful in itself the reader would have to refer to other books to go further with the topic. This is true with all of the chapters in this book. The authors don't pretend that the book is anymore than it is, a cook book. It is up to the reader to go and find other texts in the library, but this text as a starting point and as such is extremely useful. I am glad that I have this text and will refer to it, recognizing that it is only an introduction to this vast and complex topic. As a beginning it is extremely useful and so may end up on your shelves if you are in need of a text on analytical sedimentology. Libraries should have it as a source book rather than something referred to everyday. Once you have referred to the book on a topic, you are unlikely to refer to that topic again since the information in the text is simplistic, to the point and easily understood.