# *Computer Modeling of Geologic Surfaces and Volumes*

*Edited by **David E. Hamilton & Thomas A. Jones**, AAPG Computer Applications in Geology. No. 1. 297 pages. ISBN 0-89181-700-X.*

## Review by **Christopher G. Kendall**

This excellent book is probably the unintended companion to Computer Graphics, Edited by Pflug and Harbaugh, which is reviewed after this. Hamilton and Jones' well illustrated book contains both in color and black and white figures. It is composed of some 19 papers, which focus on the computer mapping of geological features. The book begins with a discussion of computer-generated, contour mapping, graphical techniques for locating anomalies, the use of shape-assited techniques to improve interpretations of geological features such as stream channels and ends with a discussion of the quite complex three-dimensional modeling of geological structures.

The book is broken down into two parts: the first half consists of some twelve papers, which deal with how you manipulate geological data and create surface models. This half begins by discussing how geological mapping problems are solved and subsequent papers show how to apply this philosophy to real examples. Emphasis in these papers is on two-dimensional mapping and how if one uses normal contouring programs, the geological trends that subsurface may contain may be obscured by the sampling interval. However, the book demonstrates that with some geological intuition and some feeling for the regional data, it is possible to influence the orientation of contouring and so instead of emphasizing the concentric circles around the high or low points, the map takes on a fabric which matches that of the geological surfaces more accurately. Obviously, as the authors of these papers recognize, even the assisted shape control on contouring may be a fantasy and care must be placed on such an interpretation and geological judgment is needed. It's a question of truth versus beauty, and beauty being in the eye of the beholder; or in this case, perhaps the Creator. Examples vary from mining to oil field examples ranging from the creation or mapping of stream channels in Kansas, pinnacle reefs in the Michigan basin, faulting, three-dimensional models on focused on a fan delta, sulfide deposits in British Columbia, estimation of hydrocarbon volumes, etc. The aim of the editors was to downplay the mathematical relationships and to emphasize the geological influence on mapping and the use of geological intuition to guide the contouring techniques used by the different authors.

In the second half of the book, there are some seven papers on three-dimensional geologic block modeling. They begin by focusing on how two-dimensional mapping problems that can be solved through three-dimensional modeling. Other papers are concerned with the storage and the creation of three-dimensional models. Some of the most interesting three-dimensional modeling involves complex geological structures and how these are displayed using color graphics.

Probably the most important concept one can gain from this book is how the science of visualization of geological data is rapidly advancing to match the falling price of microcomputers and their ready availability to us all. This is an important book for all petroleum geologists and geophysicists because it exposes us to a new and developing technology. Today, we may not be using this technology, but tomorrow, we will. The application of this type of software is becoming easier, and as we manipulate geological data more readily, we can learn more about the subsurface. The book is up to AAPG's usual standards: beautifully illustrated, well referenced, and tidily written. The editors should be

congratulated on this book and I'm glad to have it on my shelves. Anyone involved with geological mapping and the creation of geological cross-sections will find this the useful text in the evaluation and the acquisition of software for themselves to conduct a similar mapping of geological features. The only things that one needs to do this are: access to the data, software, and the correct machine. Then, you've entered the new geological era.