pretation. It incorporates the inference and knowledge of human dipmeter experts. The first prototype system, which was completed in December 1980, consisted of interpretation in marine environments, but recently the system has been extended to continental and transitional environments as well.

The Dipmeter Advisor system has a highly interactive graphics user interface. During the interpretation, the user has access to the arrow plot data and other related well data through a graphics display screen. The interpretation is made in a sequence of passes over the data, each pass arriving at some conclusions based on user input, combined with applications of the rules of dipmeter interpretation and of pattern recognition algorithms in previous passes. The partial results are displayed on the graphics screen for user verification and the user can, with graphics interaction devices, make any additions, deletions, and modifications of the results in each pass. The final output of the system consists of a log annotated much in the same way as dipmeter logs are currently annotated by human experts.

Several aspects of the Dipmeter Advisor system will be described: the system organization, the graphics interface, and the general form of the rules and the inference structure. The operation of the Dipmeter Advisor system will be demonstrated with an example of dipmeter interpretation.

CRANE, DAVID C., Consultant, Dallas, TX

Microcomputers in Exploration—A Survey

The author has contacted about 50 geoscientists who are using "personal" microcomputers (micros) in their profession. They include respondents to notes in the *AAPG Explorer*, people referred by members of the AAPG Committee on Computer Applications to Geology, and numerous other members of the AAPG and SEG whose assistance is gratefully acknowledged.

Microcomputers have been widely available for only about five years. Software sophisticated enough to realize their potential has been slow to appear, but a surprising number of geoscientists, including independents and consultants, now wonder how they ever survived without computers. Reported applications areas range from word-processing, production accounting, and financial analysis of prospects to log analysis and creation of synthetic seismograms. System costs range from under $2,000 to over $30,000 *plus* software.

Explorationists involved in the rapidly growing use of micros are invited to submit their names, addresses, applications, system descriptions, and interests to the Committee on Computer Applications to Geology for inclusion in the next survey mailing. The first survey and mailing list are being made available as part of this paper.

DOWNING, JAMES A., ZYCOR, Inc., Austin, TX

Interactive Gridding

Gridding of geologic or geophysical data is at the foundation of most computerized mapping and modeling operations. Surface display techniques such as contouring, fish-net isometrics, and cross sections are usually derived from gridded surface models. Processing and analysis techniques such as surface filtering, trend analysis, Fourier transforms, and simple algebraic combinations of surfaces use gridded models in intermediate steps.

A combination of conventional gridding techniques with interactive control for manual interpretation of data hold the potential for dramatically improving results and expanding acceptance of the technology. Several conventional algorithms are reviewed and two new gridding techniques are introduced. Procedures for interactively controlling gridding techniques and adapting the techniques to respond to manual interpretations of the data will be discussed. Also, procedures for intractively adjusting gridded surfaces to conform to manually input contour curves will be described and demonstrated.

DUDA, RICHARD, Fairchild Laboratory for Artificial Intelligence, Palo Alto, CA

An Overview of Rule-Based Expert Systems

One of the more successful applications of artificial intelligence techniques has been the development of programs that have come to be known as rule-based expert systems. These programs encode knowledge about specialized problem areas in the form of sets of if-then rules, typically obtained by interviewing people who are specialists or experts in those problems. The rules can then be used by the program to solve similar problems. The modular structure that results allows incremental development, leading to performance that continually improves as the rule base is expanded.

Most of the rule-based expert systems that have been developed to date have been designed for problems in medical diagnoses. However, among several efforts that are relevant to the petroleum industry, a program called Prospector has been developed for the U.S. Geological Survey for certain problems in hard-rock mineral exploration, and a program called the Dipmeter Adviser has been developed by Schlumberger for the geological interpretation of dipmeter data. This presentation will describe the basic principles behind all such systems and will summarize the current state of the art.

DUPREE, R. L., Amoco Production Co., Tulsa, OK

Highly Interactive Contouring Systems

Computer contour systems are intended to aid in the interpretation of geologic data as well as to prepare drafted quality displays. To accomplish this, completely automated (batch) contour systems require complex algorithms and a significant amount of computer resources. Multiple submissions are also usually required to obtain a finished display.

A highly interactive contour system, however, relies much more heavily on the interpreters and the graphical functions of an automated drafting system to prepare a finished display. This approach uses simpler algorithms, less computer resource, and more interpretative interaction from the end user. Examples of the two approaches include the use of color schemes for displaying results.

HILDEBRAND, H. A., CYBERAN Corp., Houston, TX

A Microcomputer Workstation for Interactive Geology and Geophysics

The capabilities of a new microcomputer system are reviewed. This system allows easy data management for both geologists and processing geophysicists. Currently available peripherals include a digitizer, pen plotter, raster graphics printer, and graphics video. Communications allow hardwired or modern access to other computers.