SAVIT, CARL H., Western Geophysical Co., Houston, Tex.

RECENT ADVANCES IN GEOPHYSICS

Exploration geophysics has been advancing by the increasing production of geologic information. That is, more physical parameters of the stratigraphic column are being measured to finer resolution.

In seismic prospecting, continuous determination of seismic wave velocity is beginning to be used routinely while attenuation measurements are being made experimentally. Binary-gain digital recording with 24- and 48-fold multiplicity is proving necessary for these measurements. At sea, magnetic, gravimetric, and other surveys are being conducted concurrently with seismic surveys.

In some areas, if detailed reflection data are combined with seismic velocity and attenuation values and supplemented with detailed gravity and magnetic measurements, the local stratigraphy and lithology can be uniquely defined.

Field techniques of transport and navigation have improved markedly so that useful results can be obtained almost anywhere in the world and the results can be displayed on maps that are consistent on a worldwide basis.

SCHANZ, JOHN J., JR., Univ. Denver, Denver, Colo.

ECONOMIC ASPECTS OF EXPLORATION AND DEVELOPMENT OF MINERAL RESOURCES: VIEWPOINT OF EDUCATOR

Education in mineral economics is important to the practicing geologist in his professional career. Individuals who deal with the discovery, extraction, and use of mineral resources recognize that much of what they are able to accomplish relies on "economics." Because the economic factor has such tremendous leverage, there is always a compulsion to seek more education and understanding of economics.

People who deal with mineral economics fall into 2 categories: (1) practitioners who are engaged in some economic activity and use economic data and analysis in making decisions related to their jobs, and (2) social scientists who are concerned only with economic concepts and tools. The practicing geologist, the exploration planners, and mineral company executives fall in the former category. Their need is for economic data and economic evaluation.

There are 3 stages in the exploration and development process, each with its own peculiar needs for economic information and valuation. These are: (1) establishing an exploration plan with appropriate guidelines; (2) conducting the field investigation and appraising the data obtained; and (3) making a decision on how to proceed in light of the economic and geologic information on hand.

The undergraduate in geology preparing for a career in mineral exploration has little time or need for much emphasis on traditional economics in his program. However, some university course work introducing him to the economics of nonrenewable resources, evaluation concepts and methodology, and commodity analysis is of value.

Much of the geologist's economics education must be derived from experience, company training, postgraduate college courses, and the technical programs of his professional societies. The geologic societies should make their contribution through fostering the development of improved evaluation methodology, maintaining and advancing the analytic competence of their members, and keeping members informed of national goals and priorities in mineral resource development.

SCHLAEPFER, CARMEN J., and LIBERTO DE PABLO GALÁN, Univ. Nacional Autonoma, Mexico City, Mexico

CLAY MINERALOGY OF SERIES OF REDBEDS IN STATE OF OAXACA, MEXICO, AND ITS GEOLOGIC SIGNIFICANCE

Stratigraphic studies in northern Oaxaca brought to attention the importance of the clay minerals in the interpretation of the depositional history of Tertiary deposits. A complex series of interfingering continental sediments, of lacustrine, fluvial, and volcanic origin, fill adjacent intermontane basins of late Eocene-early Oligocene age. A study of the clay fraction of the former revealed the dominant presence of smectites and illites associated with attapulgite and other minor components.

The genetic significance of the clays and their relation to depositional and postdepositional processes are discussed. Water-table changes are believed to have affected the Eh and pH conditions under which these deposits were oxidized.

SCHMIDT, VOLKMAR, Mobil Oil Canada, Calgary, Alta.

DIAGENESIS OF KEG RIVER BIOHERMS, RAINBOW LAKE, ALBERTA

The Keg River bioherms consist mainly of mechanically deposited carbonate sediments and of stromatolites. True skeletal boundstone is rare. The salinity of the contemporaneous sea fluctuated repeatedly between normal marine and highly supersaline. Accordingly, fossiliferous marine carbonates are intercalated with essentially nonfossiliferous evaporitic carbonates. Parts of these sediments were intermittently at or above sea level.

Intensive penecontemporaneous cementation by high magnesium calcite and, possibly, aragonite occurred on the bioherms at times of near-normal salinity. Unconsolidated fossiliferous carbonate sediments and soft algal mats became solidly lithified, wave-resistant rocks. The bioherms grew as cementation welded most loose carbonate particles firmly to the reef body. Abundant early fractures opened after cementation. These fractures commonly were filled with internal sediment of evaporitic facies. Early diagenetic anhydrite is present in evaporitic carbonates mainly as replacement, displacement nodules, and pore cement. Dolomitization of bioherms occurred mainly during evaporitic episodes at subtidal to supratidal sites. Unconsolidated evaporitic carbonate sediments selectively were dolomitized completely and lithified. The dolomitization produced finely crystalline dolomite in evaporitic carbonates and medium to coarsely crystalline dolomite in previously lithified fossiliferous carbonates. Temporary subaerial exposure caused little or no cementation by meteoric low-magnesium calcite. Late diagenetic processes after effective burial include: (1) conversion of all metastable calcium carbonate to low-magnesium calcite; (2) cementation and replacement by minor amounts of anhydrite, calcite, and dolomite; (3) moderate fracturing; (4) weak stylolitization; and (5) deposition of large amounts of carbonaceous material in pores.