RICHTER, C. F., Seismological Laboratory, California Institute of Technology, Pasadena, Calif.

SEISMICITY OF CIRCUM-PACIFIC BELT

The large features of Pacific seismicity, including association of shallow and deep earthquakes with arc structures, almost exclusively shallow earthquakes with block structures, and earthquakes at intermediate depth with volcanic belts, together with distribution in a complicated and branching pattern of narrow zones, are well known.

Broad generalizations about this seismicity and its relation to geologic structures, involving specific interpretations of critical areas, have sometimes been supported by appeals to mapping on an extremely small scale, which allows confounding structures and epicenters perhaps hundreds of miles apart. The briefness of our adequate seismic history on the geologic time scale is often insufficiently considered, and conclusions drawn from present relative lack of seismicity in areas where field evidence, or even historical records, indicate greater activity in the immediate past.

Distribution in depth, even within the crust, is sometimes not considered, and eathquakes are discussed with respect to surface structure as if the latter could be expected to continue vertically down without appreciable dip or other complication in three dimensions.

RIEDEL, WILLIAM R., Scripps Institution of Oceanography, University of California, La Jolla, Calif.

GEOLOGICAL AND GEOPHYSICAL IMPLICATIONS OF MOHOLE PROJECT

The technical success of the experimental drilling phase of the Mohole Project, in 11,700 feet of water, 40 miles east of Guadalupe Island, in March and April, 1961, has provided a new tool for geological and geophysical studies of the ocean floor. Cores were obtained from the 550 feet of Late Tertiary sediments and 44 feet of basalt penetrated there—some of the results of investigations on that material (not available for quotation at the time of preparation of this abstract) will be reported at the March meeting. Samples obtained from the deep crust under ocean basins in later phases of this project may be expected to provide data on changes through time in the amounts and proportions of materials removed from continents (essential for considerations of geochemical balance, and hitherto available only for post-Cretaceous), on the origin of major submarine topographic features, and on biological history during the Lipalian interval. Samples of the mantle should contribute to our understanding of the processes of differentiation of crust, mantle, and core, the evolution and possible mobility of continental and oceanic crusts, and physical properties involved in geomagnetism and other major geophysical phenomena.

ROBINSON, ROBERT B., Sinclair Research, Inc., Tulsa, Okla.

TEXTURAL CLASSIFICATION OF RESERVOIR ROCKS

The porosity of a reservoir rock is best described by the size, shape, and arrangement of the pores comprising this porosity, rather than in terms of gross per cent. It is as important for a petroleum geologist to be able to predict the probable producing characteristics of a reservoir rock as it is for him to know the precise location of a new reservoir. With this in mind, a textural classification of reservoir rocks has been devised to assist well-site geologists in differentiating producing from non-producing zones in a reservoir body. The classification is based on an empiric association between rock textures as viewed on a polished surface and producing characteristics as determined by capillary pressure, porosity, and permeability measurements.

RODDA, PETER U., DIETRICH, JOHN W., AND FISHER, W. L., Bureau of Economic Geology, University of Texas, Austin, Tex.

QUANTITATIVE STUDY OF *ATHLETA PETROSA* STOCK IN EOCENE OF TEXAS

Based on qualitative study of the gastropod genus *Athleta* in the Eocene of Texas, two species are recognized—*Athleta tuomeyi* Conrad, 1853, in the Wilcox Group, and *A. petrosa* (Conrad, 1833) in the Claiborne and Jackson Groups. *A. petrosa* is divided into four successional subspecies and three divergent subspecies.

A statistical study was made of about 1,500 specimens from 49 localities to provide quantitative confirmation of some of the qualitative conclusions. Five parameters were measured: height, maximum width, height of spire, number of columellar folds, and number of spines on the body whorl. A program was prepared for the Control Data Corporation 1604 Computer for the calculation of 20 combinations (sums and ratios) of the parameters of each individual and for the calculation of mean and standard deviation of each parameter and combination by localities. More than half of the combinations appear to be significant.

A distinct separation of *A. tuomeyi* is shown in several significant computations. Mixtures of successional and divergent subspecies of *A. petrosa* are apparent. Within the successional subspecies, there is a rapid change in measured and significant computed values from the Reklaw subspecies to the Weches subspecies, very little change from the Weches subspecies to the Cook Mountain subspecies, and a rapid change from the Cook Mountain subspecies to the Jackson subspecies. Geographic variation generally is insignificant.

ROEHL, P. O., Shell Oil Company, Denver, Colo.

OIL-BEARING ANALOGS OF MODERN CALCAREOUS SEDIMENTARY FABRICS IN LOW-ENERGY ENVIRONMENT

Examples are presented of reservoir rocks taken from Stony Mountain (Ordovician) and Interlake (Silurian) producing formations in several oil fields situated on the Cedar Creek anticline, southwestern Williston basin. In lower Paleozoic time the basin was dominantly covered by epeiric seas in which were deposited shallow-water, intertidal, and supratidal carbonates of distinctive facies and fabric. These deposits are now dolomite in which intercrystalline porosity predominates. However, the delineation and extent of the latter is strictly controlled by original facies fabrics, the character of which is favorably comparable with modern tidal-flat and low-profile supratidal deposits reported for Florida and the Bahama Islands.

A generalized working model of facies relationships is presented showing the proposed environment of deposition and some of the kinds of fabrics in which producible oil has been found. Most of the important oil-bearing fabrics suggest combined organic and inorganic processes in zones of low hydrokinetic potential, viz., pelleted and laminated muds and silts; burrowed, bored, and reworked muds and silts; algal mats and stromatolites; flat-pebble conglomerates; and endogenic and (or) solution breccias. Leaching of fossils