to own an entire oil field, industry still needs the wildcatter and the independent to find the oil. This is exemplified further by the fact that, in order to find oil, one must drill wells. For several years it has been the writer's philosophy that the amount of oil discovered is directly proportional to the exposure or number of wells drilled, providing that the wells are drilled in oil country. The Bar-Mar field is a case in point.

4. GEORGE M. SPALDING, Cobra Oil and Gas Corp., Wichita Falls, Tex.

RECLASSIFICATION OF PETROLEUM SPECIALISTS

(No abstract submitted)

5. HOWARD R. GOULD, Esso Production Research Co., Houston, Tex.

SEDIMENTARY FACIES AND THEIR IMPORTANCE IN OIL FINDING

In today's search for oil, industry has become increasingly aware of its need for information that will permit more accurate prediction of porous and permeable facies. Such information is important in exploring for both structural and stratigraphic accumulations.

To obtain the data desired, research geologists have directed their efforts to modern ocean basins and contiguous land areas where both sedimentary facies and the environments that produced them can be studied in detail. Through investigations of Recent sediments in the Gulf of Mexico and elsewhere, it has been possible to define the major types of potential reservoir facies, including alluvial, deltaic, shoreline, shelf, and turbidite deposits in the deeper parts of modern basins. Each of these facies can be readily distinguished by a combination of features, including composition and lithology, sedimentary textures and structures, fauna and flora, lateral and vertical facies relations, and geometric form.

Knowledge of these characteristics, where applied to ancient rocks, provides information of value not only in recognizing facies but also in locating porous facies and in predicting their probable trends, shapes, and dimensions.

6. J. D. MUSSETT, Gulf Oil Corp., Hobbs, N.Mex.

THE MENTAL BLOCK

(No abstract submitted)

7. ROY E. FOSTER, New Mexico Inst. Mining and Technology, State Bur. Mines and Mineral Resources, Socorro, N.Mex.

GEOLOGY AND PETROLEUM POSSIBILITIES OF WEST-CENTRAL NEW MEXICO

Post-Precambrian rocks of this area include only strata of Mississippian and younger ages. Older Paleozoic rocks probably were deposited in west-central New Mexico, but were removed during various errosional cycles prior to Mississippian deposition. Thin remnants of Mississippian limestone occur in the Ladron, Lemitar, and Magdalena Mountains. Pennsylvanian sediments record a complex history of deposition and erosion, as they thin toward the west from almost 3,000 feet in the Ladron Mountains to zero over the buried ancestral Zuni Mountains. Permian evaporite, carbonate, and sandstone thicken southward from less than 1,000 feet in the Zuni Mountains to more than 2,600 feet in parts of Catron County. Triassic and Jurassic sediments also thin in this direction and are absent in southern Catron and adjacent parts of Socorro Counties. Sandstone and shale of Cretaceous age are exposed in large areas. Early Tertiary erosion caused thinning of these rocks toward the south and southwest. Thick sequences of Tertiary sediments and volcanics, rhyolitic to basaltic in composition, underlie considerable areas in Catron and Socorro Counties, and extensive Quaternary basalt flows cover large areas in central Valencia County.

The best possibility for petroleum accumulation appears to be in unconformity traps in the Pennsylvanian east of the late Paleozoic ancestral Zuni uplift. Cretaceous sandstone and Permian carbonate and sandstone are secondary objectives in this and other parts of west-central New Mexico. The possibility of helium accumulation in the upper part of the Permian is an additional incentive for exploration in this area.

8. WILLIAM H. DUNLAP, Champlin Petroleum, Co., Midland, Tex.

CHAVEROO REVISITED

The Chaveroo San Andres field is on the line separating Chaves and Roosevelt Counties, New Mexico. The field, located geologically on the south flank of the Matador arch on the Northwestern shelf, was discovered in March, 1965, with the completion of the Champlin Petroleum Company and Warren American Oil Company No. 1 Hondo State. This well was plugged back from a total depth of 9,100 feet to 4,400 feet. The field now has more than 250 wells. Production is a sour 24° A.P.I. gravity crude and the cumulative field production was 1,116,642 barrels of oil on August 1, 1966.

The discovery was made using a combination of subsurface geology and reflection-seismograph data. Oil production is from a gray to brown fine crystalline to granular anhydritic dolomite with fine vuggy intercrystalline and fracture-type porosity zones located 650 feet below the top of the San Andres of Guadalupian (Permian) age. A gross pay section of approximately 200 feet is in the field. The field structure consists primarily of a southward-plunging nose. Reservoir conditions are controlled by thin porosity zones which pinch out updip. Development in the field has slowed considerably and appears at present to be nearing completion.

Certain areas of the field have had water problems. It is hoped that different and improved completion techniques will cure these ills.

The Chaveroo field has rekindled interest and ideas about San Andres production on the Northwestern shelf. Another new field, Cato, has extended further the Levelland-Slaughter-Buckshot-Milnesand-Chaveroo trend toward the west. The future looks bright for further San Andres development in this area of New Mexico.

9. JOHN D. MOODY, Mobil Oil Company, New York, New York

RESTRAINTS ON EXPLORATION

(No abstract submitted)

10. KARL W. KLEMENT, Texas Technological College, Lubbock, Tex.

PRACTICAL CLASSIFICATION OF REEFS AND BANKS, BIOHERMS AND BIOSTROMES

Reefs and banks form stratigraphic traps which hold more than 40 per cent of the total petroleum production in the world. They are of special importance in the Permian basin exploration. Yet there is much confusion concerning the classification and terminology of these skeletal deposits. It is the purpose of this paper to attempt to define these structures on a genetic and morphological basis and indicate their exploration potentials.

Following Lowenstam (1950) and Nelson *et al.* (1962), the writer applies the terms "reef" and "bank" to denote the origin of the structures, whereas the terms "bioherm" and "biostrome" are used to designate the shape of the structures and their relation to the associated layered facies.

A *reef* is a structure built by the in-place growth of organisms which have the ecological potential to act as frame-builders. It is a wave-resistant, prominent structure on the sea floor and, therefore, influences, and modifies sedimentation in its vicinity.

A *bank*, in contrast, consists of organisms which did not have the ability to erect a rigid three-dimensional frame-work. Banks may be formed in place or by mechanical build-up following transport of the skeletal remains. Banks also are wave-resistant. They may or may not be prominent structures on the sea floor or influence the sedimentation around them.

According to their formation, banks are subdivided into (1) mechanical and (2) biogenetic accumulations. Biogenetic accumulations are subdivided further into banks resulting from (a) biogenetic baffling of sediment, (b) biogenetic binding of sediment, and (c) gregarious local growth of organisms without erecting prominent structures.

Thus, reefs and banks are distinctly different types of accumulations. In a reef, *in situ* growth of organisms is more important than sediment trapping and binding, and the organic productivity of the frame-building organisms alone is sufficient to elevate the structure above the surrounding sea floor. Frame builders in general are organisms that cement themselves to the substratum and form a rigid mass. Cementation appears to be very important in the resulting structure. Colonial hexacorals, stromatoporoids, calcareous sponges, rudistids, and crustose $CaCO_3$-secreting red algae can act as frame builders in a reef.

In contrast, in banks, the sediment-baffling and binding functions of the organisms are the main sources of sediment accumulation. Tetracorals, tabulate corals, bryozoans, crinoids, phylloid algae, pelecypods, gastropods, and brachiopods are organisms that can not erect a rigid framework. However, they can actively trap sediment and form banks. Furthermore, their local gregarious growth may lead to bank-type accumulations.

A *bioherm* is a massive, mound-shaped structure which is in discordant relationship with the surrounding layered facies of different lithologic types. A *biostrome* is coarsely layered and grades concordantly into the surrounding layered sediments.

According to these definitions, a reef, according to its shape and geological setting, represents a bioherm. A bank, however, may take the form of a bioherm or biostrome. Mechanically accumulated banks and biogenetic banks resulting from the sediment-baffling activity of organisms generally have the form of bioherms. Banks resulting from biogenetic binding of sediment may have the form of either bioherms or biostromes. Local gregarious growth of organisms usually leads to accumulations of the biostrome type. The fact should be stressed that the shape of a fossil structure is not necessarily the same as its shape at the time of formation. Differences in compaction capabilities of skeletal deposits *versus* clay or carbonate-mud-rich deposits tend to exaggerate the relief of the organic build-up.

Examples of various types of Recent and ancient reefs and banks are illustrated and discussed. Recent coral reefs of the Florida Keys reef trend and Cretaceous rudistid reefs in Sierra El Abra, Tampico region, Mexico, are examples of true reefs. Little Molasses Reef, Florida Keys, is interpreted as a bank which was formed by mechanical accumulation of skeletal debris. Rodriguez Key, Florida Keys, and mud mounds in Florida Bay are examples of banks representing biogenetic accumulations resulting from the sediment-baffling functions of organisms. Phylloid algal mounds from the Hueco Tanks area (West Texas), Dry Canyon near Alamogordo, New Mexico, and Marble Canyon, Alamogordo, New Mexico, are ancient counterparts of these biogenetic banks.

Algal stromatolites are representative of banks formed by the sediment-binding action of organisms. Cretaceous oyster beds are indicative of bank accumulations by local gregarious growth of organisms.

It is very important to emphasize the fact that structures, which superficially appear to be very similar, may, in fact have formed in very different environments and, therefore, require different genetic interpretations.

11. A. L. PORTER, New Mexico Oil Conservation Commission, Santa Fe, N. Mex.

OIL AND GAS CONSERVATION IN NEW MEXICO

Oil has been known to exist in New Mexico for more than 50 years, but significant production did not begin until the completion of the second well in the Hobbs pool in 1930. The Hobbs pool, developed during the time when the law of capture prevailed elsewhere, stands today as an example of the wise application of sound conservation policies.

For several years the development of oil and gas resources in New Mexico has been the state's biggest business, and has added much revenue to its economy.

The conservation act and laws passed by the state's legislators, creating the New Mexico Oil Conservation Commission, charged this commission to prevent the waste of oil and gas and to protect correlative rights.

The commission can point with pride to its conservation record and, as a regulatory body, its performance in the public interest reflects its flexibility in bringing about needed changes as technology improves.

12. FRANK SPIVA AND A. K. DOSS, Consultants, Abilene, Tex.

PALO PINTO LIMESTONE OF WESTERN RUNNELS COUNTY, TEXAS

The Palo Pinto Limestone (lower Canyon Series) of western Runnels County, Texas, is generally found at depths of 3,800-4,200 feet. The two productive porosity zones are in the upper 50 feet of the formation. The lower is by far the more productive. The Palo Pinto can produce from structural traps alone but the best producing fields are those in which stratigraphic pinchouts are associated with low-relief structures. Several of the presently productive fields produce 30-60 per cent water together with the oil; history now shows these fields to have considerably