found devoid of commercial oil accumulations. An analysis of the time-sequence of structural deformation indicates that the barren closures were formed after regional oil migration had passed their sites.

Palinspastic restorations of another area, in which wildcatting has failed to find production along a belt of major overlaps, place these overlaps in their proper perspective relative to geologic history.

PARKE A. DICKEY AND RICHARD E. ROHN, The Carter Oil Company, Tulsa, Oklahoma
Facies Control of Oil Occurrence

Oil occurs in several different rock associations, but follows particular facies subdivisions within each type. In the micaceous sand and shale association, linear trends of pools are well developed and are parallel with lithologic ratio contours. Oil occurs also in similar rocks deposited in birdfoot deltas resembling the delta of the Mississippi. The zones favorable to the growth of reefs or bioherms are rigidly controlled by environment, and the occurrence of reefs can be related to the nature of their enclosing rocks. The widespread quartzose sands found associated with shelf limestones are permeable over large areas, and local pools are structurally controlled. This rock association is poor in organic matter, and the location of oil pools can be related to belts of oil-source facies in associated beds.

Lithologic conditions are important in deciding whether to lease and drill a prospect. In a large and growing number of cases where structural closure is absent, they are the only geological considerations. All types of lithologic and stratigraphic information can be shown quantitatively by contours In the same manner as structural data. Quantitative expressions provide the best means of presenting lithologic data areally. Such presentations permit the definition of areas lithologically favorable for oil occurrence.

JOHN P. LAVERY, JR., Reserve Oil and Gas Company, Bakersfield
Recent Developments—Tejon-Grapevine Field

The Tejon-Grapevine field is in the Tejon Embayment which is located in the southerly part of the San Joaquin Valley. The embayment is bordered on the south by the Tehachapi Mountains and on the east by the Sierra Nevada Range.

The mountainous areas consist of Jurassic basement rock with a border of Pleistocene to Eocene sediments exposed between basement and valley alluvium. The forces that uplifted these mountain ranges, nearly at right angles to each other, and the rapid drop off of basement developed complex fault patterns and numerous unconformities.

The Tejon-Grapevine field, central area, has six major producing zones of Miocene age: Transition, Santa Margarita, *Pulv.*, *Valv.*, Olcese, and JV sand. Prior to discovery of Olcese production in June, 1954, production was 1,285 B/D. In July, 1955, after Olcese and JV sand discoveries, production was 7,615 B/D. To date, no production has been found below the lower Miocene volcanics.

G. MOSES KNEBEL, president, A.A.P.G., Standard Oil Company of New Jersey
Habitat of Some Oil

Detailed statistics have been prepared and studied for 236 or all of the major fields of the free world. They represent 217 billion barrels, which is 82.5% of the free world's expected ultimate. The study shows the bulk of our oil occurs: (1) on the stable side of basins, (2) in anticlines, (3) in sandstone and carbonate reservoirs, (4) from formations of Mesozoic age or younger, and (5) from a depth range of 2,000 to 8,000 feet.

Most of the world's ultimate oil is 30° API or above, with mixed and asphaltic base oils predominating. The discovery of the big giants has been cyclic with 10-year intervals starting with the Lake Maracaibo discovery in 1917.

ROBIN B. WILLIS, Beloil Corporation, Ltd., Los Angeles
Huntington Beach Field—Townlot Extension

Beginning in January of this year and lasting into the summer, the City of Huntington Beach saw a flurry of townlot drilling much like the early townlot booms of Signal Hill and Huntington Beach. Wells were drilled on leases consisting of one or more 25×117-foot lots, averaging two wells to the acre. The reserves do not seem to justify this close spacing, a large part of the wells having already declined to near the economic limit. The geology uncovered gives a little more insight into the mechanics of the Inglewood fault, which in this case is a lateral-slip fault with associated vertical-slip "feather" faults, and a small fold related to the faulting. This small system resembles larger systems along the Inglewood fault line and is a near-replica of another system on the lateral-slip fault.

C. R. BALL AND S. F. FINE, Richfield Oil Corporation
Information vs. Cost in Exploratory Drilling

This is a two-part paper consisting of an analysis by an engineer of the costs of obtaining information in exploratory drilling, and a statement by a geologist of the basic information desired.

The cost of exploratory drilling is usually higher than development drilling because of more unknown factors, such as depth of objectives and incomplete knowledge of structural and stratigraphic conditions. Services are often requested by the geologist that may not evaluate potentially productive zones but aid in the geological interpretation. The cost is charged to the well, nevertheless. In order to drill exploratory holes in the most economical manner the fullest use must be made of those information gathering techniques which obtain information as the drilling progresses, that cause neither slowdown nor shutdown of drilling operations. This information must be closely watched and diligently recorded by the geologist in order to minimize the use of more expensive and more time-consuming information tools. The practice of exploring in long rat-hole intervals, in particular, appears in analysis to be extremely costly and time-consuming, and recent improvements in formation-testing equipment render it impractical. All operations which increase drilling time and the number of round trips increase drilling hazards as well as direct costs.

J. E. KILKENNY AND M. DE LAVEAGA, Union Oil Company of California
ROBERT SUMPF, Consultant, Los Angeles
Recent Developments in Guijarral Hills Field

The Guijarral Hills field is one of several large stratigraphic oil fields on the prolific Coalinga anticline. Within and adjacent to the field five new pools have been discovered in the past 2 years, all of them stratigraphic in nature. The two most important of these new pools are the North Leda and the Bourdieu.

The North Leda pool embraces 600 acres with 37 wells currently producing 6,800 barrels per day. The producing zone is in the Leda sand of lower Miocene age at an average depth of 8,750 feet. Only the westerly updip pinchout line in the gas-cap area remains undefined.

The Bourdieu pool is in the Polvadero area southeast of the main Guijarral Hills pool. Production is from the Gatchell sand of middle Eocene age at depths ranging from 10,550 feet to 10,965 feet. To date, eight wells have been completed on a 20-acre spacing pattern, proving about 200 acres. Current production averages about 500 barrels per day per well under restriction. Field limits have been established only in a westerly direction although a recent test well 1¼ miles north of the present limits was a failure. Neither bottom water nor edge water has been encountered to date.

These two new-pool discoveries have added a substantial reserve to the Guijarral Hills field.

ROBERT C. ERICKSON, Standard Oil Company of California, Oxnard
Oxnard Oil Field

The Oxnard oil field is a minor southern Ventura Basin field situated on the west flank of the southwesterly plunging Semi-Las Posas trend. The field consists of two pools, a shallow tar zone discovered in 1936 and the deeper Sespe pool discovered in 1952. Production from the tar zone is from truncated, fractured, Miocene shale and onlapping Pliocene sands. Sespe production is from three zones, each exhibiting short oil columns and rather narrow bands. Sespe accumulation is associated with a buried, faulted, half dome. There are also various stratigraphic modifications.

YOUR RESEARCH FUND[1]

G. M. KNEBEL[2]
New York, N. Y.

The Research Fund of our Association has now been properly established and a request has been made to the United States Internal Revenue Service for a ruling that this fund now qualifies for scientific research and that contributions to it are tax deductible. A favorable ruling is expected in the near future. In the meantime, upon the advice of counsel, contributions and bequests to the Research Fund can be deducted in computing income and estate taxes.

Even though the Research Committee has been in existence since 1923 and contributions have been received at infrequent intervals since 1924, the Research Fund has never been legally established until this time.

[1] Manuscript received, January 6, 1955.

[2] President of the Association.