

the distribution and thickness of these strata and of possible basins of accumulation within them, are discussed. Recent developments in exploration of this area are briefly summarized.

11. OIL PROSPECTS OF NORTHEASTERN NEVADA AND NORTHWESTERN UTAH  
PAUL H. DUDLEY, Consultant, Long Beach

Intensive geological field work currently is being carried out in northeastern Nevada and northwestern Utah, in the northern part of the Basin-and-Range province. The first exploratory test of recent years is being drilled on the eastern side of the Pancake Range. Sediments are primarily Paleozoic and constitute one of the most complete and thickest sections of this group in America. Showings of oil, asphaltic material, and gas are known at several points. Devonian and Carboniferous limestones and the White Pine shale (Upper (?) Mississippian) are the best source rocks. Certain facies of the so-called Diamond Peak quartzite (Lower (?) Pennsylvanian) and the Weber conglomerate (Upper Pennsylvanian), as well as the Upper Paleozoic limestones themselves, may prove suitable reservoirs. The thermal effect of volcanic and granitic rocks on sediments is generally unimportant. The structure and stratigraphy indicate that there are anticlinal, fault, and stratigraphic traps within the area. Faulting probably will be the most important risk in exploration.

12. SAN MIGUELITO OIL FIELD  
HUGH McCLELLAN, Continental Oil Company, Los Angeles  
RICHARD B. HAINES, Continental Oil Company, Ventura

The San Miguelito oil field, in Ventura County, California, was discovered in November, 1931, by means of surface geology. Accumulation occurs throughout a 2,500-foot series of Pliocene sands in a closed anticline, which is on the westward continuation of the Ventura Avenue axis. The field is bounded on the north by the south-dipping Padre thrust fault, which strikes nearly parallel with the axis of the fold and has an apparent vertical displacement of approximately 3,000 feet.

To date, 81 wells have been drilled and development is continuing. No wells have been abandoned. Total cumulative production to June 30, 1950, was 21,595,000 barrels of oil.

13. IS PETROLEUM GEOLOGY GEARED FOR WAR?  
FRANK A. MORGAN, Vice-President, Richfield Oil Corporation, Los Angeles

Petroleum geology has grown up. The record speaks for itself. In the United States crude-oil reserves have been discovered and are being discovered in excess of withdrawals, permitting an efficient producing rate which is comfortably above present and immediately foreseeable demands.

With a peace-time domestic production and concurrent demand exceeding 2 billion barrels of crude petroleum in a single year, the responsibility of petroleum geology as an integral part of the oil industry is greater than ever before.

There can be little doubt that there are sufficient undiscovered reserves of oil stored in the vast sedimentary basins within the United States to supply the demands of our way of life for generations. The oil industry alone can locate and develop these reserves at an efficient rate if the fine balance of organization, economics, and science required for such an operation is not undermined by thoughtless interference from various departments of government.

In addition to the immediate fruits of discovery, the over-all exploration effort constitutes, in effect, a long-term research program with the power to shape the future in oil productive capacity. Private competitive enterprise with its assured continuity of effort provides the best base for this type of research. In this environment the science of petroleum geology will continue to do the job to meet the demands of peace or war.

14. DEVELOPMENTS IN CUYAMA VALLEY—1950  
ARTHUR S. HUEY, The Hancock Oil Company of California, Long Beach

The Cuyama Valley in 1950 continues to be an important area in California for the drilling of both field development wells and wildcats. More than 50,000 barrels of high-gravity oil are now produced daily from the combined fields of Cuyama. The Russell Ranch field, discovered in June, 1948, has reached a state of almost complete development and now produces 21,000 barrels of oil per day from 138 wells. The South Cuyama field, discovered in May, 1949, is incompletely developed and now produces about 29,000 barrels of oil per day from 155 wells. The geology of these proved fields is not reviewed.

Thus far in 1950, about 45 wildcat wells have been drilled in the Cuyama-Carrizo area and only the three which resulted in new discoveries in the Morales Canyon area of North Cuyama were successful. This rather low discovery ratio of 1:15 reflects the complexity of the geologic structure and the difficulty of finding new oil in Cuyama Valley. The Superior Oil Company completed "Government" No. 18-2 in Sec. 2, T. 11 N., R. 28 W., S.B.B. & M., on April 1, 1950, flowing from an undisclosed formation in the interval 5,635-6,125 feet, 500 barrels per day of 37.5° gravity oil, 2.5% cut, through  $\frac{1}{4}$ -inch bean with 400 pounds pressure and 250 M.c.f. gas. Immediately surrounding this well, one additional pumpjack has been completed, three dry holes abandoned, and one well is currently drill-

ing. On April 25, 1950, the Hancock-Mohawk-Oceanic No. 65-10 well on the Clayton lease in Sec. 10, T. 11 N., R. 28 W., was completed as a new-pool discovery pumping 75 barrels per day of 32.8° gravity oil, 1% cut, from the Morales formation (Pliocene). There are now eleven wells in a proved area of about 120 acres, producing a total of about 800 barrels per day. The limits of the field at the south and east have been established. On August 22, 1950, the Hancock Oil Company made a discovery about 2¼ miles northwest of the Superior well in the Hancock-Bishop No. 44-31 well in Sec. 31, T. 32 S., R. 20 E., M.D.B. & M. The well was completed, pumping 226 barrels per day of 36.6° gravity oil, 0.4% cut, 100 pounds casing pressure and 100 M.c.f. gas from a new lower Miocene sand in the interval 5,785-6,020 feet. Three wells are drilling in the area.

## FRIDAY MORNING

*Presiding:* CHARLES M. CROSS, Honolulu Oil Corporation, San Francisco  
 JOSEPH J. BRYAN, Union Oil Company of California, Bakersfield  
 GRAHAM B. MOODY, Standard Oil Company of California, San Francisco

## SYMPOSIUM ON POSSIBLE FUTURE OIL PROVINCES OF THE PACIFIC COAST REGION

## 1. FOREWORD

GRAHAM B. MOODY, Chairman, Pacific Coast Committee on Possible Future Oil Provinces, Standard Oil Company of California, San Francisco

Experience influenced the Pacific Coast committee in its decision to examine critically and report on the future petroleum possibilities not only of the most promising undeveloped and presently producing regions but also of those regions that might seem to offer little encouragement for further exploration. Eastern Washington, the Modoc Lava Plateau of California, and a part of the Northern Coast Ranges of California are considered to be of insufficient interest to merit maps. The predominance of igneous and metamorphic rock exposures in these regions seems to eliminate them, at least for the present, from favorable consideration as possible future oil provinces.

A summary of data for the regions discussed is tabulated. Some of the numbers are, of necessity, approximations but are of the right order of magnitude according to available information. This tabulation affords a ready means of comparing the different regions.

The continental shelf adjacent to Southern California is treated in some detail, but the rest of the Pacific Coast continental shelf is not discussed in separate papers. The future oil possibilities of any part of the continental shelf may be considered as similar to the possibilities of the contiguous land area. Areas involved are:

## CONTINENTAL SHELF

<i>Coast of</i>	<i>Area in Square Miles</i>	
	<i>Underlying Water Having Depth</i> <i>0-10 Fathoms</i>	<i>0-100 Fathoms</i>
Washington	380	5,200
Oregon	600	7,000
California	1,400	11,700

Nothing need be said concerning the merits of the following papers—they speak for themselves and reflect great credit on the writers. Special acknowledgment should be made to those committee members whose names do not appear as authors but who contributed substantially to committee work through suggestions, criticisms, and consultations. Association with this committee, a group of forward-looking geologists, has been stimulating indeed and leaves one with the firm conviction that there is ample opportunity for successful exploratory effort within the regions considered.

## 2. WASHINGTON

T. J. ETHERINGTON, Standard Oil Company of California, San Francisco

The Cascade Mountains divide the state into two major climatic provinces. These mountains, while topographically a north-south range, are structurally a series of major anticlinal folds with N. 40° W. to E.-W. trends developed in Paleozoic and Mesozoic rocks which have been metamorphosed by large batholithic intrusions of granodiorite. This general pattern of folding is reflected in the Tertiary rocks throughout western Washington with the exception of the Olympic Mountains and the coastal belt.

The Tertiary rocks ranging from upper Eocene to Pliocene probably offer the best possibilities for the development of future oil and gas reserves. The Cowlitz (upper Eocene) formation is best developed in the Cowlitz-Puget Sound trough. The Oligocene is best developed in southwestern Washington and again along the Straits of Juan de Fuca and adjacent part of the Puget Sound. Miocene and Pliocene rocks are best developed in the vicinity of Gray's Harbor.

Volcanics in the form of tuffs, flows, and breccias of basic or medio-basic character are widespread