them. The porosity and permeability of coral-reef or bioherm reservoirs are attributed not only to the hollow corallites *etc.*, but also to the helter skelter accumulation of them so that, in many instances, such porosity is greater, more effective and more continuous. Partial or entire obliteration of porosity is, in part, due to infiltration of evaporites associated with the regressive type of bioherm.

3:55 (5) WESTERN CANADA SEDIMENTARY BASIN AREA
Theo. A. Link, consultant.

The Sedimentary Basin area of Western Canada which lies between the Pre-Cambrian Shield and the Cordilleran Mountain area, covers approximately 800,000 square miles. Sediments ranging from Cambrian to Tertiary are present, and of these the Upper and Lower Cretaceous, Jurassic, Mississippian, and Devonian have yielded commercial oil and gas fields. Producing zones in the Cretaceous and Jurassic are sandstones, while all of those of the Paleozoic are carbonate rocks such as reef limestones or dolomites (bioherms). Shows of oil and gas have also been encountered in the Cambrian and Triassic sediments.

The broad structural features of this vast expanse of sedimentary rocks are the Moose Jaw syncline, Sweet Grass-Battle River arch, Alberta syncline, the Foothills belt, the Rocky and Mackenzie mountains, the Great Bear-Slave Lake Basin and the Mackenzie Delta Basin area. This contribution is a brief outline of these data with examples of producing oil-field structures and stratigraphic traps.

FRIDAY MORNING, 9:30–12:00

Presiding: LOWELL E. REDWINE, Honolulu Oil Corporation, Santa Barbara
LOYAL E. NELSON, Southern California Petroleum Corporation, Los Angeles.

9:30 (1) GEOLOGY OF PLACERITA CANYON OIL FIELD
Robin Willis, Hilldon Oil Company, Los Angeles.

The Placerita Canyon oil field is developed in continental sands of Pico or Saugus age. Saturation occurs through an interval of 700 feet, with 150–400 feet of productive sand, yielding 12°–26° gravity oil.

The structure is a monocline dipping west-northwest at about 25 degrees, closed on the northeast by the San Gabriel fault, and on the south and east by minor faults. Other small faults divide the field into separate pools of varying gravity.

The proven area now covers about 560 acres, of which the intensively developed higher-gravity area (Confusion Hill) includes about 125 acres. The total reserve is estimated at 30 million barrels.

9:45 (2) GEOLOGY OF NORTH SULPHUR MOUNTAIN FIELD, VENTURA COUNTY
I. T. Schwade and Spencer Fine, Richfield Oil Corporation, Ventura, California.

The discovery well, Ojai Fee No. 35, was drilled in 1912, and completed for 100 barrels a day, 22.8° gravity, between 2,387–3,919 feet. In 1942, well No. 44 was drilled as a straight hole to the depth of 8,735 feet, and was completed in the interval, 2,425–4,357 feet. Both wells passed through a thrust fault from Pliocene into Miocene; however, as located, well No. 44 encountered only a small amount of lower Mohnian and was completed largely in older beds. The rediscovery of the field came about in 1947 with the drilling of No. 45 for the purpose of determining the attitude of the fault, and to obtain full information regarding the attitude of the beds and character of the reservoir beneath this fault. From this information a program of directed holes was undertaken to maintain a high structural position beneath the fault and to encounter a greater amount of productive section. Development proceeded east and west to the present size of approximately 1½ miles in length and slightly more than ½ mile in width, and having twenty wells. Cumulative production to July, 1949, when the field was shut in due to general curtailment of lower-gravity crude fields in the state, has been 496,000 barrels, average gravity 19°–20°.

Structurally, the productive zone of Mohnian sands and fractured shales on the east end dips 80° toward the north, overturned; on the west end of the productive zone dips 50°–60° southward, upright. Most wells penetrate the Sisar fault (Miocene over Pliocene) and the North Sulphur Mountain fault (Pliocene over Miocene) in order to reach the productive zone.

10:00 (3) VAQUEROS FORMATION WEST OF SANTA BARBARA, CALIFORNIA
Eugene R. Orwig, Jr., General Petroleum Corporation, Los Angeles, California.

A summary of data is submitted on the Vaqueros formation in the area between Gaviota Pass and Santa Barbara, California. A stratigraphic study was made with particular regard to variations in mass properties, heavy minerals, and age.

The results of field observations and laboratory analysis have indicated maxima of thickness, sorting, permeability, and porosity between Refugio and Bartlett canyons. Mean grain size was observed to have a decreasing trend from west to east. Heavy-mineral assemblages invariably consist of titanite and black opaques, with a subordinate percentage of other resistant minerals. The under-

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lying Sespe sands differ markedly in the dominance of epidote over titanite. The sparse megafossils found in this area were of little value in restricting the age of the Vaqueros. Foraminifera of the *Uvigerinella sparsicostata* fauna were collected from the base of the superjacent Rincon formation.

10:15 (4) GEOLOGY OF NORTHERN SANTA ROSA ISLAND

Robert E. Anderson, Signal Oil and Gas Company, Los Angeles, Lowell Redwine and Paul McGovney, Honolulu Oil Corporation, Santa Barbara and Bakersfield.

The stratigraphy of the northern part of Santa Rosa Island is somewhat similar to that of the Santa Barbara Coastal district. These two areas represent, respectively, the southern and northern margins of the Ventura Basin. The Island area mapped offered a section from Pleistocene to Eocene, with Pliocene evidently absent. Formations recognized include marine terraces, Santa Margarita sandstone, Monterey shale, Rincon shale, Vaqueros sandstone, Sespe, Cozy Dell(?) shale, and Matilija(?) sandstone. An interesting time equivalence between the Vaqueros and upper Sespe formations is indicated.

The Santa Rosa fault is the dominant structural feature of the Island. It trends east-west and divides the Island in half. A horizontal displacement of nearly five miles is indicated. Other significant but smaller faults are the Sandy Point, Garanon, and Arlington. Important folds are the Garanon, Tecolote, and Soledad anticlines and the West End and Becher's Bay synclines.

Five wells have been drilled and abandoned on the Island and a sixth is now being drilled.

10:45 (5) OCEAN FLOOR INVESTIGATIONS ALONG SANTA BARBARA COUNTY COAST

Warren C. Thompson, Scripps Institute of Oceanography, La Jolla.

For the increasing number of oil geologists who are studying the submerged shelves of Southern California in order to unravel the bedrock structure, a knowledge of where to look on the sea floor to find bedrock outcrops is highly desirable in saving exploration time and expense. Knowledge of the topography of the shelves is thus required.

The submerged shelf between Point Conception and Santa Barbara is considered. Cross sections of the shelf show that the Recent marine sediment or "overburden" which rests on the bedrock commonly forms a lens-shaped deposit. Within the surf zone, this sediment lens varies from zero to a few feet thick. It thickens offshore to an average of about 40 feet, but in places to more than 100 feet, then usually tapers off to a few feet or less in thickness near the outer edge of the submerged shelf. Isopach charts of overburden aid in conveying the nature of the sediment lens.

The bedrock of the shelf is traversed by numerous canyons and gullies probably Late Pleistocene in age. These have subsequently been alluviated by continental sediment and later by marine sediment so that no topographic expression of them is evident on the ocean floor. These features are illustrated on the submarine bedrock contour charts.

The common giant kelp which forms the extensive kelp beds along this coast (*Macrocystis pyrifera* Linnaeus) is commonly considered to be a good criterion for the presence of bedrock outcrops. This is now known to be partly erroneous, and it is shown that the kelp grows equally well in thick overburden of mud and fine sand. However, by observing the plant density from aerial photography, it can be determined whether the algae is growing on bedrock or in thick sediments.

11:05 (6) RECENT DEVELOPMENT AT GUIJARRAL HILLS

John S. Loofbourow, Jr., Barnsdall Oil Company, Los Angeles.

The Guijarral Hills oil field, located on the Coalinga anticline midway between Pleasant Valley and Kettleman Hills, was discovered by the Barnsdall Oil Company on September 19, 1948. The discovery well produced from the Leda sand. Since then there have been 36 Leda sand wells completed in the field on a 20-acre spacing program. The development has demonstrated that the accumulation is stratigraphic and only the updip or northwest limit of the field has been located. At present, approximately 800 acres of Leda sand production have been proved.

On April 28, 1949, a new zone was discovered by the Barnsdall Oil Company with the completion of Allison A73-34-2 in a sand in the Basal Temblor which was logged approximately 500 feet above the Leda sand. To date, 11 wells have been completed in this zone on a 20-acre spacing program. Indications are that the accumulation is stratigraphic. Approximate limits of production have been defined only on the southeast and at present about 360 acres may be considered as proved.

11:20 (7) REPORT OF PACIFIC COAST SUB-COMMITTEE ON CENOZOIC OF GEOLOGIC NAMES AND CORRELATIONS COMMITTEE

Robert T. White, State Exploration Company, Los Angeles.

11:35 (8) RECENT EXPLORATORY RESULTS IN CALIFORNIA

Graham B. Moody, Standard Oil Company of California, San Francisco.

Analysis of recent exploratory achievements in California indicates that those who have been prone to "view with alarm" the potentialities of California's oil resources have been overly pessimistic. This conclusion is supported by graphs, figures, quotations, and arguments.

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