

M.) 25 miles south of the town of Avenal and lies between the Pyramid Hills and Devil's Den oil fields.

Approximately 13,000 feet of sediments, ranging in age from Pliocene to Eocene have been deposited in the area since Cretaceous time. These beds thin from east to west due to both erosion and to several important unconformities. Commercial accumulations of oil have been found in eight different zones within these beds—due both to folding and faulting.

This area, referred to by Ralph D. Reed as, "a complex group of low hills," presents a very complicated structural picture. Although the surface axis of the Alferitz anticline trends N. 25° W., the axis in the lower beds has nearly an east-west trend.

Oil is produced from both the Alferitz Anticline field and from the smaller "Hillview" area in the north part of the area. Total production is approximately 500 barrels a day and varies from 15° in the Escudo sand to 34° in the lowermost productive interval in the Point of Rocks sand. Eight productive zones have been found as follows: five zones within the Point of Rocks sand, the Tumeys shale, the Agua sand, and the Escudo sand.

6. V. L. VANDER HOOFF, Intex Oil Company, Santa Barbara. Review of Sespe Paleontology.

A review of what is known of the Sespe fauna and flora leads to the following comments.

1. The meager vertebrate fauna is not diagnostic of the climate or environment or mode of deposition. It may be stated with certainty that the Sespe contains the osseous remains of land vertebrates of late Eocene, Oligocene, and early Miocene age. But it may be said with nearly equal certainty that most, if not all, of these remains have been transported some distance from the normal geographic habitat occupied by the animals in life.

2. The absence of fresh-water invertebrates supports the suggestion that the Sespe is not fluvial or lacustrine.

3. The absence of marine animals leads to the belief that the Sespe is non-marine.

4. The absence of any flora leads to the impression that the distributive provenance was without plants.

5. The concluding comment is that the Sespe is non-marine deposit derived from deeply weathered and numerous distributive land areas of high relief. Its heterogeneity of color and sorting gives it a homogeneity for field recognition, but the real nature of its deposition may perhaps be solved by some future and ingenious multiple hypotheator.

7. ROBERT H. PASCHALL, Amerada Petroleum Corporation, Ventura. The Sespe Formation of the Santa Barbara Embayment.

The Sespe formation, composed of red, buff, and gray sandstone and conglomerate, and red and green siltstone, has a landward extent of about 1,250 square miles, and a volume of about 950 cubic miles. Its seaward extent may be greater or much less than that on land, since its presence in the Channel Islands chain is confined to Santa Rosa Island. Its maximum thickness of about 7,000 feet is found in the Simi Valley, near the formation's present east margin. In general the formation thins westward, due in part to gradation into beds of definite marine character.

The Sespe has an age range possibly as great as from upper middle Eocene to middle Miocene. The formation's vivid colors and scarcity of organic matter, especially in its eastern portion, combined with its lateral gradation into beds of undisputed marine character, are suggestive of a non-marine origin for the bulk of the formation. The Sespe does not appear to be a unique unit from the standpoint of time-lithology association. Many other sedimentary basins in Southern California possess similarly appearing rocks occupying about the same place in the geologic column. It would seem that widespread climatic and orogenic factors contrived to produce these formational cousins at about the same time.

Sespe oil production has been established over an east-west belt 90 miles long. Current production from the Sespe is about 17,000 barrels daily, 95% of which comes from fields on the 17-mile-long Oak Ridge uplift. Different zones in the Sespe formation produce from field to field, even along Oak Ridge, in a manner suggestive of varying or multiple sources for the Sespe's oil.

8. DOUGLAS WILSON, Intex Oil Company, Bakersfield. Sheep Springs Area, Cymric Oil Field, Kern County, California.

The Sheep Springs area of the Cymric oil field is located on the west side of the San Joaquin Valley approximately 40 miles due west from Bakersfield. Sheep Springs is relatively small, both in areal extent and in total oil reserves; however, it includes complex structural and stratigraphic traps which will be characteristic of probable future Westside oil fields.

Production is obtained from at least five different sands ranging in age from Pliocene to Oligocene. All but one of these sands pinch-out within one mile of the wells in which they are productive.

During the Miocene the Salt Creek anticline, with its associated normal faults, was developed. Oligocene and Miocene oil accumulated near pinch-outs of the sands and was localized by faults on the plunging nose and north flank of the anticline. After a period of erosion, Pliocene and Pleistocene

deposition was accompanied by compressive forces which folded the younger beds, but which were absorbed by the top few hundred feet of Miocene shale. This produced an upper structure which has no relationship with the structure in the lower beds. Oil-saturated sands are found in the Pliocene at structurally high positions along pinch-out lines.

9. BURDETTE A. OGLE, Wm. Ross Cabeen and Associates, Denver. Geology of the Eel River Basin, Humboldt County, California.

Eel River Basin, a westerly trending Cenozoic basin in Humboldt County, was the site of deposition of 13,000 feet of dominantly marine upper Miocene to Recent clastic sediments.

Pre-Tertiary formations in the region include the Franciscan and Yager formation (Cretaceous). Deposition of the Wildcat group on an eroded surface cut on Franciscan and Yager rocks began in Mohnian time with the basal beds of the Pullen formation (Mohnian-lower Pliocene). The Pullen, 600-1,000 feet thick, locally has a 200-foot thick basal sand, but is dominantly made up of massive diatomaceous mudstone. Overlying the Pullen disconformably is the Eel River formation (600-2,000 feet) which is characterized by glauconitic sandstones and dark gray mudstones containing a Repetian fauna. From 3,000 to 6,000 feet of middle to upper Pliocene mudstones, siltstones, and sandstones of the Rio Dell formation overlie the Eel River formation and overlap onto pre-Tertiary rocks in the northeastern part of the basin. Numerous thin, friable, permeable sands are present in the middle part of this unit; gas is produced from them in the Tompkins Hill gas field. Gradationally above the Rio Dell is the Scotia Bluffs sandstone, an upper Pliocene shallow marine to non-marine massive sandstone unit, 1,000-2,000 feet thick, noted for forming spectacular cliffs. Carlotta formation's non-marine massive conglomerates, sandstones, and claystones grade up from Scotia Bluffs sandstone. This 500-3,000-foot series of beds ranges in age from upper Pliocene to Pleistocene.

Rapid changes take place in thickness, character, and distribution of these units. Sedimentary and faunal evidence indicate deep-water deposition in the early history of the basin with gradual shallowing and eventual regression of the sea by late Pliocene.

Faulting probably aided in the early development of the depositional trough. The principal structural features of the basin are the major Eel River syncline and smaller anticlines on the north and south, and the northwest-trending Little Salmon fault.

10. OLAF P. JENKINS, California State Division of Mines, San Francisco. Status of Geological Mapping in California.

During revision of the 1938 edition of the State Geologic Map, the Division of Mines has examined and compiled available geologic mapping, published, and unpublished. Thirty topographic sheets, by the Army Map Service, are to serve as the base for the revised map. The first group of 8 of these sheets, in southern California, is in press. Geologic mapping which may be considered adequate for the 1:250,000 scale adopted for the new map covers over half (57%) of the state's area; 70% of this has been published. The most completely mapped provinces are the Sierra Nevada and the central and southern Coast Ranges. About 70% of the Sierra Nevada is covered by adequate available maps, and possibly 90% of the central and southern Coast Ranges has been adequately mapped, the latter mainly by petroleum geologists. Only 27% of the Mojave-Colorado desert is adequately mapped.

Geologic mapping in the state is progressing rapidly by the U. S. Geological Survey, the universities, the State Division of Mines, and other geologists. Approximately two-thirds of the geologic mapping in California published since 1940 has been published by the Division of Mines. The Division in September, 1953, had in press 6 quadrangle geologic maps, and field mapping has been completed in 25 additional 15-minute quadrangles. The U. S. Geological Survey, in cooperation with the Division of Mines, has been mapping mineralized areas in the state, and, in addition to the cooperative investigations, is mapping in connection with several mineral commodities, including the salines of the Mojave Desert; this last is to yield a reconnaissance geologic map of the Mojave within two years. The Survey is also reconnaissance-mapping 15,000 square miles in northwestern California. Several universities are sponsoring mapping projects, including the University of California in the high Sierra Nevada, Sierra Nevada foothills, the Salinas Valley, and Diablo Range; California Institute of Technology in the San Jacinto and Avawatz mountains; University of Southern California in the southern Coast Ranges and Peninsular Ranges; and Stanford University in the east Shasta district, Sierra Nevada foothills, and Santa Lucia and San Bernardino mountains.

The Division of Mines encourages the cooperation of geologists in furnishing information on geologic mapping in progress in the State and welcomes their inquiries.

11. EDWARD A. HALL and GERALD H. RICKELS, Union Oil Company of California, Santa Paula. Oakridge Oil Field, Ventura County, California.

The Oakridge oil field is located atop the Oakridge Mountains 2 miles east of the Torrey Canyon oil field and  $3\frac{1}{2}$  miles southeast of the town of Piru.