PACIFIC SECTION PAPERS AND ABSTRACTS

1. "Introductory Remarks of Symposium on Occurrence and Production of Oil from Fractured Rocks in California," ROLLIN ECKIS, Richfield Oil Corporation, Los Angeles.

2. "Summary of Production from Fractured Rock Reservoirs in California," W. S. EGGLESTON, Union Oil Company, Los Angeles.

The main source of oil production in California is in sand reservoirs. In recent years, however, production from fractured rock reservoirs has gained prominence. Fractured rock reservoirs can in general be divided into two groups: fractured cherts and shales in sedimentary beds and fractured metamorphosed basement rocks. Approximately 55,000 barrels of oil per day are being produced at present from fractured rock reservoirs. It is estimated that 15,000 barrels per day are being produced from fractured basement rocks and 40,000 barrels per day from fractured cherts and shales.

3. "Occurrence and Origin of Chert in the Monterey Formation," M. N. BRAMLETTE, University of California at Los Angeles.

Chert is less common than the other siliceous rocks in the Monterey but is locally prominent, especially in lower parts of the formation. Evidence is presented indicating that most of the siliceous rocks were formed through an alteration of originally diatomaceous rocks, the chert forming from beds and areas of relatively pure diatomaceous deposits. Most of this alteration by solution and recementation was after burial of the deposits.

Surface rocks commonly show recementation of the fractured cherts. More open fractures might persist, however, if accumulation of oil were nearly coincident with some of the structural deformation and fracturing.

4. "Fractured Reservoirs of the Santa Maria District," L. J. REGAN, JR., General Petroleum Corporation, Santa Maria, and A. W. HUGHES, Union Oil Company, Santa Maria.

Cumulative production of the Santa Maria district to January 1, 1947, was 250,637,000 barrels of which an estimated 77% originated in fractured rocks and 23% in oil sands. 74.5% of the oil was produced from fractured rocks in the Monterey formation and 2% from fractured "Knoxville" sandstone. Monterey fractured rocks in order of importance include (1) Mohnian cherts, (2) Luisian calcareous shale, and (3) Mohnian platy siliceous and porcellaneous shale. The distribution, age, and character of fractured zones are illustrated by stratigraphic sections. The distribution of maximum chert development suggests chert originated as a sedimentary facies. General characteristics of potentially productive fractured rocks of the district are analyzed and their permeabilities and porosities as indicated by production data are discussed.

5. "Oil Production from Fractured Rocks on West Side San Joaquin Valley," S. M. REYNOLDS, consulting geologist, Taft.

There are three known areas on the west side of the San Joaquin Valley where oil is produced exclusively from fractured rocks. These are in the South Belridge, Elk Hills, and Sunset oil fields. In each accumulation the structure is anticlinal; the fractured rocks are shale of upper Miocene age. The physical characteristics of the fractured rocks are not well known generally. The upper Miocene contains considerable brittle siliceous shales on the west side of the San Joaquin Valley which are known to have favorable reservoir characteristics in some places where tested. The distribution of these members is discussed.

6. "The Nature of the Basement Complex Oil Reservoir, Edison Oil Field, California," J. C. MAY and R. L. HEWITT, Tide Water Associated Oil Company, Bakersfield.

The completion of the H. H. Magee and Independent Exploration Company's "Brockman" well No. 3, Sec. 13, T. 30 S., R. 29 E., MDB & M, in the Edison field, Kern County, initiated commercial production from basement complex rocks in the San Joaquin Valley. At the present time about 1,500 acres of these rocks are oil productive in this field. The geologic structure of the field at basement complex depth is a faulted, dome-like fold with extensive south and west flanks, but with the north and east flanks shortened by faulting. The basement complex rocks are divisible into two groups: metamorphic rocks derived from sediments and igneous intrusives, and a younger igneous rock (Sierra Nevada) which was the chief cause of metamorphism in the older rocks. The metamorphic rocks in order of their probable age are (1) McCowan schist, (2) Hershey schist, (3) Dougherty schist, and (4) felsites. The McCowan schists are satiny, lead-gray, laminar rocks of sedimentary origin which occupy the eastern part of the field. The Hershey schists of doubtful sedimentary origin, are pistachio green, poorly laminated rocks. The Dougherty schists are variously metamorphosed fine-grained igneous rocks of probable malachite or diorite-aplite composition which comprise the west half of the basement producing area. The felsites are fresh, fine-grained igneous rocks, mineralogically akin to the Dougherty schists, which occur as segregations throughout the field. The quartz diorite of the Sierra Nevada batholith bounds the east edge of the oil field. Metamorphism is regional,