The present-day drilling boom is a product of new stratigraphic ideas in the shallower Cretaceous Sunburst and Moulton sandstone units. These ideas and improved drilling economics were spawned by several recent wildcat wells. Well completions to date have increased the annual production in northwestern Montana from 4 to more than 6.5 million bbls. of oil in less than 3 yrs.

34. KENNETH E. CARTER, Consultant, Durango, Colorado

CACHE FIELD, MONTEZUMA COUNTY, COLORADO

The Cache field in southwestern Colorado is the most productive field in the Colorado part of the Paradox basin. The field was discovered in October, 1964, and currently there are 18 producing wells with 40-acre spacing. Gas and high-gravity oil are produced from limestone and dolomite in the Ismay zone (Pennsylvanian) at a depth of 5,600 ft. Within the productive intervals, average porosity is 8–10% and average permeability is 20–25 md. The average net-pay thickness is approximately 40 ft. and there have been initial flowing potentials in excess of 3,000 b/d of oil.

The productive area trends northwest, is 2 mi. long by ½ mi. wide, and encompasses 740 acres. Subsurface control indicates the existence of approximately 50 ft. of closure at the top of the Ismay zone. However, the accumulation is controlled primarily by the development of porosity and permeability within "stacked" algal bioherms which grade laterally into anhydrite.

Cumulative production to May 1, 1966, was 1,519,251 bbls. of oil. Estimated recoverable reserves are 4.6 million bbls. of oil.

35. D. KEITH MURRAY, Consulting geologist, AND LOUIS C. BORTZ, Pan American Petroleum Corporation, Denver, Colorado

EAGLE SPRINGS FIELD, NEVADA

Shell Oil Company discovered Eagle Springs oil field, Nevada's sole producing area, in 1954. Since late 1963, Texota Oil Company and Western Oil Lands have extended production more than 1 mi. east, completing several prolific wells (up to 1,000 b/d). To date, the productive limits of the field have not been defined entirely. Shell's discovery was drilled on a seismic anomaly reportedly mapped in Miocene valley-fill deposits. Cumulative production to April 1, 1966, is 1,208,530 bbls. of oil, with proved recoverable reserves from 13 productive wells estimated at 10,000,000 bbls.

Most of the production is from carbonates of the Eocene Sheep Pass Formation and from porous zones in Oligocene welded tuffs. A well in the southwest part of the field has produced a small amount of oil from Pennsylvanian(?) carbonate. The Sheep Pass Formation, which is characterized by the absence of volcanic material, was deposited in a local lacustrine basin that covered parts of the present-day Railroad Valley, White River Valley, and adjacent mountain ranges. The Oligocene welded tuffs are part of an extensive ignimbrite sequence that once covered much of Nevada and western Utah. The pay zones in the field are discontinuous, being absent both in some of the Eagle Springs Unit wells and in several of the exploratory tests drilled in the region. However, a significant percentage of wells drilled in east-central Nevada has found hydrocarbon shows in both Tertiary and Paleozoic sediments.

The oil trap at Eagle Springs appears to result from a combination of faulting, folding, truncation, and overlap; impermeable Miocene fanglomerate overlaps truncated Oligocene and Eocene reservoir beds along a northwest-plunging anticlinal nose, as mapped at the base of the Miocene valley fill. Closure on the east is provided in part by a major boundary-fault zone exhibiting 10,000–15,000 ft. of apparent stratigraphic displacement. This fault zone separates the field from the uplifted Grant Range on the east.

Although a fairly complete Paleozoic succession has been mapped in nearby mountain ranges, much of that section is absent in some of the Railroad Valley wells. For example, Mississippian overlies Cambrian in Shell's discovery well, probably because of pre-Eocene faulting. Within the central part of the "Sheep Pass basin," little or no angular discordance separates the Eocene from the upper Paleozoic sediments. However, at the edge of this depositional basin, these same rock units are separated by a distinct angular unconformity. Oligocene pyroclastic rocks disconformably overlie Eocene Sheep Pass sediments both in the field and at most observed outcrops within the "Sheep Pass basin." Basin-and-range normal faulting began during late Oligocene or early Miocene time. Movement along these faults continued at least until the end of the Tertiary. A quartz monzonite intrusive body which was penetrated in Shell's discovery well is of Miocene age as determined by K-Ar dating methods.

It is logical to assume that additional significant oil accumulations will be found in eastern Nevada. However, in order to discover them, a coordinated exploration program is required.

CERTIFICATION APPLICATIONS APPROVED FOR PUBLICATION

The executive committee has approved for publication the names of the following candidates for Certification as Petroleum Geologists. This does not constitute certification but, in accordance with certification procedures, places the names of the candidates and sponsors before the membership for a period of sixty days. If any member has information bearing on the qualifications of these candidates, it should be sent promptly to the Executive Committee, Box 979, Tulsa, Oklahoma 74101.

Bell, Forrest William, Midroc Oil Corp., Shreveport, La.
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Black, Charles Edward, Kewanee Oil Co., Brookville, Pa.
(Theodore A. DeBrosse, Everett M. O'Connell, Jack R. Huffmyer)

Boettcher, Jerome Ward, Humble Oil & Refining Co., Corpus Christi, Tex.
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