1949 5290 0101 file White Pine

344 Item 101

FRIDAY AFTERNOON, 2:00–4:00

Presiding: R. B. HUTCHESON, The Superior Oil Company, Bakersfield
WALLACE L. MATJASIC, Honolulu Oil Corporation, Los Angeles

2:00 (1) TIME OF OIL AND GAS ACCUMULATION
A. I. Levorsen, Stanford University.

An idea of the time oil and gas accumulated into pools may be gained through two separate and simple lines of reasoning. These are: (1) a pool can not form until after the trap has been formed. We have several methods of dating geologically the time the trap was formed and consequently setting the time or times before which there could have been little or no accumulation; and (2) the capacity of a trap to contain oil and gas is roughly a function of the pressure in the reservoir. The pressure in turn is related to the depth of burial and the hydrostatic head. Pools full of oil and gas to the spill point have accumulated only under the increasing pressure which comes with burial. Both types of reasoning support the idea that in some pools at least, the accumulation was late in terms of the life of the reservoir rock—accumulation even taking place to the present time.

The PVT relationship of gases may also be used to explain the time of regional migration of oil and gas within basins and provinces. The drilling of a hole into an oil and gas pool, for example, allows the gas to expand as the pressure gradient develops between the pool and the well hole. The expanding gas moves toward the area of lower pressure, either carrying or pushing the oil along with it. Basins and other large geologic units have experienced numerous upsets of their PVT relationships during their history. Tilting, faulting, folding, regional arching, erosion, and deposition all serve to upset the PVT equilibrium from time to time. The development of a pressure gradient through such causes as these makes for the expansion and movement of gas toward the area of lower pressure in a manner similar to what we know exists when a well is drilled into a pool. The available energy may be very large. Local traps which existed prior to the regional movement would collect oil and gas into pools whereas local traps which formed after the regional movement would be barren.

3:00 (2) OBSERVATIONS ON PALEOZOIC STRATIGRAPHY OF CENTRAL NEVADA
Chas. W. Merriam, California Institute of Technology, Pasadena.

3:30 (3) SOME OBSERVATIONS ON GEOLOGICAL STRUCTURES IN EASTERN NEVADA [Abs.]
Fred L. Humphrey, Stanford University, 1949, P2063 AAPG Bull. v. 33, no. 12, 2097 p.

The White Pine Range of east-central Nevada consists of a central dome of Lower Paleozoic sedimentary rocks and a small granodiorite intrusive, surrounded by sedimentary rocks of Devonian and Carboniferous age. The dome is bounded by arcuate normal faults with maximum vertical displacements of 15,000–18,000 feet. The evidence suggests that the dome has been pushed up, as a unit, into the younger rocks.

The principal structures within the Upper Paleozoic rocks of the Range are folds and thrust faults. At least part of the folding occurred during Eocene time. No evidence of folding of these rocks during the down-warping of the Cordilleran geosyncline was recognized, although any structural traps of that era would be most desirable.

Contained in these Upper Paleozoic rocks is a thick section of the Middle Mississippian White Pine formation, which, although there are rapid facies changes, often contains a considerable thickness of black carbonaceous shales. This formation is general throughout eastern Nevada and could well be a source rock for petroleum providing the structure and surrounding rocks furnish favorable reservoirs.

Other observed areas throughout eastern Nevada have structures generally similar to those within the White Pine district. That is, the rocks are folded and the folds are broken by thrust faults. The thrust faults vary from minor breaks with a few feet of displacement to displacements of several or even tens of miles. The mountain ranges generally furnish some evidence of being bounded by a series of normal faults and there are commonly many normal faults within the ranges.

The presence of volcanic flows need not discourage oil exploration as these have flowed many miles from the source. However, the intrusive rocks, including the dike feeders of lava flows, have altered and metamorphosed the surrounding rocks.

The Upper Paleozoic rocks are probably the only potential source rocks for petroleum in eastern Nevada, although the Ordovician graptolite shales of central Nevada undoubtedly warrant examination, as well as the Triassic marine shales of southern Nevada.

(More about Pacific Section on page 2080)