

much clastic material and are placed in the Montevallo Supergroup. The upper three formations, Maynardville Dolomite to Chepultepec Dolomite inclusive, consist mainly of dolomite and comprise the Knox Dolomite Supergroup.

Sedimentation studies indicate that rocks of the Sauk Sequence were deposited in a transgressing sea which advanced from the southeast. The stratigraphic succession of Cambrian and Ordovician rocks of the Appalachian basin is clearly evident across Ohio. In northeastern Indiana, however, a transition occurs between the Appalachian basin carbonate facies and the Upper Mississippi Valley clastic facies of Wisconsin and Minnesota.

Cross sections reveal that the Sauk Sequence is truncated northward beneath the Knox unconformity. Petroleum production is related to stratigraphic traps below the unconformity. Chepultepec (Beekmantown) rocks have produced small quantities of oil and gas to the south in Kentucky. Copper Ridge (Trempealeauan) Dolomite is producing in central Ohio. Shady Dolomite is the reservoir rock of the Clearville pool in southern Ontario, and the wedge-edge of the Mt. Simon Sandstone is productive in the Gobles pool of central Ontario.

An isopach map of the Sauk Sequence shows a narrow, north-south area of thin Sauk in central and southern Ohio, over which lower beds are relatively thin or absent. This is interpreted as a Precambrian buried ridge known as the Waverly Arch. A lesser ridge may be present in eastern Ohio. In central-northern Ohio, isopach studies indicate a Precambrian platform in the vicinity of Lake Erie.

Oil accumulations of Morrow County are in stratigraphic traps of the erosional remnant type. Many are buried hills of local areal extent (100 to 300 acres), but most have high relief (100 to 200 feet) with pay sections up to 150 feet or more in thickness. Angle of west slope appears to be the critical trapping factor in remnant reservoirs. The Lower Chazy Dolomite ("Glenwood") and part of the Middle Chazy Limestone are generally missing by non-deposition. Commonly, secondary dolomitization of the Middle Chazy Limestone has occurred above the unconformity in these pinnacle type remnants, making the top of the Cambrian difficult to find.

Accumulation in the Marengo area of Bennington Township is apparently in a buried ridge of low relief, with 20 to 30 feet of overlying Lower Chazy Dolomite present. Pay thicknesses in remnants of the buried ridge type commonly range from 5 to 20 feet.

Erosional remnants are gas-solution type reservoirs with a possible moderate water

drive. Porosity commonly varies from 6 to 20 percent and permeability from 1 to several hundred millidarcies. Water saturation is commonly 18 to 25 percent. Initial gas-oil ratios of 300 to 400 cubic feet per barrel increase gradually with production. Primary reserves are conservatively estimated at 140 barrels per acre foot, based upon 25 percent recovery of 560 barrels per acre foot in place.

Stratigraphic traps due to truncation, sand pinch-outs, permeability barriers, and erosional remnants below the Knox unconformity may be present in all parts of Ohio. Lack of information concerning structure in the Sauk Sequence does not rule out the possibility of structural accumulations. To the present time, the great bulk of Cambrian production has been from erosional remnants in Morrow County. Extensive exploration in Ohio is expected to continue for at least several years.

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April 7, 1964

UMBERTO COLOMBO, Donegani Research Institute, Italy
"The Evolution of Petroleum"

"The idea of a 'metamorphic' evolution of petroleum arose from the consideration of differences existing in chemical structure of crude oils within each sedimentary basin, and from certain regularities, which seem to indicate a relationship between the structure of oils and such geological parameters as age and depth of their reservoirs. This concept of evolution of petroleum was strictly connected with the classical hypothesis of the origin of oil in 'source rocks,' through complex transformations of biologic matter. Recent studies on migration of hydrocarbons and on the composition of crude oils have led to a substantially new picture of origin and alteration of oil deposits. The new ideas are reviewed, with particular reference to their implications in the problem of evolution of petroleum."

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April 13, 1964

ED BARRETT, Continental, Oklahoma City
"Origin of Mobile Belts—Ouichitas Emphasized"

No one, to the present writer's knowledge, has satisfactorily explained the underlying reason for the continent-bordering mobile belts, and the following hypothesis may fall in the same category. It is thought reasonable, however, to assume that the thermal, and therefore density, differential between the sub-continental and sub-oceanic basaltic