The Huntersville chert contains phosphatic nodules associated with glauconite and is not due to "chertification" of Onondaga shale.

Phosphate is found in abundance at many places in the Paleozoic column where it is certain that there is no unconformity, hence phosphate in itself is not a reliable criterion of unconformity. Since at some point of the phosphorus cycle there is an intimate connection between this element and organic matter, and since it is conceded today that oil and gas are derived from organic material, it is highly desirable to establish the exact connection existing between phosphates on the one hand and the source material of oil and gas on the other.

71. ROBERT C. LAFFERTY ET AL., The Owens, Libbey-Owens Gas Department, Charleston, West Virginia

Developments in Appalachian Area During 1941

NEW YORK

In the Oriskany sand area of southern New York, 41 wells were completed during 1941, 20 as gas wells with a combined open flow of 98,516,000 cu. ft., and 21 as dry holes, of which 8 can be considered as wildcat wells. No new producing areas were found during the year but the Harvard area in Steuben County was developed from 1 well to a pool of 7 wells with a daily open flow of 6,929,000 cu. ft. and 1 dry hole.

PENNSYLVANIA

During the year 1941, 17 wells drilled below the Onondaga lime were completed in Pennsylvania. Seven of these wells were completed as commercial gas wells in the Oriskany sandstone with a combined open flow of 10,750,000 cu. ft., all being located in the summit pool, Fayette County. In this pool, 1 well was lost with the tools in the hole a few feet below the top of the Oriskany sand. The 8 dry holes were wildcat tests in Armstrong, Beaver, Potter, Tioga, Mercer, and Erie counties. Only 1 of these wells tested formations below the Oriskany. This well, the Jay Childs, drilled by the Ohio Oil Company, was abandoned at a total depth of 5,191 ft. with a showing of oil, gas, and water from what is correlated as the St. Peter sand.

OHIO

In eastern Ohio, holes drilled to a depth of less than 4,000 feet are generally within or in the vicinity of the older Clinton fields of central Ohio. Only those wells more than 4,000 feet in depth are considered in this review.

Under the foregoing classification, 136 wells were completed during the past year, 89 as gas wells in the Clinton (Medina) sand with an initial open flow of 146,000,000 cu. ft., and 3 as oil wells with an initial production of 37 barrels. Forty-four were dry. Of these, 3 tested sub-Trenton strata, 39 were dry in the Clinton, and 2 tested only the Oriskany.

Gas fields in Muskingum, Stark, and Morgan counties were extended and a new field in Salt Creek Township, Muskingum County, was opened as well as a new field in Pike Township, Stark County.

WEST VIRGINIA

During the year, 182 wells were drilled to or through the Oriskany sand in West Virginia. Of these, 166 were gas wells with a combined open flow of 764,568,000 cu. ft., and 16 were dry.

The Elk-Poca and Sandyville Oriskany gas fields were extended to include 38 square miles of new territory. Eight of the 16 dry holes were drilled in defining the present boundaries of these fields. Two Oriskany wells, located in the southeastern portion of the Elk-Poca Oriskany field, were unsuccessfully deepened to the Clinton (Medina) sand.

An Oriskany test located in Randolph County encountered salt water in the Oriskany. The Oriskany test in Roane County also encountered salt water.

The Oriskany test in Monongalia County encountered a showing of gas in the Huntersville chert but was dry in the Oriskany.

The Clinton test in Boone County was dry, as were the tests in Wood and Harrison counties. This latter test is the first deep rotary well in the state penetrating to a deph of 10,018 feet.

During the year, the Department of Mines issued 1,087 drilling permits. Of this number, 495 were reported as gas wells, 48 as oil wells, 18 as combination oil and gas wells, 144 dry holes, 4 cancelled permits, and 369 unreported. During the year 916 abandonment permits were issued, of which 472 were oil wells.

KENTUCKY (Eastern)

During the year, 416 wells were drilled: 59 were dry, 254 were gas wells developing an open flow of 116,963,000 cu. ft. per day, and 103 were oil developing an initial production of 903 barrels of oil, and 6 pressure wells were completed.

Production was found in zones ranging from the Salt sand (Pennsylvania) through the Sunnybrook (Ordovician).

Most of the drilling was done in the eastern border state in developing Devonian shale gas production and extending existing pools, the Rockhouse pool developed in Johnson City from the Big Six (Silurian) sand being the only important new field.

TENNESSEE (Eastern)

During the year, 9 wells were completed in the area east of the Cincinnati arch, drilling a total of 13,705 feet. None of the wells can be classed as commercial although encouraging showings were found.

In the Cumberland Plateau area, several blocks of leases are still retained by a large company. In this area the pre-Mississippian remains essentially unexplored.

MARYLAND

One well was completed in the western Panhandle of Maryland. This well, located in the highly folded area of Garrett County, was completed at a total depth of 8,165 feet after encountering a showing of gas and salt water in the Oriskany sand at 8,096 feet.

VIRGINIA

Two wells were completed during the year, 1 in Wise County as a dry hole through the Devonian shale at a total depth of 5,348 feet, and 1 in Rockingham County encountering less than 100,000 cu. ft. from the Devonian shale and Oriskany sand at a total depth of 2,986 feet.

72. HARRY L. BALDWIN, JR., Servicio Geologico, Y.P.F., Buenos Aires, Argentina, South America

The Tupungato Oil Field, Province of Mendoza, Argentina

The Tupungato oil field is situated 50 kilometers south-southwest of the city of Mendoza in west-central Argentina, in an area just east of the foothills of the Andes Mountains where the principal tectonic features are overthrust faults of late Tertiary age. The surface structure, discovered in 1932, is a closed dome with faulted west flank. The discovery well was completed in 1934 at a depth of 250 meters, and a total of 17 shallow wells were drilled to depths averaging 450 meters, most of which produced oil associated with strong flows of salt water from fractures in the upper part of the Tertiary (Pliocene) section. The discovery well of the Victor zone of Upper Triassic age was completed in 1938 at a depth of 1,796 meters. By the end of 1941, 23 wells had been drilled, of which 20 were producing an average of 8,800 barrels per day. The major part of the differences between the structure of the various zones which can be identified in well samples is believed by the author to be due to the presence of low-angle thrust faults which cause variations in the thickness of the Tertiary section in different parts of the field, but this can not be definitely proved. There is some indication of the existence of a gentle fold prior to the deposition of the Tertiary.

The oil occurs in fractures and porosity in the upper part of a thick series of volcanic tuffs, but is believed to be produced almost entirely from the fractures. It is of the same type, with a high paraffine content, as that produced from lower stratigraphic levels in the other oil fields of northern Mendoza. A well to test these deeper zones is now being drilled. The Yacimientos Petroliferos Fiscales is the only operator in the field.

73. DONALD J. MACNEILL, McColl-Frontenac Oil Company, Limited Calgary, Alberta, Canada

Stratigraphy and Structure of the Moose Mountain Area, Alberta

The Moose Mountain area, situated along the front range of the Canadian Rockies, 32 miles northwest of the Turner Valley oil field, Alberta, has interested oil companies for a great many years. Its main feature is a large domal structure, approximately 10 miles long and 3 miles wide, that has been drilled at three widely separated locations, resulting in two producers and a failure. These tests were started only a few hundred feet above the Mississippian-Devonian contact. The dry hole was drilled about 2,700 feet below the top of the Cambrian; the producers are deriving the gas and oil from rocks