(?) Weber sandstone. The lower part of the Woodside is the equivalent of the upper Park City (Phosphoria). The Woodside is cut by an unconformity above which lies a conglomerate. The conglomerate has been classed as the basal member of the Ankareh. The upper Ankareh consists of variegated shales and varicolored sandstones and is overlain directly by massive Nugget (Navajo) sandstone.

The erosion surface below the conglomerate, the conglomerate, and the overlying variegated beds are readily recognized from one end of the range to the other. At the western end the conglomerate and variegated beds were classed as the basal member of the Nugget by Boutwell (1912, 1933) and by Mathews (1931). At the eastern end these same beds were called Ankareh by Schultz (1920) and by Sears (1925). The conglomerate and variegated beds, therefore, constitute an important un-named lithologic unit which lies unconformably above the type Ankareh and below the restricted Nugget at the western end of the Uinta Mountains and unconformably above the Woodside and below the Nugget at the eastern end of the range.

The Jurassic formations of the western Uinta Mountains, from base upward are: (1) Navajo sandstone (Nugget of earlier reports), (2) Twin Creek limestone, (3) Preuss redbeds, (4) Stump sandstone, and (5) Morrison formation. Eastward along the mountains (1) the Navajo sandstone persists, (2) the Twin Creek limestone intertongues with the Carmel redbeds, (3) the Preuss redbeds grade into the cross-bedded Entrada sandstone, (4) the Stump sandstone grades into the Curtis shales and limestones, and (5) the Morrison formation thins and becomes less conglomeratic. At the west end of the mountains *Belemnites* occur in a sandstone (Stump) in the middle of the thick Beckwith formation of earlier reports, within 35 miles of Salt Lake City, and in the Curtis in all other sections to the east. At the eastern end of the Uintas the Curtis redbeds tongue out so that Navajo is directly overlain by Entrada, forming a single sandstone unit.

The equivalents of the Navajo, Carmel (Twin Creek), Entrada, and Curtis can be recognized in the Sundance formation of eastern Wyoming.

69. LEWIS S. CORYELL, Cities Service Oil Company, Wichita Falls, Texas
ROBERT ROTH, Humble Oil and Refining Company, Wichita Falls, Texas
DOLPHE E. SIMIC, Cities Service Oil Company, Wichita Falls, Texas

New Developments in North and West-Central Texas in 1941

During the year 1941, the north and west-central Texas districts developed important new production in the following stratigraphic formations.

Ellenberger dolomite (Cambro-Ordovician), three new discoveries and three found by deeper drilling.

Mississippian limestone, five new discoveries and two by deeper drilling.

Bend (Pennsylvanian), two new discoveries.

Caddo (Pennsylvanian), nine new discoveries.

Strawn (Pennsylvanian), nine new discoveries and three by deeper drilling.

Canyon (Pennsylvanian), one new discovery and one by deeper drilling.

Cisco (Pennsylvanian), three new discoveries and two by deeper drilling.

Wolfcamp (Permian), one new discovery.

The only new producing zone discovered in the area was the Dothan limestone (Permian) in the Merkel pool in Taylor County. To date only one well is producing from this zone.

70. CONSTANTIN N. APSOURI, West Virginia Geological Survey, Morgantown, West Virginia

The So-Called "Chert Nodules" of the Oriskany Sandstone and the Problem of Phosphates

The Oriskany sandstone of New York is known in the central Appalachian region as the Ridgeley, overlying a lower member, called the Shriver. The topmost part of the Oriskany formation is generally bestrewn by round or elliptical black nodules described by modern stratigraphers as "chert nodules." These "chert nodules" were studied by the writer; they are phosphatic, the phosphate occurring in the form of collophane. X-ray diffraction pattern of the collophane is essentially the same as that of apatite.

Phosphates in the Oriskany formation are the result of complex factors prevailing in the Oriskany and Onondaga seas. The "chert nodules in the Oriskany" of New York were deposited in the westward-transgressing Onondaga sea, hence they occur in basal Onondaga. It is improbable that the genesis of phosphatic nodules is due to catastrophic events.

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.