MID-CONTINENT REGIONAL MEETING, OKLAHOMA CITY, NOVEMBER 1–2, 1955

ABSTRACTS

G. M. KNEBEL, president of A.A.P.G., Standard Oil Co. (N. J.), New York, N. Y.
What Lies Ahead for A.A.P.G.?

With the search for new oil reserves extending to all corners of the earth to-day, the activities of the American Association of Petroleum Geologists are becoming more international. The continued growth in world population and the constant improvement in the standard of living place a tremendous responsibility on all exploration men to provide the necessary raw materials and resources needed. In meeting this challenge and to properly represent the growing membership of the American Association of Petroleum Geologists, a healthy evolution has been taking place in the Association.

Detailed statistics have been prepared and studied for 236 or all of the major oil fields of the free world. They represent 217 billion barrels, which is 82.5% of the free world's expected ultimate. The study shows the bulk of our oil occurs: (1) on the stable side of basins, (2) in anticlines, (3) in sandstone and carbonate reservoirs, (4) from formations of Mesozoic age or younger, and (5) from a depth range of 2,000–8,000 feet.

Most of the world's ultimate oil is 30° API gravity or above with mixed and asphaltic base oils predominating. The discovery of the "big" giants has been cyclic with 10-year intervals starting with the Lake Maracaibo discovery in 1917.

ROBERT B. TOTTEN, Sun Oil Co., Amarillo, Texas
General Geology and Historical Development, Texas and Oklahoma Panhandles

The Texas and Oklahoma Panhandle areas include three large basins: Western Anadarko, Dalhart, and Palo Duro. The Hugoton embayment is part of the Western Anadarko basin and the Dalhart basin connects to the Palo Duro basin. The Hardeman (Red River) basin and the Harmon basin occupy a part of the southeastern Texas Panhandle area. Some major positive areas of significance are Amarillo uplift, Cimarron uplift, Bravo "Dome," and Matador archipelago. Some other uplift areas are Childress anticline, Hall County anticline, Narcisso structure, Quinduno structure, etc.

The earliest commercial gas production in the Texas Panhandle area was discovered in northern Potter County in December, 1918. The first oil production was secured in Carson County in May, 1921. Not until May, 1925, was prolific oil production found. The Panhandle boom started late in 1925 and was well under way in 1926. Gas production was first encountered in the Hugoton field in December, 1922, in Seward County, Kansas, and in 1925 Hugoton field gas production extended into Texas County, Oklahoma. In May, 1943, the Keyes gas area of northeastern Cimarron County, Oklahoma, was discovered. In May, 1946, oil production was found in the Anton-Irish field of Lamb County and Hale County, Texas. Until April, 1949, there had been no production encountered in the Western Anadarko basin, and then the Sinclair Oil and Gas Company's Lips No. 1, northern Roberts County, Texas, discovered oil in the Meramec. Since that time and with an increasing tempo many additional oil and gas fields have been discovered. Many of these fields are in Hansford County, Texas, and in Beaver County, Oklahoma. The majority of the gas and oil fields found in the past few years are in the Western Anadarko basin, but the Dalhart basin area has had a few new producing fields. The Palo Duro basin has had only one new pool, and there is one new field in Cottle County, Texas. More than fifty oil or gas fields have been discovered since the Lips field in 1949.

Much of the more recent production in the Panhandle area is from rocks of Pennsylvanian age with Morrow sand wells most numerous. Other important Pennsylvanian production occurs in the lower Virgil, Missouri, and Des Moines. At this time the pre-Pennsylvanian beds are not important in production except for the newly discovered Arbuckle dolomite oil-producer in the Laketon area of northeastern Gray County, Texas. The older Panhandle and Hugoton fields produce from the lower Permian rocks. A few other Permian (Wolfcamp) producing areas are known; chief among these is the Quinduno field, southern Roberts County, Texas.

Many of the producing areas are of the stratigraphic trap variety. A few fields have prominent anomalous structure; many have little or no closure.

J. KASPAR ARBENZ, Shell Oil Co., Denver, Colorado
Tectonic Framework of Oklahoma

Oklahoma can be divided into the following major tectonic units:

The Oklahoma salient of the Ouachita Mountain orogen with the McAlester-Arkansas basin as foredeep.

The Arbuckle Mountain-Criner Hills-Wichita orogenic system with the Anadarko basin as foredeep.

The cratonic foreland of the two above systems consisting of the Oklahoma lobe of the Ozark dome, the Central Oklahoma platform, and the Northern Oklahoma platform with the buried Nemaha ridge marking the western boundary of the Central Oklahoma platform.

A small marginal part of the Gulf Coast geosyncline.

With the possible exception of the structures of the Ouachita Mountains with their foredeep and the deep Anadarko basin, most of the tectonic units of Oklahoma show structural features which by their direction or alignment rather strikingly reflect deformational trends of the basement complex established in pre-Cambrian time and rejuvenated in later diastrophic events.

The first of these trends strikes northeast with variations from east-northeast to almost north-south ("Ozark strike") and can be recognized in the following features:

a. The tensional faulting of the Ozark region of Oklahoma.

b. The alignment of the echelon fault belts of the Central Oklahoma platform.

c. The faulting and general strike of the northern Nemaha ridge of Oklahoma.

d. The northeast striking fault pattern of the Arbuckle-Wichita system, particularly evident in the eastern Arbuckle Mountains and in the pre-Cambrian of the Wichita Mountains.

e. Transverse disturbances in the fold pattern of the Ouachita Mountains and the McAlester region.

f. Geophysical anomalies west of the Nemaha ridge crossing the Anadarko basin.

The second trend strikes normally west-northwest but varies from northwest to east-west ("Arbuckle strike") and is most typically represented in the following structures:

a. Major faults and folds of the Arbuckle-Criner Wichita system outlining the horst-graben block pattern of this tectonic unit.

b. Numerous subsurface faults of the Central Oklahoma platform.

c. Gentle folds in the Cretaceous of Southern Oklahoma.

A third, less distinct trend of structures striking north-northwest ("Anadarko strike") can be observed in:

a. The pre-Cambrian of the Wichita Mountains.

b. Fault and fold patterns of the Wichita-Criner system in the subsurface of central southern Oklahoma.

c. The southeastern portion of the Anadarko basin with the flanking south end of the Nemaha ridge.

The basement character and pre-Cambrian age of these trends can be best deducted from the dike, fault, and joint systems exposed in the pre-Cambrian cores of the Wichita and Arbuckle Mountains. The present state of knowledge of the mid-continental pre-Cambrian would not allow any precise conclusions as to the tectonic meaning of these trends in terms of pre-Cambrian structural history.

In contrast to these basement controlled structures the tectonic character of the Ouachita Mountains represents a typical compressive orogen with thick geosynclinal sediments that tend to eliminate or obscure any basement influence by disharmonic folding or decollement. Asymmetric and tight folding as well as high-angle thrust faulting are the dominant features of this province. Observable low-angle thrusts are restricted and the orogen appears to be principally an autochthonous system.

NORMAN F. WILLIAMS, Arkansas Resources and Development Commission, Little Rock, Arkansas
Pennsylvanian Geology of Northern Arkansas

Rocks of Pennsylvanian age in the Ozark Highlands and Arkansas Valley are essentially the same as the sequence representing earlier Pennsylvanian deposition in eastern Oklahoma. Outcropping in the Arkansas Valley are the Atoka, Hartshorne, McAlester, Savanna, and Boggy formations; in the Ozark Highlands only the Morrow group and the Atoka formation are exposed. There is in general a gradual thickening of beds toward the south from the outcrop toward the Arkansas Valley, an eastward extension of the McAlester basin. A marked eastward thickening in the lower Morrow and Mississippian has recently been demonstrated by Maher and Lantz who tentatively assign these thickened units to the Jackfork sandstone and Stanley shale, respectively. This thickening apparently begins along a north-south line through Pope County, which also approximates the eastern limit of outcrop of post-Atoka Pennsylvanian rocks. The significance of this facies change in terms of petroleum possibilities can not yet be determined. The Arkansas Valley, bounded on the south by the Ouachita Mountains and on the north by the Boston Mountains of the Ozark Highlands, is characterized structurally by long east-west-trending anticlines and synclines, many of which are faulted parallel with the axis. This folding had its beginning as early as Atoka time but the folding and faulting were not completed until after Boggy time. Along part of its northern margin the Arkansas Valley is separated from the Boston Mountains by a system of normal faults with a total vertical displacement as much as 3,000 feet. Pennsylvanian rocks in the Boston Mountains show a moderate regional dip south. Local folding is not as sharp and is not as common as in the Arkansas Valley. Much of the folding in the area had its inception in pre-Pennsylvanian time but almost all of the recognized faulting is post-Atoka. The anticlines of the Arkansas Valley have long been prospected for petroleum and to a slightly greater extent than those of the Ozark Highlands. The recorded pro-