

Structurally, the northern Cumberland Plateau is a monocline dipping gently to the east toward the highly folded and faulted Appalachian structural province. The Plateau is bordered to the northeast by the Pine Mountain thrust block and to the east and southeast by the Cumberland Mountain-Walden Ridge fault system. Strong secondary faults are present in southern Morgan County. Within the Plateau proper gentle dips prevail.

The upper and middle Mississippian strata have been productive in the Oneida and Glenmary areas in Scott County, respectively, and the Fort Payne of lower Mississippian age is the producing formation in the Boone Camp pool in northern Morgan County.

The subsurface stratigraphy and general structural conditions of the area are discussed and special emphasis is placed upon the pre-Mississippian possibilities.

59. J. R. LOCKETT, president, Appalachian Geological Society and Committee
Developments in Appalachian Area during 1940

60. F. R. DENTON and R. M. TROWBRIDGE, consulting geologists, Tyler, Texas
Developments in East Texas during 1940

Three oil fields were discovered and oil production found in a gas field in East Texas during 1940.

The Hawkins field of Wood County which is producing from the Woodbine is a discovery of major importance and has set in motion a large-scale leasing and geophysical program.

Routine development of proved oil fields kept completions at approximately the 1939 level. Relatively few exploratory tests were drilled.

NORTH MID-CONTINENT

61. EDWARD A. KOESTER, Darby Petroleum Corporation, Wichita, Kansas
Developments in North Mid-Continent in 1940

Kansas experienced a year of increased activity both in development and wildcatting, but results in the latter were relatively less fruitful. The number of total completions increased 33.9 per cent over 1939 and the dry hole percentage dropped from 24.7 per cent to 20.3 per cent. Initial oil production per well fell slightly from 1,577 barrels to 1,561 barrels, but the completion of 1,421 oil wells developed about 2,200,000 barrels of new potential compared to 1,500,000 barrels of new potential in 1939. Despite less activity in the Forest City basin, wildcatting increased from 95 completions in 1939 to 145 in 1940, but no important pools have yet been developed among the 23 discoveries. The most promising, as well as the most important of these pools, is the Ray pool in Phillips County, which previously had had but one small pool. In the Forest City basin, an oil and gas discovery of doubtful value was made in the McLouth pool of Jefferson County. The Bemis-Shutts, Burnett, Bornholdt, Trapp, Hall-Gurney, and Zenith pools account for 42 per cent of the new wells and 61 per cent of the new potential. Numerous extensions to old pools were made and many pools were joined.

In Nebraska the Falls City pool of Richardson County was the scene of the completion of 25 oil wells and seven dry holes. This pool produces low-gravity oil from a dolomite in the upper portion of the Devonian that is generally referred to as "Hunton." The wells respond favorably to acid treatment but water encroachment is rapid and it is doubtful that "Hunton" production in this pool will ever be of much importance. Thirty wildcat dry holes and one small oil well were completed elsewhere in Nebraska in 1940.

The Forest City basin play in Missouri resulted in the completion of seven additional deep failures and northeastern Missouri drew seven dry holes. There was also some moderately successful shallow gas development in the area east of Kansas City. There was a little intermittent drilling in Iowa, and some in the Dakotas, but the latter states were the scene of much checkerboard leasing and exploratory work.

62. LUTHER E. KENNEDY, chairman of committee of Tulsa Geological Society, Tulsa, Oklahoma
Occurrence of Oil and Gas in Pennsylvanian Sands in North Central and Northeastern Oklahoma and Southeastern Kansas

The oil and gas development maps of the northern Mid-Continent show the vast number of producing wells and fields in north-central and northeastern Oklahoma and in southeastern Kansas. These are generally described as being old Pennsylvanian pools about which geologists in general know few of the details. This paper is a joint effort of a number of geologists to divide this production into different stratigraphic horizons.

A series of four maps show where oil and gas are produced from sands in the Pennsylvanian below the base of the Cherokee, in the Cherokee formation itself, in the interval between the top of the Cherokee and the Checkerboard limestone, and in the interval from the Checkerboard limestone to the top of the Pennsylvanian. Cross sections show the position of these sands and units in the stratigraphic column. It is hoped that these maps will furnish additional information on the character and position of these sand bodies, and on the occurrence of oil and gas in them.

63. EDWIN A. DAWSON, chairman of committee of Shawnee Geological Society, Shawnee, Oklahoma
Occurrence of Oil and Gas in Pennsylvanian Sands in Central Oklahoma

64. J. A. MULL, Republic Natural Gas Company, Wichita, Kansas
Stream Channels Applied to Arbuckle of Central Kansas Uplift

The Arbuckle surface on the nucleus of the often rejuvenated northwest-southeast-trending Central Kansas uplift was exposed as a land mass at intervals before the first Pennsylvanian sea invasion, for sufficient time to permit the positive and negative features of topography to be well developed. Subsequent movements have not greatly altered the detail topography on this nucleus. As a consequence, dendritic and radial drainage patterns can be traced by well control throughout the area. These channels are largely responsible for the separation of most of the buried hills which are now productive of oil. Outside the nucleus of the uplift, the above principles still apply, although they play a minor role in some areas as a result of early Pennsylvanian movement.

CALIFORNIA

65. EUGENE H. VALLAT, Continental Oil Company, Los Angeles, California
Exploration Work in California during 1940

The discovery rate for the year 1940 in California declined. This followed and was accompanied by a decrease in geophysical work and exploratory drilling while geological employment remained approximately the same. Only one new oil field was discovered and there were a few areal and depth extensions of known fields. Several wildcat wells were completed as small producers in what, at present, appear to be non-commercial accumulations.

Drilling within fields increased California's potential production but additions to reserves has lagged behind withdrawals and lowering of estimates in fields under development. Faster drilling has accelerated the approach to a drilled up status for California fields. An attempt is made to arrive at the cost and length of payout time for an average top allowable well as an indication of the optimum expectancy for operating capital put into development wells.

Methods of attack now being used on the California exploration problem are referred to briefly.

66. ROLLIN ECKIS, Richfield Oil Corporation, Bakersfield, California
Stevens Sand, Southern San Joaquin Valley, California

The Stevens sand, first penetrated in 1936 by the Shell Oil Company's discovery well at Ten Sections oil field, is present beneath a large part of the southern San Joaquin Valley in Kern County, California. It has a maximum known thickness of about 2,000 feet, and at present is yielding commercial production from seven different structures.

It comprises a series of more or less interconnected sands that lies below the top of a prominent chert zone within the upper Miocene. This paper deals primarily with the distribution, character and probable origin of the sand body.

67. E. W. GALLIHER, Barnsdall Oil Company, Los Angeles, California
E. R. ATWILL, Union Oil Company of California, Los Angeles, California
Progress of Stratigraphic Studies in California

Many geologists in California have been converted to the belief that the stratigraphic type of trap will provide a majority of future oil fields in the state. Therefore, considerable impetus has been given to the study of sedimentation from every possible approach.

This paper presents the various methods now used in California to study sedimentation and stratigraphy, describing briefly the results obtained to date and analyzing the future trend of this type of work.