

- The Washburn Field, La Salle County, Texas*
 43. LLOYD G. WEST, Seaboard Oil Company, Corpus Christi, Texas
The Luby Field, Nueces County, Texas
 44. L. B. HERRING, Corpus Christi, Texas
South Texas Development in 1941
 45. EDWARD A. KOESTER, Darby Petroleum Corporation, Wichita, Kansas
Developments in North Mid-Continent in 1941

The discovery of commercial production in a sandstone in the lower part of the Pennsylvania system in Kearney County, Kansas was the outstanding development in the North Mid-Continent region in 1941. The true importance of this discovery remains somewhat questionable at present because of the lack of development in its vicinity. Further exploration in this geologic province will probably be forestalled by war conditions.

Otherwise Kansas experienced a year of routine development in and around proved areas. There was a sharp increase in wildcat activity, with a consequent increase in the percentage of dry holes from 20.3 per cent to 26.9 per cent. Productivity developed by oil well completions fell from about 2,200,000 barrels to 1,700,000 barrels, and the average potential per well fell from 1,561 barrels to 1,379 barrels. An important group of pools was found along the Peace Creek trend in southwest Reno County which will probably result in a large share of the drilling activity for 1942. These pools are northeast of the Zenith pool and have similar characteristics. Several small and relatively unimportant pools were found on the Central Kansas uplift, but except for the Ray pool in Phillips County attempts to develop important production in northwestern Kansas were relatively unsuccessful. Development of the McLouth pool in the Forest City basin continued.

In Nebraska the Fall City pool of Richardson County was enlivened by the discovery of a deeper pay in the Hunton dolomite. The Barada pool was discovered about the middle of the year, and gives promise of developing into a small pool similar to Fall City. Wildcatting elsewhere in both east and west Nebraska was unsuccessful although much stratigraphic information was secured.

Six deep tests were completed in the Forest City basin portion of Missouri, and six dry holes were drilled in Iowa with little encouragement for commercial production. No wells were completed in South Dakota during the year although a great amount of exploratory work was carried on. Several stratigraphic tests were drilled.

46. T. C. PETERS, Shell Oil Company, Wichita, Kansas
Subsurface Correlations between Kansas and the Rocky Mountain Front Range of Colorado

This paper describes a cross section which shows the stratigraphic relationships between the subsurface rocks of Kansas and the Great Plains and the standard outcrop sections of the Front Range and eastern Kansas. The subsurface expressions and the appearance and disappearance of various elements are emphasized, together with certain facies changes which occur laterally along the line of the cross section. The stratigraphic relationships of the surface and subsurface sections are also shown in greater detail on a correlation chart.

47. A. J. CROWLEY, Lario Oil and Gas Company, Wichita, Kansas
Recent Activities in Northwestern Kansas

The southern part of the Cambridge arch has been the scene of considerable recent interest and activity, the results of which have been somewhat disappointing.

The area, geologically, resembles some portions of the Central Kansas uplift; but it is separated from the uplift by a relatively low area.

An attempt is made herein to briefly summarize some of the salient features of the region.

48. W. C. IMBT, Stanolind Oil and Gas Company, Wichita, Kansas
 P. A. HARPER, Cities Service Oil Company, Wichita, Kansas
Viola Production in Eastern Stafford and Northwestern Reno Counties, Kansas

The area covered in this paper has three pools producing from the Viola formation. Listed in the order of discovery, they are: Zenith, Stafford, and Peace Creek. In the Zenith pool, the Maquoketa or Misener overlies the Viola. In the Stafford pool, Kinderhook shale lies on the Viola. In the Peace Creek pool, a thin remnant of Misener sand is found here and there on the Viola, which is overlain by Kinderhook shale. In the

Zenith pool, production is obtained from Misener sand, Maquoketa dolomite, and cherty dolomite of the Viola. In the Peace Creek pool, oil is produced from the cherty Viola dolomites. Production in the Stafford pool is from the Viola, and one well is producing from the Arbuckle.

Where present, the top of the Fernvale in this area is considered the top of the Viola. Fernvale limestone is present over most of the producing areas under consideration. Two pronounced unconformities are present: one between the Pennsylvanian and Mississippian, and the other between the Mississippian and Ordovician. Post-Fernvale-pre-Kinderhook erosion is shown by the absence of Maquoketa and Fernvale over considerable areas adjacent to the pools.

In the Peace Creek and Zenith pools, accumulation is thought to be controlled by stratigraphic trap conditions, while in the Stafford pool accumulation is controlled by structure on the Viola.

49. CHARLES B. READ, U. S. Geological Survey, Washington, D. C.
 LLOYD G. HENBEST, U. S. Geological Survey, Washington, D. C.
Pennsylvanian and Permian Stratigraphy of Northern New Mexico

This paper deals with the Pennsylvanian and Permian rocks exposed in the northern half of New Mexico. The Pennsylvanian consists of marine arkoses, shales, and limestones with interbedded continental clastics, including some coal. The Permian consists mainly of redbeds, arkoses, evaporites, and thick, light-colored, cross-bedded sandstones with local marine clastics and limestones in the lower part. A profound unconformity separates these rocks from the underlying granites and metamorphics of supposed pre-Cambrian age. Lithologic variations reflect the pre-Pennsylvanian physiography and the changing distribution of land and sea during the periods of deposition. All of the main units, except a basal limestone, contain fossil plants, fusulinids, and metazoans that provide evidence for detailed correlations. The earliest sedimentary formation in the areas of outcrop is a local massive limestone whose age is uncertain because it is barren of fossils excepting very rare, small crinoid columnals. It seems to be nearly conformable with the early Pennsylvanian rocks and is tentatively included as a formation with them, though it may be Mississippian or even earlier in age. Above this are rocks of Morrow, Des Moines, and upper Pennsylvanian age, though a complete succession is not present everywhere. The Morrow and lower Des Moines rocks commonly consist mainly of clastics and include some coal. The remainder of the Des Moines is dominantly calcareous and contains many horizons of *Wedekindellina* and *Fusulina*. The upper Pennsylvanian is represented by both marine and continental rocks and locally contains abundant *Triticites*.

The Wolfcamp equivalent is composed of marine and continental rocks, the latter continuing upward into possible Leonard equivalents. Above these are light-colored, tangentially cross-bedded sandstones, thin limestones, and evaporate-bearing redbeds of possible Leonard and Whitehorse age. Upper Triassic sandstones commonly overlie the last named.

Work in eastern Arizona has indicated a need for revision of the Arizona-New Mexico Permian correlations. The top of the Permian in the Colorado Plateau, the Kaibab limestone, is apparently the equivalent of the San Andres formation. Careful tracing eastward from the DeChelly upwarp indicates a continuation of the DeChelly sandstone or an upper tongue of the Coconino sandstone into the Glorieta sandstone and the Yeso formation of New Mexico. The Abo sandstone of some parts of New Mexico may be correlated with the lower Coconino as well as with the Hermit shale and Supai formation.

50. LAURENCE L. SLOSS, Montana School of Mines, Butte, Montana
 EUGENE S. PERRY, Montana School of Mines, Butte, Montana
The Big Snowy Group: Subsurface Extent and Character in the Northwest Great Plains

The Big Snowy group, as defined by Scott, consists of an upper and middle Mississippian series of shales, limestones, and sandstones with some evaporites. Recently drilled deep wells and new interpretations of older wells in eastern Montana and the Dakotas yield information which makes possible further considerations on the eastward extension of Big Snowy sediments.

An isopach map of the group indicates that an east-west depositional basin in Montana fingered over the northern portion of a widespread area of lower Mississippian (Madison) deposition. South of a narrow peninsula which occupied the approximate