parent variation in thickness of the lower part of the Ellenburger is due to lateral change in lithology. Limestones underlying the Ellenburger as defined at the surface grade laterally in the subsurface into dolomites identical in character with those of Ellenburger age. Hence a portion of the so-called Ellenburger in the subsurface of North-Central Texas is pre-Ellenburger in age.

55. JAMES L. CARLTON, University of Chicago, Chicago, Illinois
Geology of Bartelso Oil Field, Clinton County, Illinois

The paper gives the location, stratigraphy, structure, production, and oil and water analyses of this field. Subsurface contour maps on the top of the Herrin (No. 6) coal, the base of the Golconda limestone, and on the top of the Devonian producing horizon show two small domes. Analysis was made of an oil and water sample from the field and statistics are given. The Cypress producing graph seems to show the production from that horizon to be declining while that from the Devonian is too recent for any definite estimate.

56. PARK J. JONES, The Texas Company, Fort Worth, Texas
Introduction to Technique for Estimating Oil Reserves

The volume of oil ultimately recoverable from reservoirs is a function of a number of variables, the more pertinent of which may be listed as follows: (1) types of porous media, (2) sources of pressure, (3) reservoir volume factors, (4) connate water contents, (5) porosities and pay thicknesses, (6) permeabilities and permeability distributions, (7) selective location and selective completion of wells, (8) rates of recovery, (9) total or partial pressure maintenances, (10) secondary recovery methods, (11) crude prices and (12) economic limits. The volume of oil ultimately recoverable from individual properties is also a function of the listed variables but in addition it depends on migration of oil away from or into the said properties.

A method of estimating oil reserves from 19 different combinations of porous media and chief sources of pressure is presented in terms of pay thickness, porosity, connate water, reservoir-volume factors, permeability ratios, and operating methods relative to current oil prices and economic limits.

An outline of the method is included as a part of a paper entitled "Introduction to Optimum Spacing of Oil Wells" which was presented before the American Petroleum Institute, Southwestern District, Division of Production, February 27 or 28, at Shreveport, La.

57. R. P. GRANT, geologist, Lansing, Michigan
Oil and Gas Developments in Michigan in 1940

The southwestern part of Michigan was the center of oil and gas activity for the state during the greater part of 1940 with activity increasing in the "Basin" area as the year closed.

The discovery and partial development of two new shallow "Stray" sand (Mississippian) gas areas and important extensions elsewhere have increased materially the gas reserves of the state. Gas production during 1940 was approximately 40 per cent greater than in the previous year.

Dispite numerous oil discoveries and extensions to proved areas, the additions to known oil reserves were of no great consequence. Oil production for 1940 was actually sixteen per cent less than in 1939 but a general strengthening in price partly offset this decline.

Several geophysical parties were reported operating in the Southern Peninsula but core testing seemed to be the favored exploratory method.

The search for new deep producing zones has received some encouragement. In the "Basin" substantial gas showings were encountered in the basal Salina (Silurian). In southwestern Michigan showings of oil were reported at the approximate horizon of the St. Peter sandstone.

58. KENDALL E. BORN, State Division of Geology, Nashville, Tennessee
Oil and Gas Possibilities in Northern Cumberland Plateau
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The northern Cumberland Plateau is surfaced with sandstones, shales, and coals of Pennsylvanian age which aggregate over 3,000 feet in thickness. The Coal Measures are underlain by 900–1,000 feet of Mississippian rocks which, in turn, rest upon as much as 200 feet of Silurian beds that thin out rapidly to the west where the Chattanooga shale is underlain by Ordovician strata.