

Especially did pre-Permian drilling and exploration exceed that of past years. A total of 106 pre-Permian wells were completed. Of this number, 21 were dry, 6 were plugged back to the Permian for producers, and one was a temporarily abandoned gas well. This gives a percentage of dry holes of 15 per cent. Twenty-five of the pre-Permian tests could be considered wildcats and of these 10 were successfully completed as producers. The center of activity was in the Abell field in north-central Pecos County. Here 56 wells were completed, including 6 wildcat producers, 1 dry hole, 6 wells which were plugged back to the newly discovered Permian zones, and the 1 temporarily abandoned gas well.

A definite trend toward deeper drilling has been accelerated by new discoveries in the lower Permian (Leonard), lower Pennsylvanian ("Crinoidal"), and Ordovician, and Cambrian (Simpson and Ellenburger) formations.

There was a decline of 31.5 per cent in the number of wells drilled in southeastern New Mexico in 1941. A total of 371 wells were drilled, of which 294 were oil wells, 7 gas wells, and 70 dry holes—the highest percentage of dry holes in the past several years. There were four new discoveries for the year. The most active area was the Maljamar pool, where 61 wells were completed including 3 which were dry. The producing formations of the 1941 discoveries are the Yates, Seven Rivers, and Grayburg.

Geophysical activity has been conducted mainly with gravimeter and magnetometer.

57. R. M. ENGLISH, Carter Oil Company, Eldorado, Illinois
 R. M. GROGAN, Illinois State Geological Survey, Urbana, Illinois
The Omaha Pool, Gallatin County, Illinois

The Omaha pool was discovered in November, 1940, by The Carter Oil Company's York No. 1, SE.-SE.-SW. Sec. 33, T. 7 S., R. 8 E., Gallatin County, Illinois. The producing area is now defined and extends over 360 acres located generally southwest of the discovery well. Production is from the Palestine and Tar Springs formations of the Chester series.

The pool lies on the crest of a large dome, and is exceptional in that igneous rock is found in intrusive contact with the producing sands. Sills and low-angle dikes from less than one foot to fifty feet in thickness composed of porphyritic lamprophyric rock rich in biotite and olivine occur at many levels in the Pennsylvanian and Chester series.

Contact effects indicate that at least some of the oil was in the sands prior to intrusion of the igneous material, suggesting a structure predating the intrusion. Pronounced doming of the structure probably accompanied intrusion. Earlier minor folding occurred at the close of the Mississippian.

58. WILLARD D. PYE, University of Chicago, Chicago, Illinois
The Physical Properties of the Bethel Sandstone of South-Central Illinois

For the past 10 months the writer has been engaged in making a detailed study of the physical properties of the Bethel sandstone as they are revealed in cores from wells drilled in south-central Illinois. The investigation has been undertaken in cooperation with the Illinois State Geological Survey.

The Bethel sandstone is found to be very uniform in all of its physical properties both vertically and laterally although some gradations exist. The study has revealed that most of the sand has come from older sediments. Most of it has undergone at least one earlier period of deposition under conditions in which the cement was silica and some has undergone at least three cycles of erosion. Some of the sand has been derived from redbeds and the grains are frosted. The original source of the sand was in part from dynamically metamorphosed rocks and in part from regionally or thermally metamorphosed rocks. A large part originally came from igneous rocks, probably granites since the associated feldspar is acidic.

Heavy minerals are very rare but those found constitute about thirty species. A number of varieties of tourmaline and zircon are distinguished. Ten varieties of quartz are found which are readily distinguishable and it is proposed that more data can be derived concerning the origin and history of a given deposit by a detailed study of quartz and its varieties and inclusions, than from heavy-mineral studies and without the laborious procedure of making heavy-mineral concentrates.

A detailed discussion of the inter-relationships of the physical properties of the sand, together with an analysis of the effect of these upon the porosity and permeability of the Bethel, is given. This together with certain detailed information concerning the pores and pore pattern, the relationship of the silica and carbonate periods of cementation, and soluble minerals are discussed in the relationship they have upon securing