10. STRATIGRAPHY AND STRUCTURE OF THE ARBUCKLE LIMESTONE IN THE ARBUCKLE ANTICLINE, by William E. Ham, geologist, Oklahoma Geological Survey, Norman, Oklahoma.

The Arbuckle limestone of upper Cambrian and lower Ordovician age is 6,700 feet thick and is divided into eight formations which in ascending order are Fort Sill, Royer, Signal Mountain, Butterly (top of Cambrian), McKenzie Hill, Cool Creek, Kindblade, and West Spring Creek. These units crop out over 100 square miles of the Arbuckle anticline in the western Arbuckle Mountains.

Principal features of Arbuckle limestone stratigraphy are:

1. The sequence is about 98 per cent carbonate rock, the remaining part being:
   (a) thin sandstone beds, and
   (b) shale, chiefly in the form of partings.
2. Limestone is the original deposit and dolomite in general is a replacement of it. The limestone types consist mostly of:
   (a) algal beds,
   (b) calcarentite or pellet limestone, grading into intraformational conglomerate,
   (c) fine-grained limestone, either laminated or massive, and
   (d) oölitic limestone.
3. Distribution of sand and chert is of value for subdivision and correlation. Sand is lacking in Cambrian strata except coarse arkose at or near the Cambrian-Ordovician boundary, whereas Simpson type sand in limestone is common in Ordovician formations. Chert is rare in Cambrian but prevalent in Ordovician strata.
4. No physical evidence for unconformity is recognized in the Arbuckle limestone.
5. Faunal zones are persistent laterally and are close approximations to true time horizons.
6. Major dolomite-limestone facies are chiefly in Cambrian beds and are regional in scope, the contacts changing progressively along strike at the rate of 5-17 feet per mile. The dolomite-limestone ratio increases eastward.

Principal features of structural history are:

1. Anticlinal folding, overturning of the north limb and locally of the south, and accompanying thrust faulting, in post-Hoxbar, upper Pennsylvanian time, coinciding with major folding of the Ardmore basin.
2. Deposition of stratified limestone conglomerate more than 2,000 feet thick in the Turner Falls area, and folding of this conglomerate as part of the Arbuckle orogeny.
3. Later elevation and high-angle faulting, accompanied by only minor folding, in latest Pennsylvanian (Vanoss) time, resulting in deposition of the younger and thinner Pontotoc conglomerate as a bordering rim on the north and west flank of the Arbuckle Mountains.

11. FUSULINID CHART FOR PENNSYLVANIAN CORRELATIONS IN MID-CONTINENT AREA, by H. H. Kapner, Tulsa, Oklahoma; R. V. Hollingsworth and Harold L. Williams, Midland, Texas.

A correlation chart covering north Texas, southern Oklahoma, central Oklahoma, northern Oklahoma, and Kansas is presented. The chart uses the basic divisions as used in other recent correlations and shows continuities of formations as indicated by fusulinid determinations.

12. GEOLOGY OF MCALESTER-ARKANSAS VALLEY BASIN, by T. A. Hendricks, B. A. Curvin, and August Goldstein, Jr., Stanolind Oil and Gas Company.

The purpose of this paper is to outline the regional geologic features of the McAlester-Arkansas Valley basin. Much of the material for the paper has been consolidated from published papers of the U. S. Geological Survey, Oklahoma Geological Survey, and Bulletins of the A.A.P.G. This material has been brought up to date and data added by each author together with considerable information generously supplied by individuals and companies.

The pre-Pennsylvanian stratigraphy, based on available data from the comparatively few deep wells, is shown to be generally similar to that of the Seminole uplift, but minor differences that may be significant are pointed out. The stratigraphy of the Pennsylvanian of the flank of the basin and the thickening and lithologic changes toward the center of the basin are shown by sections and an isopachous map.

The generalized regional structure is shown by a structure contour map of the top of the Wapanucka-Morrow with the principal known faults and folds added. The distribution of producing oil and gas fields, both geographically and with regard to producing zones, is shown and discussed. A carbon ratio map based on all available coal analyses is shown and available porosity data on potential producing zones are presented. The relationship of these factors to present production and future productive possibilities is discussed.

13. CORRELATION BOARD, by B. Osborne Prescott, Shell Oil Company, Oklahoma City, Oklahoma.

The construction of geologic cross sections for illustration or record is facilitated by the use of a cross-section board. The board is basically a large white surface upon which various types of well logs are suspended and correlations shown with string and tacks. The final result is a photographic reproduction. Details of the process are described.

14. OIL PRODUCTION FROM PRE-CAMBRIAN BASEMENT ROCKS IN CENTRAL KANSAS, by Robert F. Walters, geologist, Heathman Drilling Company, Inc. Wichita, Kansas.

Pre-Cambrian basement rocks are the reservoir from which several scattered wells in central Kansas produce oil. More than a million barrels of oil have been produced from pre-Cambrian quartzite in the Orth field, Rice County, from fifteen wells. Similar quartzite is the reservoir from which oil is produced in four wells in the Kraft-Prusa field, one well in the Eveleigh field, and one well in the Trapp field, all in Barton County. Fresh pink biotite granite is the reservoir rock producing oil in three wells in the Hall-Gurney field and in one well in the Gorham field, both in Russell County. A few other wells, not investigated by the writer, are reported to be producing from pre-Cambrian rocks.

All wells known to be producing from pre-Cambrian rocks are located on the summits of buried pre-Cambrian hills. Porosity consists of a reticulated fracture system. The pre-Cambrian reservoir rocks are unconformably overlapped by Pennsylvanian limestones now draped above the hills in gentle anticlinal folds which trap oil in multiple thin porous zones in the Topeka (Virgil) and Lansing-Kansas City (Missouri) limestones. The Pennsylvanian rocks are considered as the probable source from which oil migrated locally into the cracks in the pre-Cambrian rocks. Truncated Cambro-Ordovician Arbuckle dolomites, themselves an oil reservoir, are present on the flanks of each hill and are a less probable source from which the oil in the pre-Cambrian reservoirs was derived.

Production records for individual wells are difficult to obtain, but available data indicate that recoveries from several quartzite wells in the Orth field exceed 75,000 barrels per well. Two wells, now abandoned, drilled by Slick, Pryor, and Lockhart on the Habinger lease in Sec. 27, T. 18 S., R. 10 W. produced 173,217 barrels of oil or 86,608 barrels per well from a depth of 3,200 feet. Wells on three other leases in the Orth field are estimated to have produced 100,000; 130,000; and 150,000 barrels per well from pre-Cambrian quartzite and are still producing. The Sunray's Culbertson No. 1 in Sec. 26, T. 18 S., R. 10 W. produced 168,000 barrels of oil (gravity 43°) into its own individual tank battery from the pre-Cambrian quartzite encountered at a depth of 3,211 feet from its completion in February, 1941, to July, 1948, and is still producing (January 1, 1950). Data on oil recoveries from wells producing from biotite granites are not available.

It is the writer's opinion that in a great many wells the pre-Cambrian rocks have been inadequately tested for porosity and fluid content. It is suggested that the pre-Cambrian basement rocks, where encountered structurally (or topographically) high in future drilling in central Kansas, are worthy of careful consideration as a potential oil reservoir.

15. PALEOGEOLOGY OF PANHANDLE OF TEXAS, by Robert Roth, Humble Oil and Refining Company, Wichita Falls, Texas.

The sedimentary sequence and facies changes in the subsurface of the Panhandle of Texas are shown by three cross sections. The stratigraphic column is divided into thirteen geologic subdivisions. A paleogeologic map presents the areal distribution of each geologic subdivision. The effects of orogenic and epeirogenic movements are discussed.

16. GEOLOGY OF FORT WORTH BASIN, by J. B. Moorhead, Continental Oil Company, Wichita Falls, Texas.

The Fort Worth basin is a regional syncline of north-central Texas, approximately 150 miles in length, varying from 0 to 70 miles in width, and striking northwest-southeast. Bounded on the west by the positive Bend arch, on the north and northeast by sharp granite scarps of the Red River-Muenster buried ridges, the trough is limited at the south and southeast by Ouachita folding. Paleozoic sediments of Cambrian, Ordovician, Mississippian, and Pennsylvanian are preserved basinward, greatest thicknesses being noted in the Ellenburger (Beekmantown) and Strawn (Des Moines) groups. Major unconformities in the geologic section occur at the top of the Trenton (Viola), top of the Chester (Mississippian), and at the Pennsylvanian-Cretaceous overlap contact.

Oil fields in the basin are relatively small in areal extent but are economically profitable. Production to date has been largely governed by structural conditions, but local porosity variations are likewise influential. It is conservatively predicted that new basin oil to be found will be greater in quantity than either the amount produced to date or known reserves in place.

17. REVIEW OF GEOLOGY OF WESTERN ANADARKO BASIN: TEXAS AND OKLAHOMA PANHANDLES, by Graydon L. Meholin, Sinclair Oil and Gas Company, Amarillo, Texas.

Very little has been written about that part of the Anadarko basin west of the Texas-Oklahoma line other than to mention that "it appears to extend some 125 miles westward into the Texas Panhandle." The main reason for this was, of course, the lack of deep well control. During the past 2