17. TAYLOR COLE, geologist, University Lands, Midland: The Black Shale Basin of West Texas; A Preliminary Report.

The Black Shale basin of West Texas covers an area in excess of 21,000 square miles and includes the region from Terrell and Pecos counties eastward to Menard and Kimble counties. It extends from Real, Edwards, and Val Verde northward beyond Glasscock and Upton counties. This basin includes such local basins as the Midland basin, the Val Verde basin of Frank E. Lewis, the Sheffield channel, and the Kerr basin.

Reasons are given for the belief that the black shale sediments in this basin were derived from rocks south of this area.

The shale ranges in age from Bend (Lower Pennsylvanian) through Clear Fork (Middle Permian). The shale of the Midland basin has been divided into three distinct zones.

Pre-Cretaceous erosion has removed the overlapping Permian shale in the extreme southern portion of the area, leaving Pennsylvanian directly beneath the Trinity (basal Cretaceous).

The problem of stratigraphy is complicated by gradation and lack of diagnostic fossils with a short vertical range. There is a great divergence of opinion, derived from the study of well cuttings, as to correlative formational units.

18. FRANK E. LEWIS, consulting geologist, Midland: Stratigraphy of the Upper and Middle Permian of West Texas and Southeast New Mexico.

The stratigraphic phenomena of the Permian basin are related directly to gradation which may be classified as follows: (1) gradual gradation of clastics into marine beds basinward and (2) abrupt gradation of clastics and evaporites into reef limestone. Surface studies and subsurface work with stereograms and paleogeographic maps reveal that, as a result of this gradation, many of the various facies are time equivalents. A significant example of type (2) gradation is found in the Glass Mountains approximately five miles north of Iron Mountain. The clastics of the Word formation may be traced on the surface into the Vidrio limestone. Over a considerable area northeast of the Glass Mountains variable thicknesses of Vidrio limestone and underlying thick sandstones both grade into San Andres limestone over structurally high areas.

The appearance, subsequent movements and disappearance of a number of the structural features are placed in the Permian time scale. Recognized as major structures are the Val Verde basin, the Cerf basin and the Blackstone arch. The latter extends northward from southeastern Pecos County across the Sheffield channel and the Fort Stockton arch into the Sand Hills arch. The Central Basin platform was built over this feature. A perspective of the Permian basin in its entirety indicates that the Anadarko basin is an integral part of the larger basin on the south.

During San Andres time sands moved into the Midland basin by way of the Sheffield channel which connected with the Delaware and Cerf basins. It appears that the sands moving into the Delaware basin came from the west through Salt Flat, which is just west of the Delaware Mountains. Throughout all Permian time red clastics, which were derived from the northwest, northeast, and east, were deposited in the northern part of the basin, the dark sediments of southern origin forming in the south portion.