feature of the region is the Anadarko syncline. It trends west and northwest across much of western Oklahoma into the Texas Panhandle, its axis following a line just north of the Wichita Mountains. Permian strata on the south limb dip as much as 250 feet per mile, whereas on the north limb they dip 9 to 40 feet, or an average of 20 feet, per mile.

With the exception of the Yelton salt, which occurs in the axial part of the syncline, the Permian evaporites bear no obvious relationship to major structure. Multiple rather than single salt basins were developed for any given sequence, and the maximum salt thickness for one stratigraphic unit does not coincide structurally or geographically with the maximum thicknesses of the other evaporites.

Salt reserves in western Oklahoma are estimated to be more than 21 million million (21,000,000,000,000) short tons. Although much of the salt is thick and nearly pure, the reserves are virtually unexploited. Within the area studied, a small amount of salt is produced from brine wells in the Upper Cimarron salt in Beckham County, and some of the salt beds are used for underground storage of liquefied petroleum gases. Four salt caverns are currently being used, one each in a salt bed of the Blaine anhydrite (Beckham County), in the Flowerpot salt (Beaver County), in the lower Cimarron salt (Beaver County), and in the Lower salt-anhydrite unit of the Wellington (Grant County). Total storage capacity of these facilities is nearly 250,000 barrels.

Future uses of the salt probably will include expanded production for livestock and human consumption, and for such chemical purposes as the production of chlorine, caustic soda, and soda ash. Additional underground storage facilities for liquefied petroleum gases are currently being made in Permian salt beds of Oklahoma. Similar caverns might be made for the underground storage of natural gas, or possibly for the storage of low-intensity radioactive waste materials. A knowledge of the distribution and thickness of salt beds also is useful in the interpretation of seismic data obtained in the exploration for petroleum.

▲ ▲ ▲

February 17, 1964

WILLIAM E. LAING, Continental Oklahoma City

"Geology and Geophysics of the Eastern Palo Duro (Hollis) Basin, Southwestern Oklahoma"

The discovery of Conley field, Hardeman County, Texas, in March of 1959 has renewed interest in the Eastern Palo Duro Basin of southwestern Oklahoma. This area, also known as the Hollis, Harmon, or Hardeman Basins, covers approximately 2,300,000 acres. It is bounded on the south by the Red River, on the east by the Waurika-Muenster Arch, on the north by the Wichita Mountains and on the west by the Texas Panhandle.

Geophysical activity in the basin started with a torsion balance survey in 1929 which resulted in the discovery of the Altus field. Since that time seismograph surveys have played a major part in the development of the basin. These surveys show a definite relationship between record quality and surface and near surface formations.

The outcrop pattern conveniently divides the basin into two distinct record quality areas. This division takes place along a N-S line roughly following the Salt Fork of the Red River. East of this line records in the Hennessey shale are good to excellent. West of the line the quality ranges from good to extremely poor in the Blaine gypsum and Dog Creek shale formations. On the latter formations record quality can be vastly improved by increased seisphone coverage and location of the charge in shale stringers. Use of the "VIBROSEIS" system resulted in data superior to that obtained from the conventional method.

Production in the basin is primarily governed by structure. In turn, the structural traps are influenced by two major orogenic movements – the Acadian at the end of Devonian time and the Wichita at the end of Morrowian time.

The basin has produced about 18 million barrels of oil from two major features in Tillman and Jackson Counties. These features are the Altus horst trend and the West Frederick – SE Frederick anticlinal trend. Anticlines at Altus, Tipton, West Frederick and SE Frederick, and a stratigraphic sand at Henderson account for 90% of the oil found along these trends. The anticlines are associated with major faults whose throws range from 500-1600'.

Development of Conley field has confirmed an anticline with 400' of closure but so far has not established the presence of a major anticlinal trend or faulting.

While it is unlikely that structural trends comparable to that of Altus and West Frederick will be found by present or future seismic programs, it is concluded that there is ample room in the western portion of the basin for many more discoveries of the size and nature of Conley field.