The section penetrated by wells consists of: Recent, Tertiary, Cretaceous, Triassic, and Permian deposits. The reservoir is in porous dolomite 300 to 600 feet below the top of the San Andres. Detailed examination and recording of the well-cuttings show the body of the reservoir to have a reef-like cross section which may be accounted for by (1) chemical deposition on a marine high, or (2) reef-growth with attendant chemical deposition.

The combination of Permian structure and stratigraphy appears to have controlled the permeability, porosity, and the accumulation of fluids. Later folding modified the position of these fluids somewhat. For the field as a whole there is no direct relationship between the present structural elevation and the ability to produce oil.

The discovery well, Honolulu Oil Corporation and Davidson Drilling Company No. 1 Bennett, was drilled into oil on September 28, 1935. Development has been continuous since that time and 16,388,981 barrels of oil had been recovered from the field on September 1, 1940.

18. W. M. OSBORN, consulting geologist, Midland, Texas
Stratigraphic Trap of Slaughter Field of West Texas

The Slaughter field of Cochran, Hockley, and Terry counties, Texas, covers approximately seventy squares miles and on February 1, 1941, it contained 162 producing oil wells.

Present control shows no structural closure. The field is situated on a series of noses dipping gently south-southeast but these do not control production.

The pay section, which is about 100 feet thick, is the Permian San Andres dolomite. The pay is a brown granular dolomite having inter-crystalline porosity. In some parts of the pay section larger openings also occur. The depth to the top of the pay, which is about 800 feet below the top of the San Andres, ranges from approximately 4,900 to 5,000 feet. The southern and eastern limits of the field are mainly determined by the structural position of this pay with reference to the water table.

Production to the west seems to be limited by contamination of the pay section with silt and anhydrite. Two structurally high dry holes on this side of the field showed large amounts of silt and anhydrite in the beds equivalent to the pay section.

The northern limits of production have not been defined but indications point to a breaking down of the section in this direction also.

19. W. A. WALDSCHMIDT, Colorado School of Mines, Golden, Colorado
Progress Report on Microscopic Examination of Permian Crude Oils

Studies of several samples of Permian crude oil were made for the purpose of determining the source, character, and amount of the included organic residues. The method of obtaining the residues was similar to that used by Sanders. Diatoms, spines, plant remains, and fragments of other organic materials were observed in the residues examined, but further studies will be necessary before the source of these remains can be determined.

20. TAYLOR COLE, University Lands, Midland, Texas
Subsurface Study of Ellenburger Formation in West Texas

Various portions of the Ellenburger (Cambro-Ordovician) formation have been penetrated throughout the West Texas area bounded by Latitude 32° and 30° and Longitude 101° and 103°. The formation consists of fine to coarsely crystalline dolomites and dense limestones. These lithologic units are of no value even in local correlations when accurate work is desired.

A careful study has been made of the insoluble residues from most of the well cuttings available. The chief criterion for correlations is chert. Four main classes of chert are recognized: smooth, granular, chalky, and drusy. Each class may have several secondary characteristics, and gradational types are present. From this work the complete Ellenburger section, which is approximately 1,335 feet thick in western Crane County, has been divided into five zones. These zones when fitted into the section worked by geologists familiar with the Missouri section have approximately the following relationship.

Silt zone	Cotter
Smooth Chert zone	Jefferson City Roubidoux Gasconade

Upper Granular Chert zone	
Chalky Chert zone	Eminence
	Potosi
Lower Granular Chert zone	

Chert zones have made it possible to locate accurately the stratigraphic position entered in the dolomite section. The upper part of the Ellenburger has been truncated in four wells in the Big Lake field (Reagan County). Restoration of the truncated part shows the axis of the folding to be parallel to the Permian folding (San Andres) which runs NW.-SE. rather than N.-S.

Some 275 feet of Ellenburger is absent from the base against the Apco Ridge (Pecos County), probably due to overlap, and about 900 feet has been eroded from the top of the section in this area.

21. ROBERT L. BATES, geologist, New Mexico Bureau of Mines and Mineral Resources, Socorro, New Mexico (Published with the permission of the Director)
Lateral Gradation in Seven Rivers Formation, Rocky Arroyo, Eddy County, New Mexico

The paper embodies results of a study of surface exposures of Rocky Arroyo, 12 miles northwest of Carlsbad, New Mexico. In the walls of this and adjacent canyons is revealed an abrupt lateral change in lithology in the Seven Rivers formation. A 275-foot section of gypsum with thin beds of dolomitic limestone merges into a thinner section of uniform dolomitic limestone with some sandstone beds. Evidence is presented to show that this change is the result of interfingering of gypsum and dolomitic limestone. Thin beds of the latter extend for some distance into the gypsum. However, thick layers of gypsum between beds of dolomitic limestone end abruptly and their places are taken by zones of red porous loosely crystalline calcitic limestone. These limestone beds become thinner away from the gypsum beds and finally pinch out, so that in the final analysis the gypsum beds are equivalent to bedding planes in the section of dolomitic limestone. Channeling of the canyon walls by present-day streams has produced a striking type of breccia, in which angular blocks of dense light-colored dolomitic limestones are firmly embedded in red crystalline highly calcitic limestone.

The following conclusions are suggested. The lateral change of section does not represent overlap, as has previously been suggested, but is an abrupt lateral gradation. This gradation is not a local phenomenon but occurs in the Seven Rivers formation for an undetermined distance at the same relative position back of the Capitan Reef, the controlling factor of Permian sedimentation in this region. Advance and retreat of the Seven Rivers seas is suggested, with the anhydrite-depositing environment approaching closest to the Capitan Reef in earliest Seven Rivers time and thereafter making shorter advances. The presence of the lateral gradation in the subsurface should be taken into account when correlating well logs penetrating the Seven Rivers section farther to the east.

22. L. R. LAUDON, University of Tulsa, Tulsa, Oklahoma
ARTHUR BOWSHER, University of Tulsa, Tulsa, Oklahoma
Mississippian Formations of Sacramento Mountains of New Mexico

Formations of Mississippian age are exposed along the west face of the Sacramento mountains of New Mexico from a short distance north of Alamogordo southward to the vicinity of Grapevine canyon. Detailed sections have been measured and the faunas collected throughout the entire area of exposure. The name Cabellero is proposed for the gray, nodular, marly limestone formation of Kinderhook age lying at the base of the Mississippian section. The Caballero formation has heretofore been considered as a part of the Lake Valley formation. The Lake Valley formation has been divided into three members, Alamogordo at the base, followed by Arcente, and capped by Dona Ana. The fauna of the Caballero formation is closely related to that of the Chouteau formation of the upper Mississippi valley region. The Lake Valley formation is entirely of early Osage age. Both Fern Glen and lower Burlington faunas can be recognized. Spectacular large bioherms characterize the Alamogordo member making it necessary to subdivide the member into several facies.

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