

Delaware Mountain sandstone. The Lower Castile formation is younger than the Capitan, which it overlaps.

In the vicinity of Carlsbad the Rustler rests directly on the Carlsbad limestone. Evidence of the Pleistocene age of the Pierce Canyon beds is presented.

13. GEORGE A. KROENLEIN, geologist, Lovington, New Mexico: Salt, Potash, and Anhydrite in the Castile Formation of Southeast New Mexico.

Continual accumulation of concentrated saline water beneath the surface water in the Delaware basin raised the level of the highly concentrated water to the point where it caused two epoch-making events to occur in Upper Permian history. First, it stopped Capitan reef building and associated petroleum deposition. Second, it diminished the inflow of marine water and started deposition of evaporites in the Delaware basin. This point marks the close of Capitan time and the beginning of Castile time.

Subsurface study of the lower Castile formation discloses many hundred feet of depositional relief on the basin floor. This condition is responsible for unsuccessful attempts to run a structural correlation across the Delaware Basin on the base of the upper Castile (Main Salt).

At present, potash is the mineral with greatest economic importance in the Castile formation. Two mines are producing from one of the finest potash deposits in the world.

Two subsurface cross sections show many interesting features about the deposition and occurrence of evaporites.

14. PHILIP B. KING, associate geologist, Geological Survey, U. S. Department of Interior, Washington, D. C.: Relation of Permian Sedimentation to Tectonics in Guadalupe Mountain Region.

This paper is based on observations in the areas of Permian outcrop of northern trans-Pecos Texas, and especially in the Guadalupe Mountains and the Sierra Diablo. The two regions are mutually supplementary in that the first exposes the higher Permian and the second the Lower Permian and pre-Permian rocks.

The stratigraphy of the Permian series is complex, for it is characterized by great and abrupt changes in faunal and lithologic facies and in thickness of beds. The most striking features are limestone reefs, of which one of the largest is formed by the Capitan limestone. These are thicker and less elastic than adjacent contemporaneous deposits. Other less striking but no less significant changes are common, including lateral gradation of limestone into clastic rocks or evaporites, and of one variety of limestone into another.

These complex relations were produced by variations from place to place of physical-chemical and ecological environments at the inner end of an embayment of the sea. The variations resulted from many causes, the relative importance of which is not easy to evaluate. Some barriers, such as the reef masses, produced largely by sedimentation, restricted the inwash of clastic sediments and caused differences in depth and salinity on opposing sides. Similar effects have been caused by buried hills that are erosional relics of pre-Permian disturbances. The author believes, however, that some structural features arising on the sea floor during Permian sedimentation were also the direct cause of variations in environment and that they were an indirect cause of variations by their effect on the placing of the reefs and hills. The fundamental control of the complex Permian deposits thus appears to be tectonic.