MEETINGS

HGS DINNER MEETING—MAY 13, 1991

L. L. SLOSS—Biographical Sketch

L. L. Sloss is currently Professor Emeritus of Geology at Northwestern University, Evanston, Illinois. He received his Bachelor's Degree in geology in 1934 from Stanford University and his Ph.D. from the University of Chicago in 1939. His early experience included positions with the Montana School of Mines, the Montana Bureau of Mines and Geology, and Carter Oil Company.

Dr. Sloss joined the faculty at Northwestern in 1947 and has done many studies for the petroleum industry.

He is an active member of AAPG, SEPM (president, Twenhofel Medal recipient), GSA (president, Penrose Medal recipient), AIPG, AGU and the Paleontological Society.

1990-1991 AAPG DISTINGUISHED LECTURE

TECTONICS-THE PRIMARY CONTROL ON SEQUENCE STRATIGRAPHY: A COUNTERVAILING VIEW

There is no question that the facies tracts identified within unconformity bounded successions of strata (sequences) represent specific depositional environments controlled substantially by position with reference to strandlines, water depth, and other factors directly related to sea level. Further, the unconformities themselves mark the shifts of a depositional area above and below base level (initiating episodes of nondeposition/erosion and episodes of sediment accumulation). In most instances, base levels of erosion and deposition are closely tied to sea levels. Therefore, it is easy to understand the popularity of sea level as the overriding influence on sequence stratigraphy. Lacking an alternative concept, the fact that many unconformity-bounded successions can be recognized and correlated interregionally and intercontinentally has served to reinforce belief in globally effective eustatic sea level change as the driving force in the interruptions of sedimentation and shifts of coastal onlap, and of facies tracts implicit in sequence analysis.

However, students of sedimentary basins remain convinced that continents and their margins are subject to a tectonic evolution of rising and subsiding elements that control relative sea level and distribution of sedimentary environments. Proof of this control lies in the details of basin fills but the expression of such proof in a form readily acceptable by the vocal community of doubters has been difficult in the face of the seemingly incontrovertible influence of eustasy. No amount of exhortation and arm-waving has been helpful; what is needed is a different approach, preferably one provided with the cloak of credibility conferred by quantitative measures.

Isopach maps constructed from thickness data produced by outcrop study, drilling, and stratigraphically interpreted depth sections are widely available. Digitization of isopach maps of successive stratigraphic units produces a mass of properly quantitative data amenable to synthesis in terms of time - variable changes in the geometry and rates of subsidence of individual basins. Consideration of these data leads to confirmation of the important part played by tectonics in basin evolution, including relative sea levels and the transgression and progradation of strandlines and depositional environments. What remains to be identified is a viable mechanism capable of accommodating interregional and intercontinental synchrony of tectonic activity.