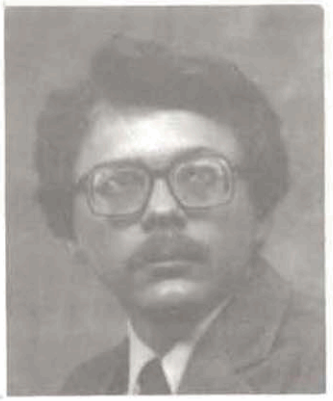
LUNCHEON MEETING — MAY 26, 1982

JAMES A. HELWIG — Biographical Sketch



James A. Helwig, employed by Arco Oil and Gas Company in Dallas, received his Bachelor of Science degree in Geological Engineering from St. Louis University in 1963 and his Ph.D. in Geology from Columbia University in 1967. Upon graduation, he joined the staff of Case Western Reserve University in Cleveland, Ohio where he taught until 1974. This was followed by a year at the University of Vienna, Austria. In 1975 he joined the Geological Research Division of Arco Oil and Gas Company. Today Dr. Helwig is Director of the Tectonics and Basin Analysis Group.

Dr. Helwig's field experience has taken him through the Eastern U.S. (in the Northern and Central Appalachians and the Atlantic Coast), to California, the Montana Overthrust Belt, and the offshore basins of Alaska.

Worldwide, he has worked in Bolivia, Morocco, the Austrian Alps, and the North Sea.

His areas of specialization include tectonics and structural geology, physical stratigraphy and modeling of physical geological processes.

APPLICATION OF COMPACTION MODELING TO PROBLEMS OF BASIN ANALYSIS

Compaction modeling utilizes the porosity-depth curve of each lithology to calculate the thickness of each bed at any given prior burial depth. Since there are many beds of different lithology and thickness in a stratigraphic section, the calculations and plotting are done most quickly by computer. The simplest way to visualize the technique is that a stratigraphic section is moved up along the porosity-depth curve to any desired previous depth of burial. When a bed reaches the surface, it is completely decompacted and recovers its maximum (initial) thickness.

Compaction modeling in general is an empirical technique that considers only the porosity reduction due to physical compaction. In the event that other processes of porosity reduction are important and sufficiently well understood, they too can be incorporated into compaction modeling.

A major application of compaction modeling is the decompaction of cross sections. As a result of differential compaction, the geometry of strata in a sedimentary basin changes continually during progressive burial. Shales and coals, in particular, undergo a large amount of compaction relative to other lithologic units. Evidently a stratigraphic cross section constructed from present bed thicknesses may differ substantially from the actual cross section shortly after deposition. Therefore, decompaction of cross sections helps to refine stratigraphic correlations, especially in laterally intertonguing sequences of compressible and incompressible facies, and it also helps to define compaction-related drape structures.

Other applications of compaction modeling include geohistory reconstructions, the calculation of fluid expulsion, and analysis of paleotopography.