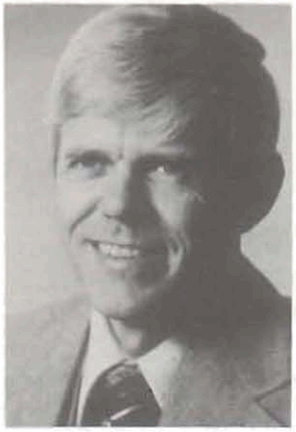
## NOON MEETING—JANUARY 31, 1979

### EDWARD D. PITTMAN—Biographical Sketch



Mr. Edward D. Pittman was born February 17, 1930 in Dublin, Texas. He received his B.A. and his M.A. degrees from U.C.L.A. in 1956 and 1958, respectively. In 1962, he was awarded his Ph.D., also from the University of California at Los Angeles.

Mr. Pittman began his professional career as a geologist with General Petroleum Corporation in 1958, being located in California and Alaska. From 1962 to 1966 he worked for Amoco Production Company as a petroleum geologist out of Oklahoma City. In 1966 he moved to the Amoco Production Company Research Center in Tulsa as a Research Scientist. In 1973 he was promoted to his present position, that of Research Supervisor at the Research Center.

DIAGENESIS: KEY TO PORE GEOMETRY AND RESERVOIR POTENTIAL OF SANDSTONES (Abstract)

Although sedimentation determines the original pore geometry, that is, the size, shape, and distribution of pores, as well as the nature of the contained fluids in sands, the diagenetic overprint is the major control of pore geometry. Early diagenetic chemical and biologic processes in soft sediment may produce significant changes; however, later diagenetic physical-chemical processes, such as compaction, pressure solution, cementation, and dissolution are more important as sandstones undergo burial. Pore geometry and/or porosity type change with diagenesis.

Pore geometry influences the type, amount, and rate of fluid produced. An understanding of pore geometry is especially important for the low-quality argillaceous sandstone reservoirs for which the domestic oil industry currently is exploring. Scanning-electron microscopy aids in understanding pore geometry and reservoir problems associated with these low-permeability rocks.

Four basic types of porosity are present in sandstone: intergranular, intragranular-moldic, micro-, and fracture. The first three types are related to rock texture and can be considered end members of a ternary-classification diagram. Fracture porosity may be associated with any other porosity types.

All sandstones initially have intergranular porosity which, if not destroyed, commonly is associated with good permeability, large pore apertures, and prolific hydrocarbon production. Intragranular and moldic porosity results from dissolution of carbonate, feldspar, sulfate, or other soluble material. Sandstone reservoirs with dissolution porosity range from excellent to poor depending on amount of porosity and interconnection of pores. The dissolution of mineral cement can lead to excellent reservoirs with secondary intergranular porosity; however isolated intragranular and moldic pores result in low permeability. Sandstones with significant amounts of clay minerals have abundant microporosity, high surface area, small pore apertures, low permeability, and high irreducible water saturation. Fracture porosity, which contributes no more than a few percent of voids to storage space, will enhance the deliverability of any reservoir. Open fractures, either natural orl induced, are essential for economic deliverability rates from reservoirs with predominantly micropores or isolated intragranular and moldic pores.