NOON MEETING—NOVEMBER 30, 1977

EUGENE A. SHINN—Biographical Sketch

Mr. Shinn was born in Key West, Florida, and attended the University of Miami, where he received his B.S. in Biology in 1957. After a brief stint in the Marine Laboratory at Miami, he joined Shell Development at Coral Gables as a Geological Technician. During the next 16 years with Shell, Shinn went from Coral Gables to Midland and Abilene, Texas, back to Coral Gables, and then to Holland and the Persian Gulf before returning to this country with Shell in Houston and New Orleans. Since 1974, he has served as Program Chief, U.S. Geological Survey Oil and Gas Branch Sedimentation Program, Fisher Island Station, Florida. His special interests include carbonate sedimentation and diagenesis, subsurface exploration, bioturbation, photography, diving, boating, and the production of 16-MM cinema. Mr. Shinn is a member of SEPM, AAAS, and the Miami Geological Society, and a 1977-78 Distinguished Lecturer for the American Association of Petroleum Geologists.

AN ENVIRONMENTAL APPROACH TO LIMESTONE DIAGENESIS (Abstract)

by Eugene A. Shinn

Shallow-marine lime sediments may convert to rock in one of three major diagenetic environments: (A) marine, i.e., on the sea floor; (B) freshwater zone; and (C) deeper subsurface. A lime sediment may undergo only one of these diagenetic environments or all three. Petrographic imprints that may identify these environments include:

A. *Marine environment*—(1) fibrous cement; (2) polygonal cement sutures; (3) superimposed borings; (4) geopetal sediment; (5) botryoidal or spherical cements; (6) mud-textured cement in various combinations with 1 to 5 of the foregoing; (7) fine-grained dolomite (i.e., supratidal marine).

B. *Freshwater environment*—(1) meniscus cement; (2) laminated crusts and other evidences of subaerial exposure; (3) leached fossils; (4) associated freshwater limestones; (5) light O^{18} composition; (6) blocky calcite.

C. *Deeper subsurface environment*—(1) compactional features; (2) blocky calcite; (3) pressure solution (i.e., stylolites); (4) leached grains and moldic porosity; (5) saccharoidal dolomite.

Some of these features, such as blocky calcite, leached grains, and dolomite, are present in more than one environment; exposure of some rocks to all three environments complicates diagenetic interpretation.

Knowledge of early diagenetic environments and their indelible imprint is based on investigations of seafloor cementation in the Persian Gulf, the Bahamas, and Bermuda, and more recently has been acquired through drilling on the Belize barrier reef and through studies of south Florida Pleistocene limestones exposed to fresh water. Recognition of petrographic features associated with deeper subsurface diagenesis is based on interpretive studies of subsurface and outcropping Cretaceous limestones in Texas, Louisiana, and Mexico, and on experimental compaction studies conducted at the Fisher Island Laboratory. Future research may modify these interpretations, but the immediacy of energy problems necessitates this attempt to form criteria which may explain, evaluate, and help predict those diagenetic environments controlling the presence, discovery, and extraction of oil and gas from ancient limestones.

Note: Mr. Shinn's presentation will include the USGS color film "Geology of Belize Barrier Reef."