

ABSTRACT

More than 2 billion barrels of oil have been produced from the oil fields of the Golden Lane and Poza Rica trend along the Gulf Coast of Mexico; in contrast, wells from the Stuart City trend of South Texas, which had as their target carbonates of the same age, facies, and paleogeographic setting, are non productive or marginally productive gas wells. With this problem as an incentive, middle Cretaceous cores from the Mexican fields were studied with the following objectives: to determine the environment of deposition of the reservoir and associated rocks, to consider the significance of sedimentary facies for interpreting the geologic history of the Tampico embayment, and to compare the middle Cretaceous carbonate rocks and history of this area with that of the South Texas area.

The Golden Lane fields produce from the El Abra limestone which was deposited in a shallow-water shelf or lagoon with scattered rudist patch reefs. The structurally lower Poza Rica trend fields contain rocks of the Tamaulipas and Tamabra limestones. The Tamaulipas limestone was deposited principally under open-marine, basinal conditions. The Tamabra limestone is composed of shallow water coral-rudist reefs, debris derived from the reefs and deposited in shoal-water nearby, and forereef talus mixed with basinal muds. Production in the Poza Rica trend is mainly from the reef debris. No coral-rudist reef was recognized in the small amount of available core examined from the Golden Lane, and present data do not support the prevalent view that the Golden Lane is a barrier reef, or reef-fringed atoll, or that the Tamabra limestone represents deep-water deposits transported 8-16 km (5-10 mi) from the supposed Golden Lane barrier reef.

In South Texas, a very orderly sequence of facies in the Stuart City formation along the shelf margin describes a transgressive to progradational cycle. The transgressive portion of the cycle is represented by dark colored planktonic foraminifer-bearing carbonate mud; progradation is indicated by the upward gradation into progressively shallower-water facies, culminating in the thick section of shoal-water rudist reefs, bars, islands, and lagoons. Significant quantities of forereef talus have not been identified along this trend.

In summary, the carbonate rocks of the Golden Lane and Poza Rica trend and of the "Stuart City" trend in south Texas are approximately the same age and, broadly speaking, were deposited under similar environmental conditions on a shallow shelf and at the shelf edge adjacent to a basin. However, the Golden Lane and Poza Rica trend are only about 60 km (37 mi) from the Sierra Madre Oriental, a major early Tertiary orogenic belt, whereas the "Stuart City" trend is hundreds of miles from the same belt. Movements associated with the early Tertiary orogeny caused exposure and subaerial leaching, producing remarkable porosity in the Golden Lane. Thus, although depositional environments of the middle Cretaceous in south Texas are similar to those of eastern Mexico, the subsequent geologic histories of the two regions are markedly different.



Don G. Bebout was born in Monesson, Pennsylvania. He received a B. S. Degree in Geology from Mount Union College, Alliance, Ohio, in 1952, and then went to the University of Wisconsin to earn a Masters Degree in 1954. He was awarded a Doctorate Degree in Geology from the University of Kansas in 1961.

Dr. Bebout was employed by the Esso Production Research Company (formerly Humble Research), Houston, Texas, from 1960 to 1972 where he studied carbonate rocks from many areas throughout the world. Dr. Bebout became a Research Scientist at the Bureau of Economic Geology, University of Texas at Austin in October, 1972, where he is responsible for carbonate and evaporite studies. He is in the final stages of a study of the carbonates of the South Texas Stuart City trend.

Dr. Bebout has published and co-authored a number of papers in carbonate stratigraphy and is a member of the American Association of Petroleum Geologists.

---