CARBONATE SEDIMENTATION ON FOUR SOUTHWESTERN CARIBBEAN ATOLLS AND RELATION TO "OÖLITE PROBLEM"[1]

Courtown Cays, Albuquerque Cays, and Roncador Bank are small atolls in the southwestern Caribbean, encompassing areas between 22 and 29 km^2. The shallow open lagoons contain sediments rich in *Halimeda*, coral, and coralline algae debris, apparently derived from peripheral reef flats and lagoonal patch reefs. Oölite and other nonskeletal carbonates are present only in small amounts.

Serrana Bank is almost an order of magnitude larger (191 km^2) than the other three atolls, but has similar morphologic and hydrographic environments. Because of their relatively small area, peripheral reefs at Serrana Bank do not contribute a significant amount of sediment to the lagoon. In the eastern lagoon, sediments are derived from nearby patch reefs, but in the western lagoon, where hermatypic growth is limited, the dominant sediments are nonskeletal, and include oölite, cryptocrystalline lumps, and pelletoids. The reason that such nonskeletal carbonates can form in open lagoon conditions at Serrana Bank and yet are almost entirely absent in similar environments at the smaller atolls, may be related to the lack of biogenic carbonate sedimentation at Serrana Bank.

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SYSTEMATICS, DISTRIBUTION, AND ABUNDANCE OF WEST INDIAN MICROMOLLUSK *Rissoina catesbyana*

The common West Indian micromollusk *Rissoina catesbyana* is the most abundant species of the family Rissoinidae in shallow inshore waters. Little is known about its distribution largely because of taxonomic confusion with other species of the genus. Most reports of the species in the United States have been under the name *Rissoina chesneli*, a species known only from Jamaica.

The small (3-4 mm) gastropods thrive in dense *Thalassia* beds in sheltered bays and lagoons. They are not found on the reef tract only a short distance away.

Although basically a tropical species, *R. catesbyana* is able to withstand reduced salinity and temperature. This adaptability has enabled the species to spread along the western Atlantic seaboard from southern Brazil to North Carolina. The young hatch as free swimming veligers and may be carried for a distance by currents. They are most abundant in areas like Biscayne Bay, Florida, where salinity is somewhat reduced, and may number several thousand live animals per square meter.

R. catesbyana is an indicator of inshore slightly brackish waters. It is not found in the coral reef tract nor can it penetrate very far into waters of low salinity. Its abundance should make it an excellent animal for further study as an environmental indicator, and its presence in the fossil record should prove to be an excellent clue to past environmental conditions.

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DEPOSIT-FEEDING PELECYPODS IN RECENT MARINE FAUNAS

All epifaunal and most infaunal pelecypods are suspension feeders, but all protobranchs, including the solemyids, and almost all tellinids and semelids are deposit feeders. The protobranchs are the more diverse in cold and temperate water, and the tellinids and semelids are the more diverse in warm water. The 20°C isotherm divides those pelecypod faunas dominated by protobranchs from those dominated by tellinids and semelids. The abyssal fauna has a larger percentage of deposit feeders than any shallow-water fauna because of the greater diversity of protobranchs. The Antarctic fauna is the only one devoid of tellinaceans.

[1] Contribution No. 2364 from the Woods Hole Oceanographic Institution.

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MOREAU-CAMINADA CHENIER COMPLEX, SOUTHEASTERN LOUISIANA

The Moreau-Caminada chenier complex south of New Orleans is the only sub-Holocene chenier system on the surface in Louisiana east of the classic western Louisiana cheniers. It occupies an area 16 km long and up to 5 km wide east of the mouth of Bayou Lafourche. About 60 ridges, 50–120 m wide and up to 7.5 km long, form the complex; the highest ridge elevation is only 1.2 m. Large new exposures along Louisiana Highway 1 revealed that the sand, which at places is at least 30 ft thick, is very fine grained and very well sorted. Detrital lignite grains make up as much as 7.6% of this chenier sand. Shell fragments, abundant in the western Louisiana cheniers, are absent. Autochthonous and detrital peat layers and laminae 1 mm or more thick are interlayered with the sand. Dating of three autochthonous peat samples from the Louisiana Construction Company and Plaisance Dragline and Dredging Company sand borrow pits revealed 2,940±120 to 2,340±120 years B.P. ages. Thus the cheniers are much older than the surrounding Lafourche- and Lafourche-Terrebonne subdelta sediments. After the last Lafourche distributary stream lost its water supply, substantial erosion started the destruction of the chenier complex. A coastal strip up to 2 km wide was eroded between 1890 and 1934, due to the closing off of the Bayou Lafourche discharge.

New information about the Mississippi deltaic plain stratigraphy refutes suggestions that the southwest Louisiana chenier ridges formed during periods when the active delta lobes were on the other end of the deltaic plain. Seven sets of chenier ridges formed in the southwest Louisiana chenier plain between 2,800±600 B.P., while not only the distant St. Bernard distributaries were active but also the much closer Lafourche distributaries. The Moreau-Caminada cheniers were forming also in the proximity of one of the active Lafourche subdeltas. Cyclicity in chenier progradation should be attributed to fluctuations in local sediment supply and hydraulic conditions. Enough sediment must have been present in the littoral drift to prevent the wholesale erosion of the shore and to allow the construction of ridges. Low ridge elevations in the Moreau-Caminada area are attributed to the great thickness of underlying post-Pleistocene sediments in contrast to the shallow Pleistocene surface in southwestern Louisiana.

Shore recession in the chenier plain was accompanied by the reversal of littoral drift directions. The Moreau-Caminada cheniers indicate westward drift whereas the presently prevailing drift direction in the area is eastward. The present drift direction may date back to the construction of the Plaquemines subdelta

which since about 800 B.P. reduced the strength of the currents and waves from the east.

Chenier ridge configurations depend primarily on the original outline of the shoreline and upon the conditions of sediment supply from the sea, from deltas, or from the estuaries. Different ridge patterns develop if the dominant littoral drift approach direction is similar or identical with that of the main sediment source area. In the present case a substantial part of the ridge sands came by the drift from the east, and most of the sediment probably came from the west, the area of an active Mississippi subdelta. A similar situation exists on the western bank of the Sabine Pass, eastern Texas, where the ridges developed from the southwest and most of the sediment supply came from the east with the prevailing drift and from the direction of Sabine Lake on the north.

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MEGAFAUNAL FACIES, ESTUARY TO SHELF EDGE, SURROUNDING GULF OF MEXICO

Nearly 20 years of marine benthic studies along the rim of the Gulf of Mexico permits recognition of areal (environmental) facies, most of which have exact counterparts in the Gulf Coast Tertiary. These facies have been recognized on the basis of invertebrate faunal diversity, benthic community size and structure, geomorphology of sea bottom, and sedimentary characteristics.

Ultimate facies control is exhibited by prevailing climates around the Gulf Coast, ranging from tropical moist in the southeast and southwest to almost xerophytic (dry) in the west. Northern regions are cool-temperate in winter and subtropical in summer with average moisture conditions ranging from very wet for several years to prolonged droughts in following years —the most variable climate in the world.

Megafaunal assemblages in shallow waters consist of those found in saltwater and freshwater marshes, river estuaries, low to medium salinity enclosed bays (interreef), low and high salinity oyster or mollusk reefs, high salinity open bay centers; open bay sandy margins, inlets, and sand or clay open beaches. Open Gulf or deeper water assemblages are characteristic of shallow shelf (1–20 m), intermediate shelf (21–72 m), outer shelf (73–132 m), and upper slope (132–700 m). Detrital carbonate muds provide slight variations to these facies in areas on the south. Reef-forming organisms create micro-epifaunal habitats modified by wave energy and depth.

Faunal composition within each of these habitats is controlled by sediment type and by stability of other environmental factors. Unstable environments with wide ranges of ecologic variables and clay sediments produce low species diversity within small populations. Stable environments on sand-clay mixed bottoms produce high diversity within large populations. Principles used to define these habitats can be applied to Tertiary formations in mapping ancient environments.

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URANIUM ON HORSEBACK, OR, SOUTH TEXAS REVISITED[1]

In 1968 minerals' explorers flocked back to South Texas to have another look at the Tertiary sedimentary prism between the outcrops of the Jackson and Goliad Formations. In a trend belt 200 mi long and 50 mi wide, uranium has been discovered in quantities which challenge the traditional position of the established mining districts of the Colorado Plateau and Wyoming.

History, background, and a review of 1968 developments set the South Texas uranium scene. The lure of major opportunities for future discoveries finds Texas sharing in a greatly stepped-up mineral activity that is based on growing world demand for nuclear fuels.

The geologist who would try to set the complex uranium phenomenon in a simple framework faces several alternatives, all credible. Not the least part of the dilemma is the coincidence(?) of oil-field structural features with the occurrence of ore. Despite an element of inexactitude in the state of the art, refinements in tools and techniques which the prospector brings to uranium exploration leave little chance that significant mineralization will be overlooked.

Oil companies with an eye on diversification have moved vigorously into the uranium field. The economics of familiar, relatively shallow sediments of the Texas coastal plain offers excellent profit opportunity, and there is confidence that the emerging uranium industry will see steady, responsible growth in the future.

[1] Published with permission of Continental Oil Co.

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ENVIRONMENTAL SIGNIFICANCE OF PHYSICAL ATTRIBUTES OF CALCAREOUS SEDIMENTARY PARTICLES

Physical attributes of carbonate particles closely reflect environmental conditions. Features such as the degree of aging of shells, particle roundness, particle staining, and shell fragmentation are particularly useful in interpretation of shelf sedimentation. Such particle attributes indicate the relict, shallow-water nature of most shelf sediments off the southeastern United States.

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USE OF RADIAL PORES IN TAXONOMY AND PALEOECOLOGY OF OSTRACODA

On the lateral surface of the carapace, ostracodes have radial pores of two types—"simple" and sieve. The functions of these two pore types are not fully known. Studies of the carapace with a scanning electron microscope reveals differences between the pores of Myodocopa, Platycopina, Cladocopa, and Podocopina. Sieve pores demonstrate the greatest dimorphism and are confined to the superfamily Cytheracea. A basic pattern of pores was formulated.

Type A.—Single pore with a sensory hair. A′ Normal pore without a lip. A″ Normal pore with a lip.

Type B.—A sieve plate without a well-defined central or subcentral pore with a sensory hair.

Type C.—Type A superimposed on Type B. A sieve plate with a pore and sensory hair emerging from its center.

Type D.—Combination of Type A and Type B. A sieve plate, and a separate single pore with a sensory hair.

These types can be utilized in future systematic studies of Ostracoda