The tectonic-stratigraphic framework of the Georges Bank basin is that of an Atlantic-type plate margin. Two major unconformities divide the section into prerift, synrift, and postrift sequences. The prerift sequence consists of Paleozoic metasediments in basement fault blocks. Synrift sediments consist of Newark Group equivalents: the Argo Salt and the Iroquois Formation. The postrift sequence consists of Mohican red beds overlain by progradational wedges, with the carbonate Abenaki Formation at the base.

The objective in 4 of the 8 wildcats was the Iroquois Formation. Mobil 312-1 and Shell 357-1 were drilled into a seismic anomaly interpreted to be a reef. This structure was found to be a complex carbonate mound. Exxon 975-1 was drilled on a seismic amplitude anomaly variously interpreted to be the result of salt, coal, or porous carbonates. This anomaly proved to be caused by a salt bed. The objective in Shell 410-1R was carbonate banks over a basement horst block. No significant zones of porosity were found.

The remaining 4 wildcats were drilled on Abenaki prospects. Mobil 273-1, Tenneco 187-1, and Conoco 145-1 were drilled for possible carbonate banks over a salt structure. Only thin oolitic grainstone intervals were found. Exxon 133-1 was based on a seismic anomaly interpreted to be a patch reef. This feature was found to be a volcanic cone.

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Eocene Euthecosomatous Pteropoda (Gastropoda) of North America

Thirty-four species of Eocene pteropods (minute, shell-bearing, planktonic gastropods) are added to the 11 previously known from North America. They can, on occasion, be used effectively for global correlation of synchronous strata. As pteropods receive further attention, the number and accuracy of these correlations will increase.

Pteropods are one of the most abundant and ubiquitous members of the plankton community in modern oceans. They were just as diverse and abundant in Eocene seas. There are about 28 modern euthecosome species. We have identified 45 Eocene species in North America, 7 of which were already known in England and Europe; 27 are new. They were collected from outcrops in Texas and Alabama and from exploratory wells in Louisiana and the Nova Scotian shelf.

All euthecosomatous pteropods have aragonitic shells but there are at least 3 different kinds of microstructure: (1) most spirally coiled species (family Spiratellidae) have crossed-lamellar microstructure, (2) straight or bilaterally symmetrical shells (family Cavoliniidae and Creisidae) have a helical microstructure, and (3) the Eocene species, *Plotophysops bearnensis* Curry (family Spiratellidae), has both crossed-lamellar and helical microstructure.

Helical microstructure, first described in pteropods by Bé, MacClintock, and Chew-Currie in the modern species, *Cuvierina columnella* Rang, is not known to exist in other molluscan groups. The helical rods are nested in such a manner as to give maximum strength to the thin fragile shell, a decided advantage for an organism with a planktonic life style.

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Secondary Porosity in Miocene Sandstones of Louisiana Gulf Coast and Its Significance in Reservoir Properties

Petrographic examination of Louisiana Gulf Coast Miocene sandstones recovered from depths ranging from 9,600 to 20,100 ft indicates that considerable porosity enhancement has occurred. Dissolution of authigenic calcite and dolomite is the primary mode of porosity enhancement. Relatively minor but locally significant secondary porosity is formed by dissolution of framework feldspars, rock fragments, and bioclasts or their replacements. Siderite dissolution is negligible.

The degree of porosity enhancement is determined largely by the original textural and compositional characteristics of a sediment. Relatively coarse-grained, well-sorted, matrix-free sands are subject to early diagenetic pervasive carbonate cementation and replacement. Sandstones later affected by extensive dissolution of pervasive carbonate cement and replacements contain excellent pore networks and exhibit maximum deliverability. Poorly sorted, fine-grained, matrix-rich (e.g., bioturbated) sands undergo little effective porosity enhancement. Consequently, "dirty" sands retain inferior reservoir characteristics.

Compaction and cementation generally diminish reservoir quality with increasing burial depth and aside from simple porosity loss, reservoir productivity and recovery efficiency are affected adversely by secondary pore geometry modification accompanying deep burial. Pore interconnection decreases and pore-throat geometry declines from tabular to lamellar with increasing depth. Pore to pore-throat ratios increase with depth, particularly in sandstones containing abundant secondary moldic and over-sized pores. Premature production decline in ultra-deep reservoirs can, in places, be attributed to reservoir-stress sensitivity associated with lamellar pore throats, very large pore to pore-throat ratios, and high overburden pressure.

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Geostatistical Analysis of Devonian Shale Production in Southwestern West Virginia

The success rate for Devonian shale wells in southwestern West Virginia is greater than 90%, yet the geologic factors determining hydrocarbon distribution are poorly understood. Initial potentials (IP) vary, but are generally low. Siting a new well may have little more justification than proximity to successful wells with acceptable to high open flows. Such a procedure can be made objectively through the use of geostatistics that measure the degree of randomness in the distribution of dry penetrations and the spatial variation in IP's.

Semivariograms were calculated to show (1) average difference in success between wells relative to the distance separating them, and (2) average difference in open flow between wells relative to distance. The semivariogram for gas IP showed a large degree of noise, but some spatial autocorrelation. Similarly, dry penetrations were found to be clustered. Success probability and gas IP contoured from kriged estimates exhibit clustering of dry penetrations and nonrandom patterns in IP's, in particular, linear highs and lows paralleling structural features. Highest flows correspond to flanks of known anticlines. One linear trend in IP follows a lineament that might represent a cross-strike structural discontinuity. Significant correlation between IP at each well site with that predicted from surrounding wells demonstrates the efficacy of the geostatistical approach.

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Mechanisms of Deposition of a Carbonate Mud Spit: Ramshorn Spit, Eastern Florida Bay

The turtle grass (*Thalassia testudinum*) community has a significant influence on sedimentation in Florida Bay, but the roles other processes may play in the buildup of mud bank and spit sediments are poorly understood. Samples from cores taken from Ramshorn Spit and Ramshorn Shoal were classified into 4 basic types on the basis of particle size distribution, organic content, and faunal assemblages. In order of increasing volumetric importance they are: (1) very thin, discontinuous shelly packstones, representing overbank or storm deposits; (2) thin, continuous basal shelly packstones, the initial marine deposit on the Pleistocene bedrock surface; (3) muddy wackestones, of variable thickness, deposited in the presence of a seagrass community; (4) very thick, faintly laminated fine mudstones, with very sparse fauna, representing weak current-transported sediments settling out of suspension. Discriminant function analysis confirms the classifications and shows that these sediment layers are indeed correlatable between cores.

Interpretation of the core logs from Ramshorn Spit indicates a definite change in stratigraphy southwestward from the spit and bank junction to the tip of the spit itself. The different sediment layers show a small but significant inclination to the southwest. Throughout its depositional history, Ramshorn Spit seems to have been actively accreting outward into the surrounding "lake" by means of a current-transported fine mud fraction. After settling out at the growing tip of the spit, the sediments are subsequently stabilized at some later time by a turtle-grass cover.