observed in this urban area appear to result from leaded gasoline source. Except for the high Pb samples (Pb>300ppm), there is no apparent elevation of Cd levels in recent urban samples in comparison to rural or historic samples.

Chromium (Cr) was analyzed in selected samples (6) to determine if the abrasion of the yellow paint stripes on roads ($PbCrO_4$ pigment) were a source of lead to the lichens. The range of Cr concentrations is 5 to 29ppm with no systematic differences between the three groups; this indicates no significant uptake of Pb from the abrasion of stripes.

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OCCURRENCE AND STRATIGRAPHY OF ORGANIC DEPOSITS, ST. MARY PARISH, LOUISIANA

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Organic clays and peats represent a significant percentage of the Mississippi River deltaic plain deposition. Organic-rich deposits form by the accumulation of partially decayed marsh and swamp vegetation atop subsiding delta lobes. Such deposits form on both prograding and abandoned sub-deltas of the Mississippi. Published sources indicate that the Sale-Cypremort and Teche sub-deltas of the Mississippi River were active near central St. Mary parish between 4500-4000 B.P. and 3500-3000 B.P., respectively. Sequences of organic clays and peats up to ten meters thick have formed since delta abandonment.

Several hundred control borings averaging six meters were obtained using a portable vibracorer and a Macauley peat sampler. An upper peat horizon which exhibits a high degree of lateral continuity has been mapped throughout the study area. Two lower peat horizons have been recognized in several borings, but their areal extent has not been determined. Clay and silt facies, which separate the three peat layers, contain less organic material and are representative of natural levee, swamp, lacustrine, and brackish bay environments. The tops of the three peat horizons occur at approximately 1.2, 4.3, and 6.4 meters and their respective thicknesses average 1.2, 0.4, and 0.8 meters.

The results of this study combined with published radiocarbon age dates suggest a possible relationship between the percentage of organic material and the location of the active Mississippi River delta lobe. Horizons displaying a high organic content presumably can be correlated with progradation of delta lobes far to the east of the study area. Conversely, horizons with low organic percentages formed during activity of delta lobes closer to the study area.

SATELLITE AND FIELD OBSERVATIONS OF SUSPENDED SEDIMENT MOVEMENT NEAR CAPE MAY, NEW JERSEY

KELLEY, Joseph T., Earth Science Department, University of New Orleans, New Orleans, LA 70148

The origin of Holocene, fine-grained, coastal asediment near Cape May Peninsula (CMP), NJ has never been determined with certainty. Temporal variation in mineralogy and heavy metal chemistry of material accumulating in CMP lagoons suggests the source of Recent mud is complex and anthropogenically influenced. Between 1975 and 1976 current meters were deployed on the Atlantic side of CMP, and between 1977 and 1978 suspended sediment was collected in this area and evaluated for texture, chemistry, and mineralogy. This paper ties together physical oceanographic and suspended sediment observations with Landsat imagery acquired before, during, and subsequent to field observations; and presents a 3 stage model for sediment introduction into the back-barrier regions of CMP: 1) On "quiet" days illite-rich plumes of suspensate issue from northeast Delaware Bay on ebb tides and move up the Atlantic coast of CMP. This material is derived from tidal current and wave resuspensions of Bay sediment and most returns to Delaware Bay on the succeeding flood tide with little accumulation in CMP marshes. 2) During Delaware River floods montmorillonite, vermiculite, heavy metal-rich river sediment is introduced into northeast Delaware Bay, from whence it issues as plumes on ebb tides into the inner shelf region of CMP. Much of this material is temporarily deposited on the inner shelf and is subsequently drawn into CMP inlets on flood tides. 3) During hurricanes and winter storms Pleistocene-age, illite rich, heavy metal-impoverished inner and mid-shelf sediment is moved onshore and deposited as mudball clasts. These clasts are comminuted and mixed with a chlorite/kaolinite-rich material locally eroded from the Cape May Formation. Short term observations suggest Delaware River and Bay sediment as the principal source of inorganic material to CMP marsh regions.

PREDATOR-RESISTANT ADAPTATIONS OF SHALLOW WATER TERTIARY BIVALVES

KELLEY, Patricia H., Department of Geology and Geological Engineering, The University of Mississippi, University, MS 38677

Bivalve mollusc shell morphology represents adaptation to a variety of environmental factors such as water movement, substrate, food availability, and predation. Shallow water bivalves are subjected to intense predation by drilling gastropods. Postulated antipredatory morphologic adaptations include 1) increased shell size, 2) increased valve thickness, 3) strong shell ornamentation, and 4) tight valve closure.

Predator-resistant adaptations are examined for Paleocene, Eocene and Miocene faunas of the Gulf and Atlantic Coastal Plains. Within early Tertiary eastern Gulf Coast faunas (Midway through Jackson Stages), shallow-burrowing bivalve morphology is related to naticid gastropod predation intensity. At high levels of predation, the dominant bivalve taxa (presumably those resistant to predation) display larger, thicker, more highly ornamented shells with crenulate margins. Discriminant analysis, however, indicates that morphologic differences between faunas subjected to low vs. high predation levels are generally slight.

Drilling rates calculated for ten common bivalve genera collected from Maryland exposures of the Chesapeake Group (Miocene) range from less than 10% to nearly 60%. Naticid gastropods are responsible for most of the mortality attributable to drilling. Predation rates vary with prey size and morphology. Within a taxon, predation is concentrated upon the small to intermediate size classes. Predation-resistant adaptations may include rapid growth to large size (exhibited by Glossus), increased shell thickness (Corbula), and strong ornamentation (Anadara).

TECTONIC MAP OF NOVA SCOTIA

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The Tectonic Map of Nova Scotia is displayed. It is based upon plate tectonic theory and portrays the origin and evolution of the region in space and time. Previously, tectonic maps were based upon the outdated geosynclinal theory. The advent of plate tectonics heralded a new generation of tectonic maps, however, no generally acceptable scheme has yet emerged. The scheme devised for the Tectonic Map of Nova Scotia should form the basis for other tectonic maps.

In this tectonic classification scheme, three hierarchical categories are recognized: zones, stages and elements.

A tectonic zone is defined as an area characterized by the nature of the underlying crust (continental, transitional or oceanic) and is bounded in time by orogenies.

A tectonic stage is defined as a phase of tectonic development forming part of a tectonic zone and characterized by an association of tectonic elements. The following stages are recognized: stable, rift, atlantic, pacific and transpression stages.

A tectonic element is defined as a certain, specific, well-defined tectonic environment and characterized by a distinct tectono-stratigraphic or tectono-plutonic rock unit which is part of a tectonic zone or stage, e.g. continental shelf, forearc basin, marginal basin, etc.

On the tectonic map, each tectonic stage is assigned one or more colors and each tectonic element bears a shade of color dependent upon the stage to which it belongs. The notation on the map identifies each tectonic element to its stage, zone and terminating orogeny.

Structural elements plotted on the Tectonic Map of Nova Scotia include folds (color-coded according to their age), faults, unconformities, structure contours, metamorphic isograds and gravity anomalies.

FIELD RELATIONS AND REGIONAL SIGNIFICANCE OF THE VOLCANICS OF WOODS ISLAND, BAY OF ISLANDS, NEWFOUNDLAND.

KIDD, W.S.F., and IDLEMAN, B.D., Dept. of Geological Sciences, SUNY at Albany, Albany, N.Y. 12222

Volcanic rocks on Woods Island are shown on Williams' 1973 map as interstratified with the allochthonous Arenigian-Llanvirnian flysch of the Blow-me-Down Brook Formation. They comprise a rare example of volcanics possibly erupted in a trench, or outer trench slope area of a subducting plate. The exposures on Woods Island show that the contact below the volcanics is tectonic, so the volcanics are not interstratified with the flysch. However, the flysch does conformably overlie the mafic volcanic rocks, even though the contact seems likely to be a disconformity because coarse quartzose greywackes rest abruptly on hematized volcanics. About 50 m. thickness is preserved, pillow lavas making up much of the section, most of which is partially to strongly hematized. Calcite-filled vesicles are common. The volcanics are structurally underlain by an extensive sedimentary melange. Following Williams, we interpret the volcanics as correlative with the Skinner Cove volcanics, but not as part of the Blow-me-Down Brook Formation. Previous interpretations of the Skinner Cove volcanics by Williams and by Karson and Dewey have restricted the volcanics to close association with the Coastal Complex (Little Port assemblage), interpreted by the latter authors as a transform fault product, and the Bay of Islands Ophiolite Complex. We suggest that the Woods Island and other occurrences of Skinner Cove-type volcanics are lenticular slivers riding directly on a single major thrust that outcrops throughout the area of the Humber and Bay of Islands Allochthons at an original structural level in most places close to the base of the combined Bay of Islands/Coastal Complex Allochthon. This Woods Island slice consists mostly of highly allochthonous early Ordovician shales and flysch that forms with the volcanics a coherent sheet that lies above, and was derived from a more oceanward position than, the less far-travelled continental rise sediments (Cooks Brook, etc.).

3 *William A. Oliver, Jr.:* Arborescent Corals 2:30
4 *Ann B. Foster:* Branching within Some Typically Massive Species of Scleractinian Coral 2:50
5 *Raymond C. Highsmith:* Reproduction by Fragmentation in Hermatypic Corals 3:10
Discussion and Break 3:30
6 *James E. Conkin,* Barbara M. Conkin: Amphipora ramosa* Zone—Stromatoporoid Interval in Lower Eifelian of East-Central United States and Southern Ontario 3:45
7 *Roger J. Cuffey,* Alan H. Cheetham:* Reconstruction of Bryozoan Colonies from Measurements of Branch Fragments 4:05
8 *Frank K. McKinney:* Convergent Evolution of Branch Linkage in Fenestrate Bryozoans 4:25
9 *David L. Meyer,* Danita S. Brandt:* Branching Morphologies of Recent Comatulid Crinoids from the Great Barrier Reef and Their Relation to Living Habits 4:45
10 *Robert W. Frey:* Patterns of Branching among Modern and Ancient Lebensspuren 5:05
Summary and Discussion 5:25

COASTAL PLAIN GEOLOGY: DEPOSITIONAL ENVIRONMENTS AND AMINOSTRATIGRAPHY
Executive Room, 1:45 p.m.

Gregory S. Gohn and Laurel M. Bybell, Presiding

1 *John M. Malinky:* Depositional Framework of the Navesink Formation (Upper Cretaceous) in the Atlantic Coastal Plain of New Jersey 1:45
2 *Thomas G. Gibson,* Laurel M. Bybell:* Stratigraphy of Paleocene and Eocene Units of the Eastern U.S. and Its Relationship to Global Sea-Level Curves 2:05
3 *Paul G. Nystrom, Jr., Ralph H. Willoughby*:* Early Tertiary (Jacksonian?) Stratigraphy in Graniteville and Hollow Creek Quadrangles, Aiken County, South Carolina 2:25
4 *R. Steve Peacock,* Sherwood W. Wise, Jr.:* Reconnaissance Study of the Post-Eocene Subsurface Stratigraphy of Southern Collier County, Florida 2:45
5 *Steven K. Mittwede:* The Eastover Formation–Yorktown Formation Contact at the Lieutenant Run Exposure, Petersburg, Virginia 3:05
6 *Lee J. Otte,* Daniel A. Textoris:* A Coastal Embayment Model for the Depositional Environment of the Eocene Castle Hayne Limestone of North Carolina 3:25
7 *Stephen W. Snyder,* Daniel F. Belknap, Albert C. Hine, Alec G. Steele:* Seismic Stratigraphy, Litho-Stratigraphy, and Amino Acid Racemization of the Diamond City Fm: Reinterpretation of a Reported "Mid-Wisconsin High" Sea-Level Indicator from the North Carolina Coastal Plain 3:45
8 *Daniel F. Belknap:* Amino Acid Racemization from C-14 Dated "Mid-Wisconsin" Mollusks of the Atlantic Coastal Plain 4:05
9 *John F. Wehmiller:* Implications of U-series Coral Dates for Aminostratigraphy of Atlantic Coastal Plain Localities 4:25
10 *Lucy McCartan,* James P. Owens, Barney J. Szabo:* Absolute and Relative Dating of Atlantic Coastal Plain Pleistocene Formations: Evaluation of Amino-Acid Epimerization Age Estimates 4:45

TECTONICS I: REGIONAL GEOLOGY
Palladian Room, 1:45 p.m.

Peter T. Lyttle and Dana L. Roy, Presiding

1 *James Hibbard:* Obduction Related Boninites: Newfoundland Appalachians 1:45
2 *W. R. Smyth:* The Southern White Bay Allochthon—A Newly Defined Taconic Allochthon in Western Newfoundland 2:05
3 *W.S.F. Kidd,* B. D. Idleman:* Field Relations and Regional Significance of the Volcanics of Woods Island, Bay of Islands, Newfoundland 2:25
4 *Stephen G. Pollock:* Stratigraphy of the Caucomgomoc Lake Area, Northern Maine: Example of an Obducted Ophiolite-Melange Complex 2:45
5 *Peter R. Tauvers:* Basement-Cover Relationships in West-Central Vermont 3:05
6 *Paul Karabinos:* Deformation and Metamorphism of Cambrian and Precambrian Rocks on the East Limb of the Green Mountains Anticlinorium near Jamaica, Vermont 3:25
7 *R. S. Stanley,* D. L. Roy, M. H. Gale, P. R. Tauvers:* Thrust Zones in the Pre-Silurian Eugeoclinal Rocks of Vermont 3:45
8 *Christine Farrens,* Sharon Mosher:* Allegheniam Deformation in Southeastern Naragansett Basin, R.I. . 4:05
9 *Charles Merguerian,* Charles A. Baskerville, Steven Okulewicz:* Cameron's Line in the Vicinity of New York City 4:25
10 *Denny N. Bearce:* Talladega Belt Basal Clastic Sequence, Cleburne County, Alabama 4:45
11 *Mark T. Swanson:* A Possible Complex Decoupling History for Mesozoic Rifting 5:05

QUATERNARY GEOLOGY: GLACIAL STRATIGRAPHY, PROCESS AND CHRONOLOGY
Tudor Room, 1:45 p.m.

Geoffrey W. Smith and Carl Koteff, Presiding

1 *P. T. Davis:* Late Holocene Glacial History, Pangnirtung Area, Baffin Island, Canada 1:45
2 *Barbara Gaddis:* Till Ridges of the Vaasa Region, Finland 2:05
3 *Geoffrey W. Smith:* DeGeer Moraines of the Maine Coastal Zone 2:25
4 *D. W. Caldwell,* Lindley S. Hanson:* The Alpine Glaciation of Mt. Katahdin, North Central Maine 2:45

*Speaker

ABSTRACTS with PROGRAMS 1982

NORTHEASTERN and SOUTHEASTERN Combined Section Meetings

The Geological Society of America
17th Annual Meeting of Northeastern Section
31st Annual Meeting of Southeastern Section

with
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and
Eastern Section of the
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