

## DEPOSITIONAL HISTORY OF THE TACONIC CONTINENTAL RISE COMPARED WITH EQUIVALENT SEQUENCES ALONG THE NORTHERN APPALACHIANS

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Deposition on the Taconic continental rise prior to the Caradocian flysch is divisible into three episodes. Before the mid early Cambrian, a thick sequence accumulated of arenaceous and silty rocks with abundant quartzofeldspathic and mica detritus. From mid early Cambrian to earliest Ordovician a thin sequence was deposited of mudrocks with coarser clastic interbeds derived from the developing quartzite-carbonate shelf. The shelf-derived clastics are debris-flow deposits (carbonate breccias and the thickest arenites) and turbidites (most quartz and carbonate arenites and carbonate muds), interpreted as deposits of small ephemeral submarine fans. From the earliest Ordovician (late Tremadocian), deposition consisted of quartzofeldspathic silts and muds, essentially lacking carbonates, and interpreted by us to be contourite deposits. In comparison to the continental rise sequences of Quebec and Newfoundland, the first two divisions of the Taconic sequence are very similar in facies and time of development, but the third, early to mid Ordovician part, is not. Sediments coeval with the Taconic contourites are flysch in Newfoundland while carbonate deposition continued in Quebec. Two possible sources for the Ordovician contourites are 1) material supplied to the rise through the carbonate platform south of the Quebec area, or 2) the early Ordovician flysch represented in Newfoundland. Coincident timing of first appearance of flysch in the Newfoundland section and contourites in the Taconics perhaps suggests 2), but persistence of contourite quartzites up into presumed karsted shelf-derived red muds of the late Llanvirn Indian River Formation favors 1). Derivation of the Indian River muds from weathering of the ophiolite and arc terrain would resolve this problem.

## STRATIGRAPHY AND PRELIMINARY GEOCHEMISTRY OF THE GLOVER GROUP OF WESTERN NEWFOUNDLAND

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The Glover group outcrops in the Grand Lake area in western Newfoundland, and from bottom to top consists of a fine-grained, quartzose graywacke with sparse clasts of gabbro, basalt and trondhjemite, mafic and silicic tuffs and flows, volcanoclastic sediments and mafic pillow lavas. The Glover group overlies ophiolitic rocks along a sharp surface that may represent an unconformity. It is unconformably overlain by argillites and coarse clastic rocks of Middle or Upper Ordovician or Silurian age. Graptolites from shales in the Glover group are Lower Ordovician (Middle Arenig) in age.

Preliminary geochemistry indicates that the Glover group is a bimodal, basalt-rhyolite suite. Basalts consistently plot in the ocean floor field on standard trace element plots. They contrast with typical ocean floor basalts, however, in that they are enriched in incompatible trace elements and contain distinctive kaersutite-ilmenite bearing basalts.

Geochemically similar rocks (Snooks Arm Group) occur on the Baie Verte Peninsula in a geologic setting comparable to that of the Glover group. These rocks are LIL enriched tholeiites of Lower Ordovician (Upper Arenig, possible Llanvirn) age. Jenner and Fryer (1980) have argued that these rocks are unlikely to have formed in an island arc setting and more closely resemble rocks from oceanic islands or back-arc basins. Although it is not possible to choose between these two possibilities at the present time, it is concluded a single choice must suffice for both the Snooks Arm Group and the Glover group.

## COELOBIOTIC (CAVITY-DWELLING) MICROORGANISMS IN OPEN AND GLOOMY REEF FRAMEWORK CAVITIES, 18-80 METER DEPTH ZONE, BONAIRE, NETHERLANDS ANTILLES

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Growth framework cavities in the foreereef zone of reefs from Bonaire, Netherlands Antilles, display well developed coelobiotic (cavity-dwelling) biotas in the open and gloomy cavities in the depth range from 18 meters to 80 meters. The macrobiota is dominated by corals, sponges, etc., but the cavities also show a strikingly abundant and diverse microbiota which live attached to, or vagrant upon, the walls and roof of cavities. The microbiota was studied from 9 cavities using scanning electron microscopy and thin sections of epoxy impregnated samples. Present in all cavities are: foraminifera (including *Homo-trema rubrum* and several other genera), loricate peritrichous ciliates, amoeboid testaceans, filamentous algae and fungi, vorticellids, encrusting calcareous red algae, bacteria (including filamentous, bacillus-, and *Microcyclus*-types), very small serpulids, diatoms (including pennate diatoms), and small patches of bryozoans (including *Cribrilaria radiata*). Organic detritus is ubiquitous on the walls and roof of cavities, and appears to comprise macerated organic material and sub-micron sized broken skeletal material in a densely-compact mass. Sediment grains ranging in size from 2 µm to 250 µm are bound to the walls and roof by algal and fungal filaments, organic slime (mucus?) and cement. Endoliths are common in the walls and roof; endolithic sponges, algae and fungi infest all hard substrates but are covered over commonly by encrustations of calcareous algae, sponges, and other organisms. Cementation is occurring in the cavities simultaneously with the living organisms; cements consist of very fine crystals of magnesium calcite and needles of aragonite, both of which occur in small patches coating skeletons and filaments of algae and fungi.

## MAGNETICS AND GRAVITY EVIDENCE FOR A SUBSURFACE CONNECTION BETWEEN THE PALISADES SILL AND LADENTOWN BASALTS, MT. IVY, NEW YORK

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Total magnetic field and gravity studies were conducted near Mt. Ivy, New York to delineate a possible subsurface connection between the Palisades Sill and the Ladentown basalt flows. The area studied is a 1.25 km wide gap between the northwesternmost tip of the Palisades Sill and the easternmost outcrops of the Ladentown basalt flows. Total magnetic field measurements were made with a proton precession magnetometer along three N-S traverses 0.5 km (17 stations), 0.9 km (21 stations), and 1.2 km (20 stations) east of the easternmost outcrops of the Ladentown basalts. All three traverses revealed negative total field anomalies (-1000 gammas, -1500 gammas, and -2100 gammas, from west to east) suggesting that subsurface magnetic bodies trend from the Ladentown basalts to the Palisades Sill. Gravity measurements were made with a Worden gravimeter at 10 stations along the westernmost magnetics traverse. Bouguer and terrain corrections using a density of 2.67 gm/cm<sup>3</sup> yielded a gravity anomaly with a large positive peak (amplitude = 1.2 mgal) at the same location as the large negative in the magnetics. There are suggestions of smaller peaks in the gravity data to the north and south of this central gravity anomaly. One possible model of the magnetics and gravity data for the westernmost traverse consists of three bodies; two thin, horizontal intrusive bodies, one to the north and one to the south, with a thin, vertical body in the center. The gravity and magnetics data do strongly suggest that there is subsurface intrusive connection between the Palisades Sill and the Ladentown basalt flows.

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## THE HISTORY AND DEVELOPMENT OF THE MOUNT PLEASANT TUNGSTEN MINE

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The Mount Pleasant tungsten-molybdenum deposit is approximately 40 km north of St. George in southern New Brunswick.

The property is located on the western edge of a caldera of a Mississippian age, adjacent to its contact with Ordovician sediments. It is bounded to the north by Pennsylvanian sediments and on the south by the Devonian St. George batholith.

The most important unit at Mt. Pleasant is a highly fractured, brecciated, silicified and greisenised rhyolite porphyry. This unit forms two main intrusive plugs, the North Zone and Fire Tower Zone. Tungsten-molybdenum mineralization is confined almost exclusively to these plugs.

In the North Zone past drilling indicated 11.4 million tonnes of 0.24% WO<sub>3</sub> and 0.08% MoS<sub>2</sub>. The W:Mo ratio decreases with the increase in depth.

Detailed geological investigation of Mt. Pleasant began in 1954. Earlier studies were carried out on tin-base metal zones. They overlie and roughly surround the tungsten-molybdenum ore bodies. Although the large tungsten-molybdenum reserves have been known for several years, it was not until the summer of 1979 that a production decision was made. Complex metallurgy of the ore required the development of a ferberite flotation process. Commercial production is scheduled to start in the second quarter of 1982.

## HYDROGEOLOGY OF A CLAY UNIT IN NORTH-CENTRAL SUFFOLK COUNTY, LONG ISLAND, NEW YORK

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Recent hydrogeologic data indicate an extensive clay unit within the upper glacial deposits in the intermoraine area of north-central Suffolk County. The lacustrine clay locally known as the "Smithtown clay," is an integral part of the upper glacial aquifer in this area.

The Smithtown clay occurs at varying depths from 90 feet above sea level to 150 feet below sea level and attains a maximum thickness of 200 feet. Its upper surface is generally above sea level and reaches a maximum altitude of 90 feet in the Town of Brookhaven. The unit is predominantly clay, but lenses of sand containing silt and gravel are found locally. The upper part of the clay is generally light to dark brown; the lower part is light gray, which is characteristic of clays in upper glacial deposits.

The clay unit acts as an effective confining layer between the water table and the lower part of the upper glacial aquifer. Declines in potentiometric head exist across the clay, due to changes in transmissivities and hydraulic conductivities. These declines in head range from 5 to 10 feet. By restricting downward flow, the Smithtown clay plays a significant role in reducing contamination of the underlying ground-water reservoir from man's activities.

## IGNEOUS PETROLOGY

Room D, 0820 hours

*Archie W. Berry and John W. Creasy*, Presiding

- 1 *A. T. Walker,\* C. B. Sclar*: Geochemistry of the Magmatic Differentiates of the Preston Gabbro, Southeastern Connecticut ..... 0820
- 2 *Charles K. Shearer*: Geochemistry of the Tonalite Member of the Hardwick Plutonic Complex, Central Massachusetts ..... 0840
- 3 *Ellen P. Metzger*: Origin of K-Rich Pegmatites by Partial Melting at Ledge Mountain, Central Adirondacks, New York ..... 0900
- 4 *Joyce C. Trygstad*: The Petrology of Mesozoic Diabase Dikes in Southern New Hampshire and Maine ..... 0920
- 5 *J. B. Reid, Jr.,\* O. C. Evans*: A Comparison of Magma-mixing Processes in Granitic Rocks from Northern New Hampshire and the Central Sierra Nevada, California ..... 0940
- 6 *Edward F. Duke,\* C. Page Chamberlain*: Petrology of Spaulding Tonalites, Southern New Hampshire: Major and Rare-earth Element Composition ..... 1000
- 7 *D. S. Westerman*: Whole Rock Chemistry and Tectonic History of the Pocomoonshine Gabbrodiorite, Central Washington County, Maine ..... 1020
- 8 *Rudolph Hon,\* David Acheson III, Jaye Schulman*: Geochemical and Petrological Correlation of Acadian Magmatic Rocks in Northwest and North-central Maine ..... 1040
- 9 *Alan G. Del Signore,\* John C. Fountain, Dennis S. Hodge*: A Comparison of U and Th Distribution in Granitoid Plutons of Different Depths of Emplacement ..... 1100
- 10 *Carolyn A. Jacobson,\* G. Nelson Eby*: Petrography, Geochemistry, and Petrogenesis of Mount Rougemont . 1120
- 11 *G. Nelson Eby*: Geochemistry and Petrogenesis of Mount Brome, Monteregian Hills Petrographic Province, Quebec ..... 1140

## SYMPOSIUM: LATE WISCONSINAN DEGLACIATION OF NORTHERN NEW ENGLAND AND ADJACENT CANADA I

Room E, 0820 hours

*Harold W. Borns, Jr., and Pierre LaSalle*, Conveners

- 1 *Terence J. Hughes*: Models of Glacial Reconstruction and Deglaciation Applied to Maritime Canada and New England ..... 0820
- 2 *Byron D. Stone*: Extent of the Late Wisconsinan Laurentide Ice Sheet—A Review ..... 0840
- 3 *H. W. Borns, Jr.*: Mode of Recession of the Late Wisconsin Laurentide Ice Sheet in Coastal Maine ..... 0900
- 4 *Pierre LaSalle*: The Champlain Sea with Special Reference to the Deglaciation of the Montreal Area ..... 0920
- 5 *D. W. Caldwell,\* Woodrow B. Thompson, Lindley S. Hanson*: Styles of Deglaciation above the Marine Limit in Central and Western Maine ..... 0940
- 6 *Andrew N. Genes,\* William A. Newman, Thomas*

- Brewer*: Late Wisconsin Deglaciation of Northern Maine ..... 1000
- 7 *Thomas V. Lowell*: Late Wisconsin Ice-flow Reversal and Deglaciation, Northwestern Maine ..... 1020
  - 8 *Claude Gauthier*: Deglaciation of Northern New Brunswick and Adjoining Regions ..... 1040
  - 9 *L. Chauvin*: Deglaciation of the Thetford Mines Area, Quebec ..... 1100
- Discussion ..... 1120

## POSTER SESSION I

Room G, Thursday Morning

Authors will be present from 0900 to 1200

- 1 *Robert L. Albert, Frank A. Revetta,\* Reinhart Frohlich*: Three-dimensional Computer Analysis of Gravity Data from Northern and Western New York ..... Booth 1
- 2 *John W. Attig, Jr.*: Quaternary Stratigraphy and History of the Central Androscoggin River Valley, Maine ..... Booth 2
- 3 *Shafiul Islam,\* Olugbenga Ogonyomi, Reinhard Hesse, André Chagnon, Yvon Heroux*: Thermal Maturation of Cambro-Ordovician Flysch, Northern Appalachians, Quebec ..... Booth 3
- 4 *David O. Cook,\* Robert C. Smith, Robert A. Jackson*: Shoreline Responses to Human Perturbation along the Shoreline of Long Island Sound in Westport, Connecticut ..... Booth 4
- 5 *Holly C. Garrow*: Hydraulic Interpretation of the Grain-size Distributions Found in Bedforms ..... Booth 5
- 6 *Robert F. Gerath*: Systematic Approaches to Glacial Geologic Mapping: British Columbia and Mountainous New England ..... Booth 6
- 7 *Carol Morgan,\* Ronald Parker,\** Paleoenvironmental Reconstruction of the Ogdensburg Dolostone (Beekmantown Group: Lower Ordovician); Ottawa-St. Lawrence Lowlands ..... Booth 7
- 8 *David B. Rowley, William Bosworth*: Structural Relationships Adjacent to the Leading Edge of the Taconic Allochthon: Implications for Emplacement History ..... Booth 8

## SYMPOSIUM: DEPOSITIONAL HISTORY AND EVOLUTION OF THE ANCIENT CONTINENTAL MARGIN OF EASTERN NORTH AMERICA IN THE NORTHERN APPALACHIANS

Room A, 1310 hours

*Victor D. Rahmanian and Richard Hiscot*, Conveners

- 1 *Harold Williams*: Regional Setting and Structural History of the Ancient Continental Margin of Eastern North America in the Appalachian Orogen: A Review . 1310
- 2 *A. R. Palmer*: Subdivisions of the Sauk Sequence and Their Implications for Appalachian Cambrian History ..... 1340

\*Speaker

3 *Donald B. Potter*: Rensselaer Graywacke: Rift Basin Fill at the Outer Part of the Continental Shelf ..... 1400

4 *Victor D. Rahmanian*: Mixed Siliciclastic-carbonate Tidal Sedimentation in the Lower Cambrian Monkton Formation of West Central Vermont ..... 1420

5 *Bruce W. Selleck*: Depositional History of the Late Cambrian-Early Ordovician Continental Margin: Ottawa-St. Lawrence Lowlands ..... 1440

6 *Gerald M. Friedman*: Shelf, Slope, and Rise of Proto-Atlantic (Iapetus) Ocean, Cambrian and Ordovician Periods, Eastern New York State ..... 1500

7 *David B. Rowley,\* W.S.F. Kidd*: Relationship between Shelf and Rise Sedimentation of the Early Paleozoic Continental Margin of Western New England ..... 1520

8 *W.S.F. Kidd,\* L. L. Delano, D. B. Rowley*: Depositional History of the Taconic Continental Rise Compared with Equivalent Sequences along the Northern Appalachians ..... 1540

9 *Robert K. Stevens,\* Noel P. James*: Some Problems of the Transported Early Paleozoic Continental Margin Sediments of West Newfoundland ..... 1600

10 *Lawrence A. Hardie,\* Robert V. Demicco, Raymond W. Mitchell*: The Great Cambro-Ordovician Bank of the Central Appalachians ..... 1620

11 *J. F. Read*: Evolution of a Carbonate Continental Shelf, Cambrian-Ordovician, Virginia Appalachians ... 1640

Discussion ..... 1700

9 *N. K. Chakravorti,\* D. V. Gaffney*: Underground Refuse Disposal Systems for Active Coal Mines ..... 1600

10 *R. S. Farrell, F. G. Hoar,\* S. R. Ouellette*: Hydrogeologic Assessment of a High-Chromium Sludge Disposal Site in Maine: Payrolls or Pickerel: Or, Out of Sight, Out of Mind ..... 1620

11 *S. A. Molello,\* S. M. Potter, L. A. Dunne, H. H. Bailey, R. Fickies, R. Fakundiny*: Hydrologic and Radiochemical Investigations of Small Streams Draining a Nuclear Fuel Reprocessing Facility, Cattaraugus County, New York: Progress Report ..... 1640

12 *J. Edward Tillman*: Fracture Permeability in the Siting and Monitoring of Waste Repositories ..... 1700

**SYMPOSIUM: GEOCHRONOLOGY OF THE NORTHERN APPALACHIANS: NEW ENGLAND AND MARITIME CANADA II**  
**Room C, 1320 hours**

*William C. Poole and Henri E. Gaudette*, Conveners

1 *Robert K. Wanless, William H. Poole,\* Lewis H. King, Gordon B. Fader*: Flemish Cap Granodiorite: Age and Correlation ..... 1320

2 *William J. Olszewski, Jr.,\* Henri E. Gaudette, J. Duncan Keppie, Howard V. Donohoe*: Rb-Sr Whole Rock Age of the Kelly's Mountain Basement Complex, Cape Breton Island ..... 1340

3 *James W. Skehan, S.J.,\* Nicholas Rast*: Age Control of Rocks in Rhode Island ..... 1400

4 *Robert E. Zartman, Gerhard W. Leo\**: New Radiometric Ages of Oliverian Core Gneisses and Contact Relationships with Ammonoosuc Volcanics ..... 1420

5 *Kieran D. O'Hara,\* L. Peter Gromet*: Rb-Sr Systematics within the Yantic Member, Tatnic Hill Formation, Eastern Connecticut: Their Bearing on the Age of Movement on the Honey Hill Fault ..... 1440

Discussion ..... 1500

**SYMPOSIUM: SOLVING ENVIRONMENTAL PROBLEMS IN THE NORTHEASTERN UNITED STATES AND EASTERN CANADA**  
**Room B, 1320 hours**

*Allen W. Hatheway and Owen L. White*, Conveners

1 *Murray A. Roed*: First Base in Resource Problem Solving—Comprehensive Legend Development, Northern Ontario Engineering Terrain ..... 1320

2 *Ian Thomson,\* Roger B. Barlow*: Regional Geochemical Mapping: A Multipurpose Planning Base for Environmental Investigations ..... 1340

3 *A. Bar-Josef,\* R. Varnum*: Issues and Criteria for Participants in Waste Disposal Siting ..... 1400

4 *A. R. Day,\* R. S. Farrell, F. G. Hoar, R. C. Howes*: Ground Water Impact Assessment at Selected Maine Solid Waste Disposal Sites ..... 1420

5 *R. S. Farrell*: Approximating the Height of a Ground Water Mound by Changes in Infiltration ..... 1440

6 *Janet E. Haynes,\* John F. Gartner, Hubert J. Bourque*: Remote Sensing and Sanitary Landfills: A Canadian Experience ..... 1500

7 *David E. J. Creasy*: In-situ Contaminant Attenuation and Remediation Studies of Organic-rich Sediments Using a Portable Field Unit ..... 1520

8 *Robert G. Gerber,\* John R. Rand*: Ground Water Investigations and Modelling for a Coal Ash Disposal Site in Wiscasset, Maine ..... 1540

**PRECAMBRIAN GEOLOGY**  
**Room C, 1520 hours**

*James W. Granath*, Presiding

1 *M. P. Foose,\* D. G. Mose, M. S. Nagel, A. Tunsoy*: The Rb-Sr Ages and Structural and Stratigraphic Relationships of Precambrian Granitic Rocks in the Northwest Adirondacks, N.Y. .... 1520

2 *Thomas M. Maher,\* Robert J. Lepak, Norman K. Grant*: Rb-Sr Ages, Crustal Prehistory, and Stratigraphic Sequence: Leucogneisses and Marbles of the Adirondack Lowlands, New York ..... 1540

3 *Adrienne Labotka,\* R. T. Dodd, T. C. Labotka*: Geology of Iona Island, Hudson Highlands ..... 1600

4 *Richard E. Schofield*: Geology of Komatiites at Dundonald, Ontario ..... 1620

5 *G. J. Fredericksen,\* J. W. Granath*: Grenville-aged Shear Zones at Whiteface Mountain, N.Y. .... 1640

\*Speaker

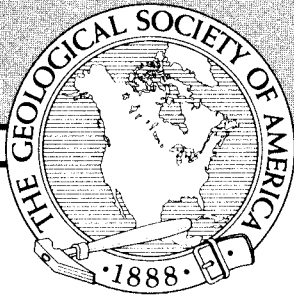
# ABSTRACTS

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with

# PROGRAMS

# 1981



## NORTHEASTERN SECTION

The Geological Society of America  
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with  
Northeastern Section of the  
Paleontological Society  
and  
Eastern Section of the Society of Economic  
Paleontologists and Mineralogists

April 9-11, 1981  
Bangor Civic Center  
Bangor, Maine