up to 9m thick that crops out as en echelon segments along a NW trend with dips steeper than 80°. This dike is in turn cut by another plagioclase-phyric dike 0.9m thick, striking NNE, and dipping 40°W.

A Type 3 dike crops out as 2 en echelon segments on the north and south side of the mouth of Rockport Harbor. The plagioclase phenocrysts increase in abundance and size toward the interior of the dike where they account for 35 percent of the rock volume and attain lengths up to 9.2cm. Anorthite contents of the phenocryst cores decrease from An_{49} at the dike margin to An_{40} near its center.

THE CHAMPLAIN THRUST: A ZONE OF MAJOR STRUCTURAL CONVERGENCE

ROWLEY, David B., Department of Geological State University of New York at Albany, Albany, NY 12222

The amount of horizontal transport along the Champlain Thrust is estimated using geometrical constraints derived from modern Atlantic-type continental shelf sequences. The Champlain Thrust juxtaposes sections of the Early Paleozoic shelf sequence that differ significantly in stratigraphic thickness, stratigraphic interval represented, and facies. West of the thrust, a relatively thin (~775 m), Dresbachian to early Mohawkian shelf sequence unconformably overlies basement. East of the thrust, a markedly thicker (~2,000 m), earliest Cambrian to early Mohawkian section, representing more distal shelf facies, unconformably overlies basement. Comparison of sections representing equivalent time intervals, for example, Dresbachian to Gasconadian reveals a factor of 2.5 or more thickness contrast from west to east side of the thrust. The cross-sectional shape of post-rift facies sediments along modern Atlantic-type continental shelves can be reasonably approximated by a right triangular wedge-shaped prism, thickening oceanward due to differential subsidence across the margin. This geometric approximation allows calculation of horizontal separation of different sections across a margin if either the location of the hinge line or the thickness of two untransported sections are known. Calculations using both types of data yield similar results and require a minimum transport of 50 km. A second approach using an average continental shelf width and rates of subsidence at the shelf edge allows estimation of horizontal separation of time equivalent sections on either side of the thrust. Values range from 80 to more than 210 km are obtained. These data in conjunction with known facies contrasts require significantly greater throw than previous estimates of 16 km would suggest.

STRUCTURAL RELATIONSHIPS ADJACENT TO THE LEADING EDGE OF THE TACONIC ALLOCHTHON: IMPLICATIONS FOR EMPLACEMENT HISTORY

ROWLEY, David B. and BOSWORTH, William, Department of Geological Sciences, State University of New York at Albany, Albany, NY 12222

Analysis of facies relationships and structural histories within recently mapped (1:12,000) areas adjacent to the leading edge of the Taconic Allochthon reveals the following. (1) The Giddings Brook slice consists of a series of imbricate thrust-bounded subslices. (2) The facies and stratigraphy contained within different subslices varies in a fashion consistent with derivation of higher, more easterly subslices from progressively more distal paleogeographic realms of the early Paleozoic continental rise prism. (3) The thrusts bounding different subslices cut across hinges and axial surfaces of the major map-pattern generating folds within the Allochthon. (4) Structural elements, including slaty cleavage, fold hinges and axial surfaces, have different orientations in different subslices. (5) Structural histories vary between subslices and in a general fashion structural complexity and intensity of deformation increase to the east. Structural relationships within and adjacent to the allochthon-autochthon boundary indicate that one and, in some places, two phases of macroscopically important tight to isoclinal, west-verging folds pre-date both the thrusts internal to and bounding the Giddings Brook slice. The slaty cleavage also predates final emplacement of the Allochthon. Overprinting by late upright to steeply west-verging folds with associated crenulation cleavage, slaty cleavage and/or secondary layering developed synchronously or post-date Allochthon emplacement. These observations are compatible with emplacement of the Allochthon during a medial Ordovician continental margin-volcanic arc collision. This structural evolution is considered analogous to that developed during initial stages of subduction accretion and may be used to constrain models of this process.

RELATIONSHIP BETWEEN SHELF AND RISE SEDIMENTATION OF THE EARLY PALEOZOIC CONTINENTAL MARGIN OF WESTERN NEW ENGLAND

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The late pЄ to early Ord. evolution of western New England corresponds to the establishment of an Atlantic-type continental margin. Three main facies associations are recognized in the shelf and rise sequences of this margin. 1) Rift-facies characterized by immature arkosic sandstones and conglomerates with associated mafic volcanics; 2) Rift-drift transition facies characterized by shallow-water feldspathic sandstones on the shelf and by wackes and micaceous shales on the rise, but lacking associated volcanics; 3) Continental shelf/rise facies characterized on the shelf by shallow-water quartzites and carbonates, and on the rise by hemi-pelagic shales with associated turbidite and debris flow-deposited sandstones and carbonates. Large-scale transgressive-regressive events control the facies distribution on the shelf as well as the type of sediment and mode of sedimentation on the rise. During regressive periods (late early Є, early late Є) or when the shelf was relatively narrow (earliest Є) strandline facies were close to the shelf edge, deposition on the rise was characterized by coarse clastics interbedded with hemi-pelagic and turbiditic shales. These turbidite, grain flow and debris flow deposits are associated with submarine canyon-fed fan complexes. During periods of transgression (early Є, medial Є, late Є to early Ord.) when strandline facies were remote from the shelf edge and a wide carbonate platform existed, variegated shales ± contourites, lacking associated coarse clastics, characterized rise deposition. These correlations between shelf and rise sequences allow paleogeographic reconstruction of facies relationships for the entire Atlantic-type continental margin.

NEW ASPECTS ON THE STRATIGRAPHY AND STRUCTURE OF THE SHAWANGUNK MOUNTAINS, ULSTER COUNTY, SOUTHEASTERN NEW YORK

RUBIN, Paul A., Department of Geological Sciences, State University of New York, College at New Paltz, New Paltz, New York 12561

The Shawangunk Conglomerate can be subdivided on the basis of average pebble size, percent matrix, and shale interbeds, allowing the development of detailed stratigraphic columns and the identification of subunits facilitating local correlation and mapping. Marker beds have been defined and used to identify a previously unrecognized eight mile long reverse fault trending N45°E upthrown 300 feet on the northwest. The basins of Awosting Lake and Mud Pond are scoured out along the southeast wall of the fault. Further to the northeast the fault has exposed a small shale inlier along the Sanders Kill.

Marker beds do not support the previously described Clove Valley fenster and faults. The shale in Clove Valley is an inlier which can simply be explained by glacial breaching of the quartz sandstone caprock, exposing the shale below.

Chemical and pH testing of mountain streams and lakes has revealed an important relationship between waters on quartz sandstone (pH 2.9-5.0) which reflect acid precipitation in the area and those having come in contact with shale (pH 6.5-8.0). Intermediate waters (pH 5.1-6.4) are found only immediately downstream of the sandstone-shale contact. As a result, pH has been successfully used as an invaluable structural mapping tool in establishing the presence and boundaries of five previously unknown shale inliers, even where no surface outcrops occur.

Southwestern lateral gradation and thickening of red and green shale and sandstone beds throughout the Shawangunk Mountains sandwiched between massive quartz sandstone beds as mapped in a Trapps Cliff, Stony Kill Falls and North Gully section are believed to represent a Silurian strandline. Apparent onlap is southwest to northeast.

"ASBESTOS" - FRIEND, FOE, OR FRAUD?

RUTSTEIN, Martin S., Department of Geological Sciences, State University of New York, College at New Paltz, New Paltz, New York 12561

Three massive societal efforts involving "asbestos" pollution are critically reviewed: public information, abatement and remediation technologies, and mineral characterization and identification.

(1) The public dissemination of information on asbestos health dangers is often limited. There is inadequate evaluation of: a) alternatives to the linear, non-threshold dose vs. response model; b) relative mortality risks for low level "asbestos" exposures vs. other causes of death; and c) the lack of distinction between varying health effects from asbestiform amphiboles vs. the much more abundant chrysotile. Instead, all levels of exposure to all asbestiform minerals have been judged hazardous.

(2) For situations of supposed building pollution, abatement and remediation technologies were rapidly developed. Initially, most plans called for the complete removal of "asbestos". These attempts for total societal elimination of "asbestos" solely for health safety can be demonstrated to be often unnecessary, if not unrealistic.

(3) Mineralogical methods of "asbestos" characterization and identification have evolved through workable techniques to those that are considered as "Regulatory Overkill Techniques". We lack knowledge of the health effects of "asbestos" exposure concentrations that vary by tens of percent. Therefore, the possible additional quantification from technologically, oversophisticated techniques does not seem to justify the extra effort and expense.

It is suggested that some, if not much, of the "asbestos scare" in this country may be unfounded. If this is so, then the goal of zero risk exposure levels for "asbestos" requires re-examination.

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 Ogunyomi, 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

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 Remobilization 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
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

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 with PROGRAMS 1981

NORTHEASTERN SECTION

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