INTRUSIVE LHERZOLITE AND RELATED ROCKS OF THE LEWIS HILLS, BAY OF ISLANDS OPHIOLITE COMPLEX, WESTERN NEWFOUNDLAND

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The Lewis Hills is the southernmost of the Bay of Islands Complex Klippen. The Klippe consists of two partially exposed layered ophiolite complexes separated by a subvertical, north-northwest trending 3 kilometer wide zone of highly deformed metagabbros and related rocks including lenses of highly deformed serpentinized peridotite as large as 100 meters X 500 meters. The metagabbros and adjacent layered gabbro, dunite and wehrlite are intruded by masses of very weakly deformed peridotite. The masses include numerous small bodies up to 50 meters across and a large dike up to 300 meters wide that lies along the eastern edge of the metamorphic belt across most of the width of the klippe. The central regions of the peridotite bodies consist of homogeneous to weakly layered, poikilitic lherzolite, feldspathic lherzolite and wehrlite. Near the margins of the bodies foliated and lineated coarse-grained wehrlites and clinopyroxenites occur. Pyroxenite net veins and gabbroic pegmatites cutting the surrounding metagabbros and xenoliths of metagabbro and dunite in the peridotite are common. Apophyses of peridotite intruding the surrounding rocks grade into fine-grained pargasite bearing lherzolite or pyroxenite a few meters from the main masses. The Lewis Hills Klippe is considered to be an obducted section of an oceanic fracture zone and adjacent oceanic crust and upper mantle. The intrusive peridotites of the Lewis Hills probably represent the deep levels of serpentinite diapirs or peridotite megadikes observed in oceanic fracture zones.

CATACLASTIC METAMORPHISM IN THE SOUTHEASTERN ADIRONDACK MOUNTAINS, NEW YORK

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Three post-Devonian (?) faults in the Adirondack Mountains of New York were examined in an attempt to understand the structural, chemical, mineralogical, and textural changes associated with normal faults in "granitic" (granulite facies) rocks. Structural data and a series of samples were collected along traverses across northerly-trending faults and from the surrounding areas. With decreasing distance from the fault structural changes that were noted include a rapid increase in joint density (0.8 joints/m. to35-40 joints/m.) and the development of at least two subordinate joint sets with variable orientation in addition to the regional sets. Thin section of 170 samples from all three faults indicates that extensive retrograde metamorphism is restricted to the fault zone itself. Hornblende is replaced by biotite and chlorite, and sericite is common as alteration product of the feldspars Preliminary chemical analysis suggests that H_2O, and possibly K_2O, Na_2O and MgO may have been added to the system. In all three faults, brittle failure and retrograde mineralization have produced a fault breccia. Refaulted fault breccias and the degree of comminution suggest at least two episodes of faulting. At two of the three fualts, a chlorite-muscovite schist has developed along near vertical, N30-40E joint planes. some shear movement may have taken place along these planes, and may represent aftershock events of the main faulting event.

SOURCES OF TIDAL INLET SUSPENDED SEDIMENT, STONE HARBOR, NEW JERSEY

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Coastal lagoons in the vicinity of Stone Harbor, New Jersey (Cape May Co.) have shoaled dramatically in the last hundred years. Fine grained materials are presently accumulating at rates estimated between 0.5 cm/yr and 1.0 cm/yr. Since there is no significant stream sediment input to this salt marsh/coastal lagoon complex, the fine material must enter the area through inlets in suspension on flood tides.

To evaluate the provenance of flood tide suspended sediment, several grams of sample were required for detailed mineralogical analysis. A special device was constructed consisting of a large volume pump and a filtering apparatus with a series of 293 mm diameter filters of decreasing pore size. The device collected between 3 and 4 grams of suspended sediment in 15 minutes, from concentrations of less than 50 mg/ℓ to 200 mg/ℓ, in August, 1977. The mineralogy of segregated size fractions of the inlet suspended sediment was then compared to that of such likely sources as an offshore (recent?) mud deposit, offshore near-surface and near-bottom suspended matter, and a Pleistocene (carbon-14 dated at 20,000-24,000 yrs B.P.) mudball overwash deposit on a nearby barrier island.

Preliminary indications are that the inlet suspended sediment represents a mixture of the eroding Pleistocene mud and more recent material. This report evaluates seasonal changes in the suspended sediment sources by comparing the data collected in August, 1977 with that obtained in December, 1977.

ELECTRICAL SOUNDING FOR ESTIMATING GLACIAL AQUIFER PROPERTIES IN SOUTHERN RHODE ISLAND

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Locating sites for high yield wells in glacial aquifers in southern Rhode Island normally requires extensive test drilling followed by pump testing. Glacial deposits in this area are heterogeneous and coarse zones are of limited lateral and vertical extent. Laboratory and field measurements indicate correlations between hydraulic conductivity and electrical resistivity or formation factor and transmissivity are possible. Since electrical soundings sample large aquifer volumes--volumes comparable to those controlling well yields--electrical soundings may be useful for estimating aquifer hydraulic properties. Such estimates may be used to reduce the number of test borings, or to extrapolate aquifer properties for modeling studies.
Schlumberger soundings have been made in two aquifers in southern Rhode Island. Aquifer electrical resistivities and formation factors were correlated with aquifer hydraulic conductivities. As a first approximation hydraulic conductivity in gallons per day per square foot is equal to aquifer resistivity in ohm-feet. Aquifer materials are clay free and ground water resistivity is in the range of 200 to 400 ohm-feet.

BROWNS MOUNTAIN GROUP, ANTIGONISH HIGHLANDS, NOVA SCOTIA - PRELIMINARY REASSESSMENT

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The generally unfossiliferous, pre-Silurian rocks of the Browns Mountain Group have been considered to be Cambro-Ordovician in age. Preliminary results from southwest of Cape George reveal two newly named sequences, the Late Precambrian Georgeville Group and the (?)Ordovician Nori Group. The Georgeville Group consists of marbles overlain by volcanic rocks, black mudstones and siltstones, and conglomerates in that order. Deformation of these rocks by NW-SE recumbent folds and thrusts followed by E-W upright folds was accompanied by greenschist facies regional metamorphism. This was followed by post-tectonic intrusion of diorite and alaskite plutons, whose relative ages are unknown. The alaskite yields a Rb-Sr isochron age of 553 m.y. (Cormier, pers. comm.). Thus, the Georgeville Group and the pre-alaskite orogenesis are interpreted to be Late Precambrian in age. The base of the Georgeville Group was not observed; however, granite pebbles in the conglomerate, shelf carbonates, and a high initial $^{87}Sr/^{86}Sr$ ratio for the alaskite imply a granitoid basement. The Nori Group consists of siltstone, shale, limestone, ironstone and tuff, and contain fossils of possible Lower Ordovician age. Deformation of the Nori Group by NNE upright folds is similar to that observed in the Silurian Arisaig Group. It is concluded that a Taconian Orogeny in the Antigonish Highlands is unconfirmed because previous evidence may be reinterpreted in terms of an Hadrynian Avalonian Orogeny. These results suggest that the name Browns Mountain Group be abandoned, and pending remapping these rocks should be referred to as pre-Silurian. The lack of fossils in these rocks suggests that they may be largely Late Precambrian in age.

SEDIMENTS OVERLYING THE BAY OF ISLANDS OPHIOLITE COMPLEX, NEWFOUNDLAND

KIDD, W.S.F. and CASEY, J.F., Department of Geological Sciences, State University of New York at Albany, Albany, NY 12222

Sedimentary rocks conformably overlie the pillow lava unit of the Bay of Islands ophiolite complex in the North Arm Mountain massif. They chiefly consist of maroon and red shale and mudstone containing minor green shale laminae, with subordinate units of grey homogenous mudstone, and brown-black pyritiferous shale within green shale. Beds up to 2 m. thick of laminated, fine-grained, well-sorted, grey calcareous quartzite are found near the base of the sequence. A majority of the shales and mudstones have, to at least some extent, undergone a melange-like deformation, but we emphasize that they are nowhere penetratively cleaved. The sediments are always in sharp contact, and not interdigitated with underlying mafic breccia. This breccia may be a few meters thick above pillow lava in the north but is several hundred meters thick in the south. Where the sediments are most intact, the breccia is overlain by about 20 m. of maroon shale succeded by at least 40 m. of homogenous grey mudstone. Elsewhere, greater thicknesses of red and local green and black shales occur in an undetermined relationship to this basal sequence. The quartzites in the shales can only have been derived from a cratonic area and require that the Bay of Islands ophiolite complex be formed as oceanic lithosphere near the early Ordovician continental margin. Purple pebbly sandstones that occur in a small syncline near the coast overlie the shaly sediments. We suggest that they are equivalents of the Devonian Clam Bank Formation. If correct, this implies that much of the large scale folding of the Bay of Islands Complex is of Devonian age.

RELATIONSHIP BETWEEN SHAPE OF APERTURE, SHAPE OF FOOT AND SUBSTRATE IN THE CLASS GASTROPODA

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We are accustomed to describing the shape of the aperture of Gastropoda as it appears from a vantage point perpendicular to the axis of coiling, the view normally utilized in illustrations of gastropods. However, this view of the aperture has no functional significance for the organism. For the purpose of this study, the shape of the aperture is defined as it is seen relative to the substrate as the shell is normally positioned by the organism during locomotion. This definition also takes into account the functional significance of the aperture in clamping against the substrate for protection. For most species this definition of aperture is based on the position of the mantle exclusive of the siphonal or anal extensions.

PALEONTOLOGY II

Gardner Room, 0800 hours

George D. Brown, Jr., and Robert Linsley, Presiding

1 *Peter E. Isaacson,* Stephen F. Barrett:* Faunal Assemblages in a Progradational Clastic Sequence during Transgression: The Oriskany Sandstone (Early Devonian) of the Central Appalachians 0800
2 *Steven M. Warshauer,* Richard Smosna:* Paleoecologic Controls of the Ostracode Communities in the Tonoloway Limestone (Silurian: Pridoli) of the Central Appalachians 0820
3 *David E. Schindel:* "Non-Community" Paleoecology and Faunal "Non-Succession" in the Cyclic Pennsylvanian of North-Central Texas 0840
4 *Betsy L. Coward,* S. W. Mitchell:* Paleoecological Implications of *in Situ* Dissolution Rates of Veneroid Bivalves 0900
5 *Steven W. Mitchell,* Jennifer H. Druce, Elizabeth D. Mullin, Irene C. Sandborg:* Paleoclimatological Significance of Mollusc Adaptation to Nuclear Power Station Thermal Effluents 0920
6 *Philip W. Signor III:* The Implications of the Observed Species Diversity-Sediment Abundance Correlation for Three Phanerozoic Diversity Models 0940

Coffee Break 1000

7 *Rex E. Crick:* A Probabilistic and Multivariate Method of Paleobiogeographic Analysis: An Alternative Approach 1020
8 *Thomas M. Cronin:* Ostracode and Foraminifer Species Diversity in a Pleistocene Inland Sea 1040
9 *Emily B. Giffin:* A Thelodont Agnathid Fauna from the Silurian of Pennsylvania 1100
10 *Ralph E. Chapman,* J. John Sepkoski, Jr., William Wall, Peter M. Galton:* The Taxonomic Structure of the Pachycephalosaurian Dinosaur Genus *Stegoceras* as Illuminated by Principal Components 1120

REGIONAL STRATIGRAPHY

Hampton Room, 0800 hours

Judith Rehmer and Barry Cameron, Presiding

1 *Thomas O. Wright,* Ellen K. Wright, George C. Stephens:* The Autochthonous Martinsburg Formation (Ordovician) of Eastern Pennsylvania—New Evidence for a Revised Stratigraphy 0800
2 *Ina B. Alterman:* A Middle Ordovician Unconformity in the Piedmont of the Central Appalachians 0820
3 *E. S. Belt,* W. S. McKerrow, L.R.M. Cocks:* Ordovician and Silurian Gravity Flow Deposits in Newfoundland 0840
4 *W.S.F. Kidd,* J. F. Casey:* Sediments Overlying the Bay of Islands Ophiolite Complex, Newfoundland 0900
5 *Charles D. Senz,* Allan Ludman:* The Cookson Formation (Cambro-Ordovician) in Southeastern Maine: A Sedimentary Record of Early Paleozoic Tectonism .. 0920
6 *H.H.J. Geldsetzer:* The Lower Windsor of Cape Breton Island, Nova Scotia, Canada: An Early Carboniferous Evaporite Basin of a Zechstein-Type? 0940

Coffee Break 1000

7 *Ronald L. Martino:* Sedimentology and Paleoenvironments of the Late Cretaceous (Maestrictian) Monmouth Group in the Northern and Central New Jersey Coastal Plain 1020
8 *Peter W. Goodwin,* Edwin J. Anderson:* The Middle Ordovician of Pennsylvania: A Test of the Hypothesis that all Deposition Occurs as Punctuated Aggradational Cycles 1040
9 *Barry Cameron:* Punctuated Aggradational Cycles: Medial Ordovician Black River and Trenton Groups of New York and Ontario 1100
10 *E. J. Anderson,* Peter W. Goodwin:* Punctuated Aggradational Cycles: The Helderberg Group Lower Devonian of New York 1120
11 *China O. Ayer:* Depositional Environment of the Late Ordovician Hillier Limestone (Trenton Group) of New York 1140

Student identification will be required for those registering as students.

A no-smoking policy has been established by the Program Committee and will be followed in all meeting rooms for technical sessions.

*Speaker

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abstracts with programs

Northeastern Section of The Geological Society of America 13th Annual Meeting

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