INTRODUCTORY INFORMATION AND RELATED ROCKS OF THE LEWIS HILLS, BAY OF ISLANDS ORTHOLITHIC COMPLEX, WESTERN NEWFOUNDLAND

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The Lewis Hills are the southernmost of the Bay of Islands Complex Klippe, which is one of two or three large ortholite complexes separated by a subvertical, north-northwest trending 3 kilometer wide zone of highly deformed metabasalts and related rocks including granodiorite, amphibolite, sappheneite, and gabbro. The metabasalts and adjacent layered gabbro, dunite, and clinopyroxenite are intruded by masses of 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 contact between the metabasalts and peridotite is characterized by weakly layered, poikilitic hornfels, faujasite hornfels and clinopyroxenite. Near the margins of the bodies followed by layered gneiss, migmatitic gneiss, pyroxenite, and xenoliths of peridotite and gabbroic pegmatites cutting the surrounding metabasalts and xenoliths of metabasalts and dunite in the peridotite are common. Amphiboles of peridotite intruding the surrounding rocks grade into fine-grained paragneiss bearing hornfels 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 mélanges observed in oceanic fracture zones.

CATAclySMIC METAMORPHISM IN THE SOUTHERN ADIRONDACK MOUNTAINS, NEW YORK

M. S. Sibbald, E, Department of Geological Sciences and Environmental Studies, State University of New York, Binghamton (1977) 197

Three fault blocks in the Adirondack Mountains of New York were examined in an attempt to understand the structure of the central Adirondacks and the nature of the rocks associated with normal faults in 'granitic' (granulitic facies) rocks. Structural data and a series of samples were collected along traverses from northern-trending faults and from the surrounding areas. With decreasing distance from the fault structural changes that were noted include a rapid increase in the density of faults, 90% strikeslip faults with the development of at least two subparallel joint sets with variable orientation in addition to the regional sets. Thin sections of all the faulted rocks in the area that exhibit retrograde metamorphism are restricted to the fault zone itself. Hornblende is replaced by biotite and chlorite, and plagioclase is a precursor of an alteration product of the feldspars.

Preliminary chemical analysis suggests that H₂O, and possibly K₂O, Na₂O and MgO may have been added to the system. In all three faulted rocks, the brittle fracture and retrograde mineralization have produced a fault breccia. Faulted fault breccias and the degree of comminution suggest at least two episodes of faulting. At two of the three faults, a chlorite-epidote-chloritized schist developed along near vertical, N30°E joint planes, some shear movement may have taken place along these planes, and may represent aftershock events of the main fault.

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

KELLEY, Joseph, CARSON, Bobb, and PARKS, James A., Department of Geological Sciences, Lehigh University, Bethlehem, Pennsylvania (1980) 1980

Coastal inlets in the vicinity of Stone Harbor, New Jersey (Cape May Co.) have been studied. The inlet has been deteriorating dramatically in the last hundred years. Fine-grained materials are presently accumulating at rates estimated between 0.5 cm/year and 1.0 cm/year. 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 chemical and mineralogical analysis. A special device was constructed consisting of a large volume pump and a filtering apparatus with a series of 233 mm diameter filters of decreasing pore size. The device collected between 4 grams of suspended sediment in 15 minutes, from concentrations of less than 50 mg/ml to 200 mg/ml, in August 1977. The mineralogy of segregated size fractions 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 (14,000 to 70,000 yr b.p.) backbarrier sand deposit on a nearby island.

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

ELECTRICAL Sounding for ESTIMATING GLACIAL AUERPER STRATUMS IN SOUKENDRIVE 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 variograms were developed to permit computation of variogram parameters within a low comonmissivity-volumes comparable to those controlling well yields—electrical imaging may be useful for estimating aquifer hydraulic properties. Scalar variograms may be produced for depth to glacial drift, or for contained water content horizons, or to extrapolate aquifer properties for modeling studies. Schlumberger soundings have been made in two aquifers in southern Rhode Island. Aquifer properties in coarse gravelly sandstones were correlated with aquifer hydraulic conductivities. As a first approximation hydraulic conductivities in gallons per day per square foot are equal to aquifer transmissivities in gallons per day. The rock units are clay free and ground water resistivity is in the range of 200 to 400 cem-fet.

BROWNS MOUNTAIN GROUP, ANTIGONISH HIGHLANDS, NOVA SCOTIA—PRELIMINARY MEASUREMENTS

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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 southeast of St. George reveal two newly recognized sequences, the Late Precambrian Geosilurian Group and the (?)-Ordovician Nori Group. The Geosilurian Group consists of marbles overlying euhedral rock and interbeds of quartzose pelites with quartzites in conglomerates in that order. Deformation of these rocks by NW-SE recumbent folds and thrusts followed by NW-SE upright folds was accompanied by greenstone facies regional metamorphism. This was followed by a retrograde intrusional event and minor alpine phases, whose relative ages are unknown. The slakellite yields a Rb-Sr isochron age of 555 m.y. (Cornier, pers. comm.). Thus, the Geosilurian Group and the Nori Group are interpreted to be older than Silurian in age. The base of the Geosilurian Group was not observed, however, granite gneiss in the conglomerate, shale, carbonates, and a high grade of the granite is interpreted to have a Silurian age. The Nori Group consists of siltstone, shale, limestone, ironstone and tuff, and contains fossils of possible Lower Ordovician age. The Nori Group is internally upward-folds similar to that observed in the Silurian Arisaig Group. It is concluded that a Yaconian Orogeny in the Antigonish Highlands is confirmed because previously evidence had been interpreted in terms of an Antillean Avalonian Orogeny. These results suggest that the name Browns Mountain Group should be abandoned, and pending remapping these rocks should be referred to as the Yaconian. The lack of fossils in these rocks suggests that they may be largely Late Precambrian in age.

SEDIMENTOLOGY OF THE BAY OF ISLANDS ORTHOLITHIC COMPLEX, NOORFOAKLAND


Sedimentary rocks of the Bay of Islands ortholite complex in the North Arm Mountain massif. The rocks include: (1) Devonian maroon and red shale and mudstone containing minor green shale laminae, with subordinate units of grey homogeneous mudstone, and (2) Upper Devonian (Syracuse) grey pyritic mudstone and thin laminated, fine-grained, well-sorted, grey calcareous quartzite that are found near the base of the sequence. A majority of the shale and siltstone have undergone some degree of diagenetic and metamorphic deformation, but we emphasize that they are nowhere penetratively cleaved. The sediments are always in sharp contact, and not interbedded with underlying sediments, although some ribs of slate within thick silt above pillow lavas 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 succeeded by at least 40 m. of homogeneous 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 crustal area and require that the Bay of Islands ortholite complex be formed as a oceanic lithosphere near the early Ordovician continental margin. Purple powdery sediments that occur in a small syncline near the coast overlie the shaly sediments. We suggest that they are equivalents of the Devonian Clay Bank Formation.

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

KELLY, William, M. McNAIR, Cathy G., and LINSLEY, Robert M., Department of Geology, Colgate University, Hamilton, New York 13346

We are accustomed to describing the shape of gastropods as if a gastropod were a vector 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 way that the aperture in clamping against the substrate for protection. For most species this definition of aperture is based on the position of the mantle 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: Paleoecological 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 Pennsylvania 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. Sandberg: Paleoecological 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. Bell, 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 Zeichstein-Type? .................................. 0940

Coffee Break .................................. 1000

7 Ronald L. Martino: Sedimentology and Paleoenvironments of the Late Cretaceous (Maestrichtian) 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


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
abstracts
with
programs

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

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