ic, lithofacies, and isopachous maps. Informal units within the Fort Payne, designated by drillers as the "Beaver sand," "Corder," and "Stray," are estimated to have produced six million barrels of oil (Lewis and Potter, 1978). Regional subsurface maps may be useful for continuing petroleum exploration in the area.

THE PAC (PUNCTUATED AGGRADATIONAL CYCLES) APPROACH TO PALEOGEOGRAPHIC RECONSTRUCTION

ANDERSON, E.J., and GOODWIN, Peter W., Department of Geology, Temple University, Philadelphia, PA 19122

According to the hypothesis of punctuated aggradational cycles, actual paleogeographic patterns develop episodically and are recorded in thin basinwide time-stratigraphic rock units (PACs). New patterns are established and evolve on basinwide surfaces produced by geologically instantaneous base-level rises, punctuation events. Following a punctuation event deposition occurs within a spectrum of environments and continues up to the limit of available space or until the occurrence of the next punctuation event. The stratigraphic result is a PAC, a 1-10 meters thick shallowing-upward package of sedimentary rock bounded by sharp non-depositional surfaces of relative deepening. Within a PAC, paleogeographic patterns evolve gradually during sedimentary aggradation. However, paleogeography is abruptly altered, often radically, by punctuation events occurring between PACs.

In the Lower Devonian Manlius Formation of eastern N.Y. within a single PAC, traceable over a distance of 100 kilometers, a lateral pattern of algal laminite islands, oolite-pelloid shoals, lagoonal lime "turbidites", and stromatoporoid biostromes developed and in part coexisted following a punctuation event. This paleogeographic pattern developed upon a widespread surface of tidal flat laminites and was abruptly succeeded by a different spectrum of environments following the next punctuation event. Thus within 10 meters of vertical section there are three distinct paleogeographic patterns, each a complex environmental mosaic. Therefore, when viewed at this scale paleogeography developed continuously within PACs but changed abruptly at PAC boundaries. Thus, assuming the hypothesis of punctuated aggradational cycles, PACs become the fundamental units of paleogeographic reconstruction.

CRUSTAL GEOMETRY OF THE APPALACHIAN OROGEN FROM SEISMIC REFLECTION STUDIES

ANDO, Clifford J., COOK, Frederick A., OLIVER, Jack E., BROWN, Larry D., and KAUFMAN, Sidney, Department of Geological Sciences Cornell University, Ithaca, N.Y. 14853

Regional seismic reflection studies in the New England and southern Appalachians by COCORP, and in Québec by the Ministère des Richesses Naturelles show considerable horizontal transport of off-shelf sediments over coeval, relatively undeformed lower Paleozoic miogeoclinal rocks. In the southern Appalachians, long distance (200 km) transport of thin crystalline thrust sheets can be shown as well.

The COCORP data from the Green Mountains of Vermont and a USGS seismic study in the Grandfather Mountain window of North Carolina and Tennessee appear to indicate that Precambrian Grenville basement in those areas is allochthonous and underlain either by shelf sediments or detachment horizons. In Québec, allochthonous basinal facies clastics are still preserved over a major anticlinorial structure, and extensive exposures of Precambrian basement are not found in an internal position in this part of the Appalachian chain.

The Bouguer gravity gradient in the central and southern Appalachians and the gravity high in New England and Québec are believed to mark a fundamental crustal density change at depth along the mountain chain, perhaps representing a preserved transition from continent to ocean. We infer, in part from the distribution of surface rock units with respect to the locus of the gravity gradient, that allochthonous off-shelf rocks may have been transported farther in the southern than in the northern Appalachians. Perhaps this is true for allochthonous Grenville basement as well, although the question cannot be unequivocally answered at this time.

The seismic data suggest that the highly deformed part of the Appalachian chain is a relatively thin, composite allochthon confined to relatively high structural levels, and that the deeper part of the crust may constitute a largely undeformed ancient continental margin.

BANDED MAGNETITE-QUARTZ IRON FORMATION IN THE AMMONOOSUC VOLCANICS, SUGAR HILL, NEW HAMPSHIRE

ANNIS, M. P., Department of Geology, University of Cincinnati, Cincinnati, Ohio 45221

The Franconia Iron Mine was founded on a banded magnetite-quartz iron formation. The iron formation and associated rocks form a marker horizon in the Ammonoosuc formation.

Meta-volcanic amphibolite layers with relic vesicular structures outcrop east of the mine. Felsic muscovite-quartz schist with minor disseminated pyrite forms the major lithology west of the workings. It contains thin lenses of coticule rock (orange garnet) locally. Magnetite- and epidote-rich rocks form an ore zone suite located at the contact between the amphibolites and the felsic schist. The banded magnetite-quartz iron formation consists of alternating lenses of magnetite and quartz, 0.5 to 1 cm thick. North of the banded rock, the ore zone suite is represented by magnetite-biotite quartz schist ± hornblende. The schist contains a few thin magnetite bands. In addition to the magnetite-rich rocks, three epidosite layers outcrop near the banded magnetite-quartz iron formation and in the adjacent felsic schist.

These lithologies are deformed into a gently eastward-plunging open antiform. The dominant schistosity is slightly oblique to lithologic layering, except in the hinge zones of mesoscopic folds where it displaces layering to form small horst structures. The metamorphic mineral assemblages belong to the amphibolite facies of regional metamorphism.

Magnetite has been the only mineral of economic interest in the area. Traces of iron sulfides and, very rarely, chalcopyrite and arsenopyrite occur in the magnetite-rich rocks. The chief interest in this type of deposit today lies in the potential discovery of massive sulfide deposits associated with the banded magnetite-quartz iron formation.

POULTNEY FORMATION-EARLY ORDOVICIAN CONTOURITE DEPOSIT ON THE TACONIC CONTINENTAL RISE

APARISI, M., and KIDD, W.S.F., Dept. of Geological Sciences, SUNY at Albany, Albany, NY, 12222

Early Ordovician sections throughout the length (200 km) of the Taconic Allochthon all possess a unit (Poultney Fm.) with distinctive sedimentary characteristics, which we interpret to have been produced almost entirely by transport in and deposition from deep contour-following bottom currents. The Poultney is dominated by green and lesser grey and black mudrocks, now slates, with 10-30% very pure, quartz silts and fine arenites, now quartzites. The quartz-rich layers are extremely well sorted, grain size ranging from 3-6 Φ. Quartz dominates but minor quantities of feldspar (up to 15%), clay and carbonate "matrix" (up to 5%) and heavy minerals including zircon and opaques (up to 10%) are also found. Present thickness of the unit is about 200 m but 600-700 m existed before compaction and tectonic deformation. Where preserved from abundant burrowing, grey and black mud layers and most quartzites form thin, very continuous beds (less than 1 mm to a few cm thick) with sharp top and bottom contacts. Most of the silt and arenite beds show parallel lamination; the rest have small scale cross-lamination and current ripples. Paleocurrent directions consistently indicate northerly flowing currents. Fine quartz arenite beds up to 50 cm thick, possibly turbidite-deposited, are rare. Post depositional disturbance in the form of sedimentary dikes and a few slump-disrupted layers is seen locally. The lateral continuity and extent, and the thickness of the whole unit and its sedimentary features we interpret as due to intensive reworking of arenaceous, silty and muddy material fed from the North American Platform adjacent to and south of the present area of the Taconics. The material may have been part of a positive topographic feature like the present Blake-Bahama Outer Ridge since platform-derived carbonate detritus, although common in beds below this unit, is rare within the Poultney and hence may have been excluded by it from most of the area of deposition.

SURFICIAL GEOLOGIC CONTROLS ON THE SENSITIVITY OF ADIRONDACK LAKES TO ACID PRECIPITATION

APRIL, Richard H., Department of Geology, Colgate University, Hamilton, NY 13346; and NEWTON, Robert M., Department of Geology, Smith College, Northampton, MA 01063

Acid precipitation has been linked to a decrease in the pH of waters of many lakes in Scandanavia and eastern North America and this phenomenon may be increasing in scope. On a regional scale, bedrock geology has been used by some investigators to approximate the sensitivity of an area to lake acidification. We studied two lake watersheds in the western Adirondacks of New York that demonstrate the strong influence of surficial geology on the acidification of fresh water lakes. The two lakes are of similar size, are 20 km apart, and are underlain by granitic bedrock. Yet, the lakes represent end members on the acidification scale with Woods Lake being acidic (pH-4.4-5.1) and Panther Lake being neutral (pH of approximately 7.0 for most of the year). The difference in their response to acid inputs is attributed to the characteristics of the surficial material in the two lake-watersheds.

Woods Lake watershed is covered by a thin, sandy glacial till (<3 m) and contains abundant bedrock outcrops. The till, in turn, is mantled by a relatively thick (50 cm), but discontinuous layer of aeolian silt that significantly lowers the permeability of the B soil horizon. Panther Lake watershed is covered by a thick (>30 m), permeable glacial till that contains little aeolian silt.

Acid precipitation in Woods Lake watershed has little contact with the glacial till. Some of the water is "short-circuited" along the contact between the upper soil horizons and the impermeable B horizon. The water that does infiltrate the till flows along relatively short flow paths through the shallow till and into the lake. In Panther Lake watershed, high infiltration rates, longer flow paths, and increased residence time result in more acid neutralization.

PROGRAM OF TECHNICAL SESSIONS

THURSDAY, MARCH 25, 1982

SEPM EASTERN SECTION SYMPOSIUM: GEOLOGY OF THE TRIASSIC-JURASSIC BASINS IN EASTERN NORTH AMERICA

Palladian Room, 8:00 a.m.

Roy C. Lindholm, Presiding

Introductory remarks 8:00

1 *Andy R. Bobyarchick:* Influence of the Formation of Triassic Basins on the Regional Thermal and Structural History of Crystalline Rocks in the Southern Appalachians 8:05

2 *Donald U. Wise,* Peter Robinson:* Tectonics of the Mesozoic Connecticut Valley Graben 8:20

Discussion 8:35

3 *Paul C. Ragland:* Mesozoic Diabase Dikes in Eastern North America—A Review 8:45

4 *John H. Puffer,* Donlan O. Hurtubise:* Early Jurassic Basalt of Fundy Basin, Nova Scotia 9:00

5 *Paul E. Olsen,* Donald Baird:* Early Jurassic Vertebrate Assemblages from the McCoy Brook Formation of the Fundy Group (Newark Supergroup, Nova Scotia, Ca) . 9:15

Discussion 9:30

Break 9:45

6 *Robert E. Weems:* Footprints in the Newark Supergroup as a Stratigraphic Tool 10:00

Discussion 10:15

7 *Tucker F. Hentz:* Sedimentology and Structure of Lower Jurassic Lake Beds in the Culpeper Basin at Thoroughfare Gap, Virginia 10:20

8 *R. C. Lindholm,* P. J. Gore, J. K. Crowley:* A Lacustrine Sequence in the Upper Triassic Bull Run Formation (Culpeper Basin) in Northern Virginia 10:35

Discussion 10:50

9 *Christine E. Turner-Peterson:* Tectonism and Sedimentation in the Triassic-Jurassic Newark Basin, Pennsylvania and New Jersey 11:00

10 *Joseph P. Smoot,* Samuel B. Katz:* Comparison of Modern Playa Mudflat Fabrics to Cycles in the Triassic Lockatong Formation of New Jersey 11:15

Discussion 11:30

11 *P. A. Thayer,* E. I. Robbins, D. G. Ziegler:* Hydrocarbon Potential of the Dan River–Danville Triassic Basin, North Carolina and Virginia 11:40

Discussion 11:55

PALEONTOLOGY I: TAXONOMY, FUNCTIONAL MORPHOLOGY, PALEOECOLOGY

The Forum, 8:00 a.m.

Norman O. Frederiksen and Johnny A. Waters, Presiding

1 *Vincent B. Dick,* Carleton E. Brett:* Taphonomy and Depositional Environment of Middle Devonian (Hamilton Group) Pyritic Fossil Horizons in Western New York 8:00

2 *Annabelle C. Powell:* Brachiopod Associations during the Lower Carboniferous Transgression of the Shallow Carbonate Platform of South Wales 8:20

3 *Wilhelm Stürmer, Ellis L. Yochelson*:* Soft Parts of Styliolinids (Devonian) 8:40

4 *Honfu Yin:* Bivalves near the Permo-Triassic Boundary in South China 9:00

5 *Robert W. Starcher:* Growth Parameters in Vine-Like Encrusting Bryozoans: A Deductive Analysis of Branch Extension and Bifurcation 9:20

6 *Raymond A. Scheinfeld:* Calcium Binding in Fossil Venerid Mollusc Shells 9:40

7 *Jorge N. Cortes, Michael J. Risk*:* Effect of Siltation on a Modern Coral Reef: Parque Nacional Cahuita, Costa Rica 10:00

8 *Katherine Bergman,* Michael J. Risk:* Sediment Production and Reef Framework Destruction by a Boring Sponge: Great Barrier Reef, Australia 10:20

9 *Richard H. Bailey:* Growth Rate and Corallum Morphology of the Pliocene Ahermatypic Coral *Septastrea crassa* and Implications Concerning Rates of Sedimentation 10:40

10 *George C. McIntosh:* Feeding Strategies in Lower Paleozoic Cladid Inadunate Crinoids 11:00

11 *Johnny A. Waters,* Alan Stanley Horowitz:* Some Notes on Hyrospires in Pentremites 11:20

12 *Shirley S. Fonda:* Late Pleistocene Vertebrates from a Filled Fissure-Cave in Central Pennsylvania 11:40

STRATIGRAPHY: PALEOZOIC PALEOGEOGRAPHY, TECTONICS, AND SEDIMENTATION

Tudor Room, 8:00 a.m.

William C. MacQuown and Richard J. Diecchio, Presiding

1 *Kenneth O. Hasson,* C. Stephen Haase:* Stratigraphy of the Conasauga Group (Middle and Upper Cambrian) in the Valley and Ridge Province of East Tennessee ... 8:00

2 *M. Aparisi,* W.S.F. Kidd:* Poultney Formation–Early Ordovician Contourite Deposit on the Taconic Continental Rise 8:20

*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
Northeastern and Southeastern Sections
of the Paleontological Society
and
Eastern Section of the
Society of Economic Paleontologists and Mineralogists

March 25-27, 1982
Shoreham Hotel
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