VOLUME 34, NO. 2 • November 1999

NEW YORK GLACIOGRAM

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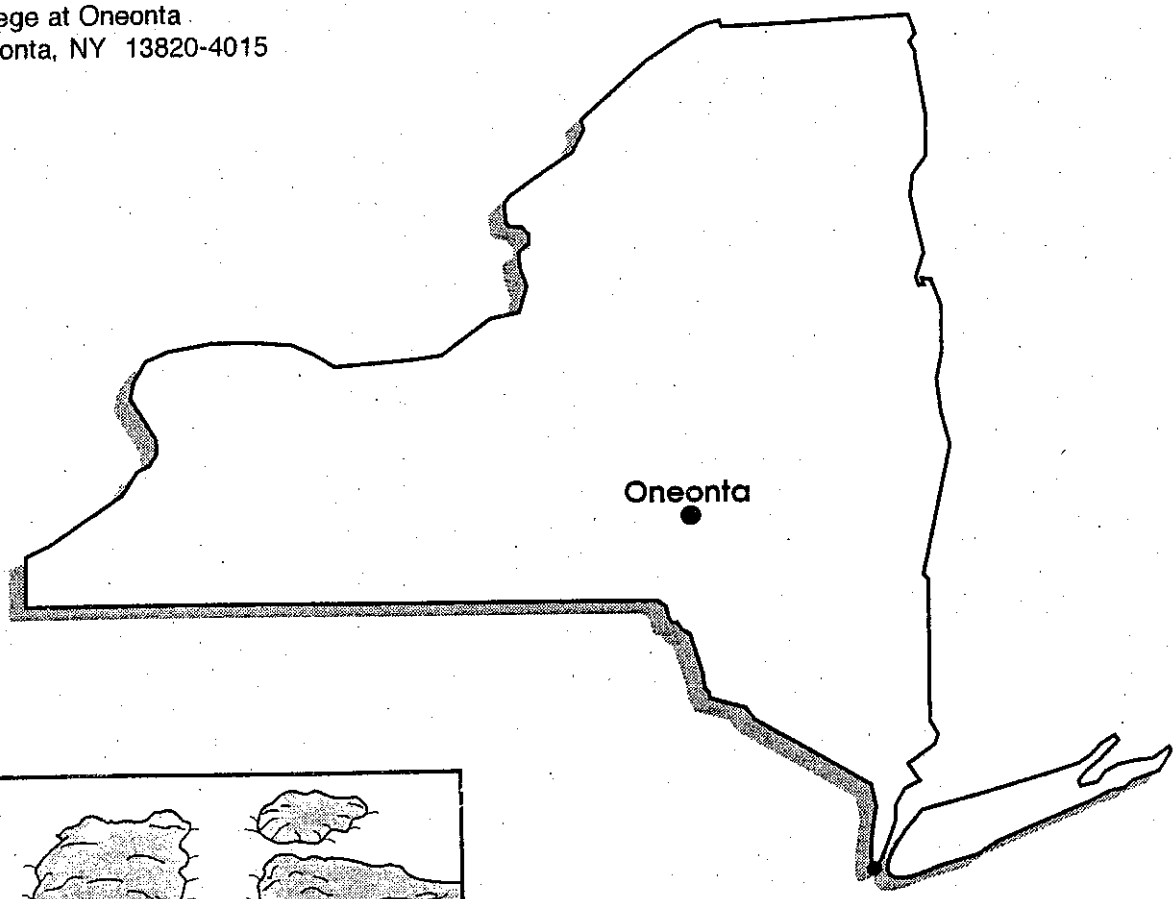

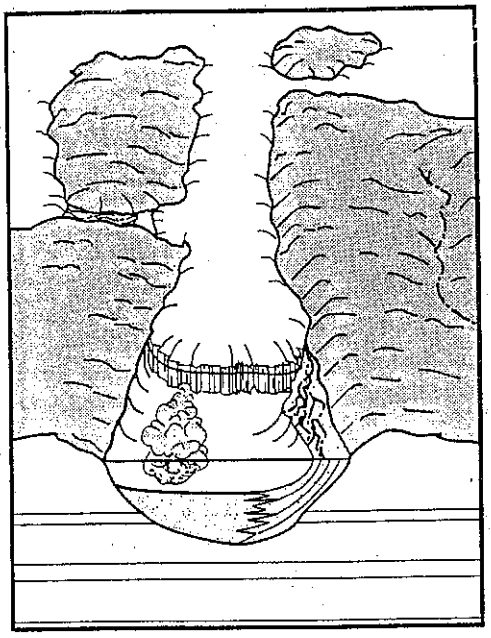

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EDITORIAL POLICY

The **GLACIOGRAM** is intended to be a collection of informal notes concentrating on Quaternary work that relates to New York State either directly or indirectly. The **GLACIOGRAM** is not a formal publication and is not circulated to libraries, nor to individuals not engaged or interested in Quaternary research. The information included is often of a preliminary and tentative nature, and as such, should not be quoted without direct communication with the appropriate authors. It is suggested that reference to information in the **GLACIOGRAM** be identified merely as informal communication.

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INVITATION FROM THE EDITOR

As you may know, the **Glaciogram** contains volunteered notes and project summaries. As the title implies, past issues have contained entries weighted toward Glacial Geology. Perhaps it's time to expand the coverage to also include topics that may be closely related to glacial geology, such as limnology, palynology, soil science, ground water geology, environmental geology, etc., but to date have not yet been included. Should your area of interest fall within this broader realm, please consider having your work included in the spring edition by forwarding a brief (300-500 words or less) summary at your convenience. Easily duplicated, simple, line diagrams and map figures (sorry, no photos) may also be submitted. Please pass this invitation on to friends and colleagues who may wish to share their work or be placed on the mailing list.

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I am pleased to announce that I have joined the SUNY Cortland Department of Geology as the new geomorphologist, replacing Jim Bugh who has now retired. I completed my doctorate at the University at Buffalo, working with Parker Calkin, and most recently taught at SUNY College at Buffalo as a visiting assistant professor.

This past summer Parker Calkin (University at Buffalo emeritus, now at INSTAAR) and I returned to southern Alaska to continue our work on Holocene climate change. This was the first field season on our new NSF grant (together with Greg Wiles, College of Wooster, OH) to develop tree-ring and glacier fluctuation records of late Holocene climate change from the Prince William Sound area. In three weeks of unusually dry weather we worked at Sheridan and Sherman glaciers near Cordova, and at Tebenkov Glacier near Whittier. Jason Graves (SUNY Cortland undergraduate) accompanied us and is now working hard on developing a tree-ring dated history of Sherman Glacier.

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Duane Braun, 400 East Second Street, Bloomsburg University, Bloomsburg, PA 17815-1301; dbraun@husky.bloomu.edu

Glacial deposit mapping at 7.5' scale continues in NE PA just south of the NYS line. The northern Pocono plateau has just been completed. The till is so bouldery that exposures are few because they rapidly become boulder mantled and stabilized. Nearly all hilltops are bare bedrock while adjacent valleys have thick till fill. The current mapping verified that all lakes in the Pocono region are drift dammed on one or two sides. Drift masses often exceed 150 ft. thickness. The valley systems are mostly oriented in a N to S direction and contain remnants of extensive esker systems but do not contain outwash terrace systems like those observed in similar topographic settings in New England.

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The New York State Geological Survey is currently working on an exciting new idea for developing a repository for digital images of New York State Quaternary landforms and deposits. Our plan is for captioned slides, and other images, to be referenced, scanned, catalogued, and cross referenced by subject, research/study project, photographer, quadrangle, and location of landforms/exposures/outcrops. Images may document specific Pleistocene - Holocene landforms, processes and/or materials that are (were) present in New York State, such as glacial, glaciolacustrine, and glaciofluvial, periglacial, fluvial, etc. Images of subjects from outside New York State may be included provided they relate directly to the Quaternary geology of New York State. We expect to have this repository available through our website for all interested persons.

I am interested in getting your reaction and input to this project, and remain open to suggestions regarding the organization of the repository. Please forward to me with a general estimate of the number and types of images that you would like to preserve in this repository. Please e-mail me: dcadwell@mail.nysed.gov

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Oneida Lake Project

This was our first field season working along the eastern shoreline of Oneida Lake. We collected over 25 short bucket auger cores over various geomorphologic features. The prominent sets of beach ridges are capped with a thin eolian sand but internally consist of sorted, granule to pebble foresets rich in shell detritus and intact halves of Spaerium. GPR data reveal a pronounced set of westward dipping foresets at steep angles all along the southern ridge complex, but the foresets are not as evident in the ridges to the north of the Fish Creek entrance.

We have also mapped an early bay fill lowland fronted by the first prominent ridge which may represent a bay mouth bar or spit sequence. To the east the higher drift uplands of the Oneida Verona lowland are punctuated by asymmetric ridges we interpret at grounding line moraines that formed during the earliest stages of Oneida Lobe retreat from the Rome area, one of these is Irish Ridge Road which is marked by prominent eastward dipping foresets in stratified drift.

Fluvial-alluvial exposures in cut banks of the Fish Creek valley reveal a number of buried forest within floodplain deposits which should provide good radiocarbon control on the minimum age for shoreline aggregation.

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Work continues this fall as we convert the field maps to computer based surficial maps of the Sylvan Bean quadrangle. We hope to conduct deeper core sampling and elevation surveys of the beach ridges next summer (2000).

Our Antarctic work continues at a brisk pace with publications in GEOLOGY on fjord sediment drifts and on the Ross Sea deglacial stratigraphy (GSA Bulletin). We have also summarized our work on radiocarbon problems in recent issues of Quaternary Research (with John Andrews and co.) and in Quaternary Science Reviews: Geochronology. Look for your radiocarbon workshop report in an upcoming EOS issue.

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Field work at Bering Glacier, Alaska, continues to provide rewarding results.

With continued support from the National Geographic Society, field work at Bering Glacier, with Ernie Muller and Matt Lachniet (Syracuse University) was conducted last summer without the usual participation of Dorothy Peteet (Lamont Doherty Earth Observatory), who was tending to responsibilities as a new mom. While Dorothy worked at Lamont on peat samples gathered earlier, we focused on foreland uplands of the Bering/Steller piedmont lobe. Reports in the literature of uplands lacking evidence of overriding ice seemed intuitively curious and difficult to explain. Could the Bering/Steller piedmont lobe have been stunted while neighboring alpine glaciers spread beyond current coastal positions? Our 1998 discovery of glaciogenic materials (till/diamicton, exotics, and striated stones) concealed beneath upland muskeg was the "Rosetta stone" leading to additional terrestrial evidence from which the Late Pleistocene extent and thickness of this ice mass might be newly interpreted. The general lack of similar evidence from beyond the muskeg suggests efficient removal by vigorous periglacial slope processes. In the process of doubling our 1998 data base, we now have information to determine the minimum eastern-most Late Pleistocene ice position beyond Holocene moraines. In addition, overriding ice crossed western uplands to a limiting elevation that would sustain a large coastal ice mass fed by the Bagley Ice Field, including contributing ice from the regionally adjacent Martin River Glacier.

Related Bering Glacier studies on the eastern ice front in June, 1999, involved BERG veterans Brian Tormey, Palmer Bailey, and two SUNY-Oneonta undergraduates, Matt Chartier and Chris Kinnick. In addition to continuing our post-surge monitoring of ice front retreat and ice-contact lake bathymetry, we mapped and sampled subglacial, fountaining vents around which frazil ice commonly forms. To help us understand the significance of the frazil ice realm, Grahame Larson of

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Matanuska Mafia fame, was invited to spend a week looking for basal ice freeze-on features and frazil ice injection dikes. The results justify a return visit, and BERG looks forward to starting the new millennium with continued cooperative efforts.

Sheridan Glacier, near Cordova, also received our attention for the first time in 1999. To complement earlier work by Austin Post, and more recently by Parker Calkin and Dave Barclay, we gathered depth information from the west basin of Sheridan Lake for preparation of a bathymetric map soon to be made available through the Chugach National Forest and Prince William Sound Science Center.

So, what has this to do with New York State Quaternary geology? We continue to find that information about ice front processes from a modern analog glacial environment helps to place in perspective the conditions associated with Laurentide retreat from central NYS. For example, measured rates of annual sediment accumulation in ice-contact lakes have shed new light on the significance of proglacial lake sediments found beneath the eastern Susquehanna floodplain. The association of these deposits with water bearing outwash sand and gravel is providing a better understanding of primary and principle aquifers and recharge areas.

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Dr. David Franzi, Center for Earth and Environmental Science, SUNY-Plattsburgh, Plattsburgh, NY 12901, david.franzi@plattsburgh.edu

My work continues to focus upon the hydrogeology of the jack pine barrens at Altona Flat Rock in the northwestern Champlain Valley. This summer the Center for Earth and Environmental Science at Plattsburgh State University and the W.H. Miner Agricultural Research Institute will offer a 6-week summer research experience for highly motivated undergraduate students interested in ecosystem research. The research will involve an interdisciplinary investigation of ice-storm disturbance on the Altona Flat Rock jack pine barrens. The physical environment of the pine barrens strongly influences ecosystem processes such as runoff and nutrient cycling, as well as aquatic and terrestrial habitats. The participants, individually and in small groups, will work closely with the program's eight faculty mentors on research projects ranging from surface and ground water hydrogeology, biogeochemistry (nutrient cycling), and terrestrial plant and invertebrate ecology. The high level of damage to the pine barrens by the January, 1998, ice storm and subsequent "restoration cutting" of the jack pine forest provide a unique opportunity for undergraduate students to investigate the impacts of natural and anthropogenic disturbances on ecosystem processes.

I hope to have an informational brochure available in November that will outline the program's content and costs. If any of the academic or professional recipients of the Glaciogram have or know of any students who might be interested in this program, please have them contact me.

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Glacial and Holocene Environments of Eastern Ontario

In 1999 I continued work on the glacial landscape of the area around Kingston with a study of a large pothole on a ridge crest in Precambrian granite of the Frontenac axis. The pothole has no relation to post-glacial drainage. I am proposing that the pothole formed as a result of subglacial fluvial discharge being focused by the ridge crest.

In nearby Devil Lake we recovered a core containing beautiful millimeter-scale varves below about 1.5 m depth (estimated to represent about 2 - 2.5 ka BP). Above to the sediment surface is black gyttja. Although confirmation that they are varves awaits dating, each rhythmite consists of a light-toned, carbonate-rich lamina and a dark, organic-rich lamina. The lake is in the Shield, but there is considerable marble in the bedrock of the drainage basin. Detailed studies of the core are under way by undergraduate student, J. Cockburn but the preliminary hypothesis is that the light layers were deposited as marl precipitated from warm lake water before the onset of cooler conditions during the Neoglacial. Acoustic subbottom profiling suggests marl at the surface in some parts of the lake, marl at 1 - 3 m depth in others, and that marl is absent from the rest of the lake. None of these zones is determined by water depth. A more extensive monitoring and coring program is planned for 2000 and beyond.

In Lake Ontario, J. A. Hartling (University of Freiburg, Germany) and I completed a study of the surficial sediment in the Kingston region. An interesting aspect of that work was the relation of wave base calculated from fetch and wind speed to the distribution of late Pleistocene (Lake Iroquois and its relatives) and Holocene sediment in the lake. The first results are in press in the Journal of Great Lakes Research.

During work in Greenland I discovered by serendipity spectacular erosion marks on the bed of a river draining the Inland Ice. There is no evidence of weathering of the rock, indicating that they are of recent origin, and are probably still being formed, especially by jokulhlaups from the ice cap. They relate very closely to similar features on the Paleozoic limestones and Precambrian rocks of the Great Lakes region. J. A. Hyatt (Eastern Connecticut State University) and I will return to Kangerlusuak to document them more fully next summer.

Further information and photos of the varves and erosion marks are on my web site: http://qsilver.queensu.ca/~gilbertr/

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John P. Hart, Ph.D., RPA; Chair, Anthropological Survey; New York State Museum; 3122 Cultural Education Center; Albany, NY 12230; jhart@mail.nysed.gov; 518-474-3895; (fax) 518-473-8496; http://www.nysm.nysed.gov/archeology.html

SYMPOSIUM ANNOUNCEMENT

David L Cremeens (GAI Consultants, Inc.) and John P. Hart (New York State Museum) are organizing a symposium on geoarchaeology in the Northeast titled "Current Topics in Northeast Geoarchaeology: Glaciated Landscape" for the 2000 New York Natural History Conference that will be held at the New York State Museum in Albany on April 26-29. The content for the symposium is below. Symposium papers will be 20-minutes in length. Plans are to publish a volume based on the symposium in the Museum's peer-reviewed Bulletin series. Those participants interested in publishing a chapter in the volume will be asked to submit a first draft of no more than 30 pages at the time of the symposium. Interested parties should contact John Hart at jhart@mail.nysed.gov or 518-474-3895.

SYMPOSIUM CONTENT

Formerly glaciated terrains of northeastern North America present a wide variety of landscapes that affected the location, formation, and preservation of prehistoric archaeological sites. Many of these landscapes, such as simple till-covered uplands, have been little altered since the terminal stages of the Pleistocene. Other landscapes are more complex, for example, glaciofluvial and glaciolacustrine valley floor environments that have undergone significant modification through Holocene alluvial and colluvial processes. This symposium is organized to address current geoarchaeological work in these glaciated landscapes. It will be presented in four sections. The first will present regional overviews of the geomorphology, paleoecology and prehistory of northeastern North America. The second will present geoarchaeological case studies in upland settings. The third will present geoarchaeological case studies in valley floor settings. The final section will consist of a panel discussion on the effects of changing post-Pleistocene landscapes on prehistoric settlement and archaeological site formation and preservation.

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Schoharie Valley Archaeological Project

John Hart initiated what he hopes will be a long-term field-based research program on the evolution of prehistoric agriculture in the Schoharie Valley. The initial focus is on sites with components dating to about 1500 B.P. in order to assess the potential for preservation of charred botanical remains. Two sites were tested by Hart with the aid of Robert Funk, retired State Archaeologist, and Beth Wellman, Anthropological Survey, New York State Museum. The first was the Parslow Field site located on a levee adjacent to an abandoned stream channel near Breakabeen. The second was the Westheimer site located near the confluence of Fox and Schoharie Creeks. Both sites have stratified Holocene deposits with buried A-horizon soils containing artifacts and features dating from circa 2000 B.P. to 1500 B.P. located beneath 0.5 to 1-meter of alluvium in which Ap and B horizons have developed. Large numbers of flotation samples were taken in the field and subsequently floated in the lab. Preliminary analysis resulted in the identification of numerous seeds as well as charred nut shell and wood charcoal, suggested that further research in the valley is warranted. Of interest to this readership is the report of a component dating to circa 1500 B.P. just downstream of the Westheimer site on the west bank buried beneath 2.5 meters of alluvium. If access to the site is available, efforts will be made to determine if the full 2.5 meters is alluvium or if some of it consists of fill.

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Gary B. Hughes, Department of Earth and Environmental Science, University of Pennsylvania, gbhughes@west.raytheon.com

(Editor's note: Glaciogram readers may wish to respond to the following request from Gary Hughes. pjf)

Dear Fellow Glacial Researchers -

I am looking for a lacustrine varve sequence created by annual freeze-thaw cycles, and where glacial melt-water is the predominant source of sediment material. I was hoping for a 2.5-3.0 century long varve thickness record dating backwards from 'present' day.

Do any of you know of a measured varve sequence that fits this description? If so, I would be interested in collaborating with you to obtain the thickness data. I am using coherent state analysis to investigate temporal variations in periodic modes that might be present in the time-series data. Please let me know if you would be interested in such a collaboration. Gary B. Hughes/RWS/Raytheon/US@RWS

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Paul Karrow, Department of Earth Sciences, University of Waterloo, 200 University Avenue West, Waterloo, Ontario, Canada N2L 3G1; phone 519-885-1211; FAX 519-746-7484, pfkarrow@sciborg.uwaterloo.ca

The "summer" season began in April with surveys of Algonquin shorelines near North Bay and, like last year, the curtain dropped with warm weather foliation on May 2nd. A day was spent back on Manitoulin Island checking out some Algonquin shorelines and a pop-up in the bedrock.

In late May I attended the Midwest FOP to see an interlobate area in north-central Indiana. Shortly after, PDF RICHARD MEYRICK arrived from Cambridge to spend three months at Waterloo (June-August) applying his European tufa terrestrial mollusc experience to a 2 m tufa deposit in the Grand River valley near Cambridge. An AMS sample was submitted for dating and FRANCINE MCCARTHY, Brock University, is looking at pollen samples to give us a time framework. It should at least provide a minimum age for river incision to near the present floodplain and provide an environmental record for an as yet unknown span of time. We also sampled an alluvial fan on the Lake Iroquois terrace at Toronto; sampling of a second fan is planned.

ASTRIDE SILIS defended her M.Sc. thesis on Lake Algonquin ostracodes in April and JOHN JOHNSTON defended his on Nipissing bar complexes in May. ANDY STUART defended his M.Sc. thesis in October on shorelines on the Sibley Peninsula (Thunder Bay, Lake Superior).

In the Fort Erie area, STEVE DOUGLAS sampled from a backhoe pit to bedrock (4 m) near the Niagara River in May. He is doing pollen analysis, plant macrofossils and molluscs, and whatever else turns up in the fossiliferous clay. A wood date at the base of archeological beds at the top of the fossiliferous clay is about 4600 B. P. Earlier grab samples of the clay had also yielded ostracodes and fish bones. Steve will base his M. Sc. thesis on the Quaternary geology of the Fort Erie area.

Meanwhile, progress on manuscripts now places a paper on marl molluscs and a paper on Woodstock quarry stratigraphy in revision from reviewers' comments. A lengthy paper on the Woodbridge (Toronto) site is now in the hands of co-authors MCANDREWS, MILLER, MORGAN, SEYMOUR, and WHITE for final comments before submission. The volume "Urban Geology of Canadian Cities" (Geol. Assoc. Can. Spec. Paper 42) is being awarded the E. B. Burwell, Jr., Award by the Engineering Geology Division, G.S.A. in Denver. Following completion of the processing of all samples from the Fernbank (NY) interglacial site in the spring of 1998 and dispersal of picked fossils to specialists on molluscs (BARRY MILLER), plants (JOCK MCANDREWS), insects (ALAN MORGAN), and vertebrates (KEVIN SEYMOUR), assembly of a manuscript with ARTHUR BLOOM will begin as soon as submissions are received.

This summer, a hole was drilled to bedrock for purposes of hydrogeological study on our north campus, supervised by JOHN CHERRY and BETH PARKER. It apparently intersected organic sediments of the Waterloo interstadial site (Karrow et

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al., 1984, Boreas). Sampling was intermittent and recovery poor, but it should help define the extent of these sediments (one AMS date of 40,000 B. P.).

For the winter, lab work and fossil identification for sites in Ontario and British Columbia will continue. Now that funding for foreign students has improved, grad work applicants can be welcomed for work on marl deposits, alluvial deposits, Ontario mastodons, glacial lake history or other Quaternary topics.

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Mike Lewis, Geological Survey of Canada, Box 1006 Dartmouth NS B2Y 4A2, Canada; mlewis@agc.bio.ns.ca

A workshop dealing with mid- and late Holocene levels of the Great Lakes was hosted last April for the US Army Corps of Engineers by the US NOAA Great Lakes Environmental Research Laboratory in Ann Arbor MI. A report "Proceedings of the Great Lakes Paleo Levels Workshop The Last 4000 Years" (www2.glerl.noaa.gov/Publications/techrpt.html) contains presentations by J. P. Coakley, C. Larsen, T. Thompson and myself, and results of discussion. A major issue is the anticipation of impacts of future lake levels on shipping, coastal infrastructure, habitat, and water flow regulation. A role for future geoscience research was identified for studies of long-term high-resolution records in lake and beach sediments. These have the potential of determining linkages between previous changes in atmospheric circulation and lake levels for a better understanding of lake response to climate and hydrological processes. I continued communicating evidence of a major unconformity and of significant events of subglacial erosion in the Great Lakes basin. Talks illustrating a patchy distribution of diamicton (basal till) associated with a bedrock escarpment up to 45-m high and now buried by glaciolacustrine and Holocene lake sediments in eastern Lake Erie were presented at the 1999 meetings of the International Association of Great Lakes Research (Lake Erie Geology symposium), and the Canadian Quaternary Association - Canadian Geomorphology Research Group (Subglacial Processes session). The unusual distribution of till remnants is most easily explained by erosion through the action of subglacial turbulent meltwater flows.

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Ernest H. Muller, 204 Heroy Geology Laboratory, Syracuse Univ., Syracuse, NY, 13244-1070. Phone (315) 478-5827; ehmuller@mailbox.syr.edu

For the past decade, i.e. since retirement from teaching at Syracuse University, my geological efforts have centered largely on research with Jay Fleisher, Don Cadwell, Palmer Bailey, Brian Tormey, Dorothy Peteet, Matt Lachniet and other members of BERG, (Bering Glacier Research Group) an independent effort focused on the environs of Bering Glacier in central southern Alaska.

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And how do I justify inclusion of the above item in the New York Glaciogram? In fact, it was the quest for modern situations analogous with the Pleistocene record in New York that first triggered our efforts. Map coverage of New York glacial geology at 1:250,000 scale had just been completed with full awareness of the limited first-hand glaciological experience represented among those responsible for this mapping achievement. To counter this deficiency we sought, by documenting current glacial activity and associated stratigraphic records in Alaska, to improve our understanding of the Pleistocene record in New York. A problem now is how best to make some of this information available for practical application in New York geology.

For several years the NYSGS 1:250,000 maps seemed often to be considered the final word in New York glacial geology instead of being recognized as basic products of reconnaissance mapping appropriately to be examined, questioned, and refined by locally focused studies. With this in mind, it has been encouraging this year to receive communications from students at several institutions regarding their research efforts that examine, refine, and in some cases question existing concepts.

As token evidence that I am still a New York glacial geologist I have a) undertaken (but sadly slacked off to the present moment), with Don Cadwell to fill in New York data for a world map of Pleistocene glaciation, a project of an INQUA task group; b) also with Don Cadwell to prepare a brief summary of New York geomorphic history; and c) tempted by Richard Laub, Buffalo Natural Science Museum, I am collaborating with Parker Calkin and Keith Tinkler in re-examining geologic history and environmental factors responsible for the productive Hiscock archeological site in western New York.

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John A. Rayburn, Dept. of Geological Sciences, SUNY Binghamton, Binghamton, NY 13902; bg23930@binghamton.edu

My name is John Rayburn and I'm a PhD student of Pete Knuepfer's. He passed along your e-mail and said you might be interested in hearing about the work I'm doing in the Champlain Valley.

I did my M.Sc. at the University of Manitoba with Jim Teller working on Lake Agassiz shorelines and last year started work here at Binghamton. I am investigating the shorelines of Glacial Lake Vermont (Champlain Valley) in New York and Vermont to investigate ice margin retreat, lake history and drainage, and post glacial isostatic deformation. This last summer I mapped some of the Coville and Fort Anne phase shorelines on the New York side and have identified some potential paleo-lagoons/bays for coring (hopefully this spring). David Franzi (who was my undergraduate advisor at SUNY Plattsburgh) is helping to direct this work. There is still a lot of mapping to do, and there is next to nothing yet for age constraints. The shorelines are nowhere near as obvious as the Lake Agassiz shores, especially around the edge of the Adirondacks.

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Les Sirkin, Department of Earth Sciences, Adelphi University, Garden City, NY 11530; currently at P. O. Box 90, Johnsburg, NY 12843; Phone 518-251-0115

Long Island Geologists Field Trip: Montauk, Part 1. Ditch Plains

Evidence of two separate glaciations, glacial advances, deposition of glacial facies, glacial and postglacial erosion, and glacial recession can be studied here. This geology is based on detailed surface and shallow subsurface mapping (see Sirkin and Busheck, 1977; and Sirkin, 1995 for a summary of relevant works). Two distinct glacial drift sheets are identified, a lower, older drift and a younger, upper and overlying, drift.

The Lower Drift. The lower drift, presumable of Illinoian age (ca 150,000 years), extends under much of the South Fork of Long Island, its in situ upper surface cropping out in the vicinity of sea level. Where exposed it appears planed either by glacial erosion during the last glaciation or by coastal erosion during the last interglacial. The lower drift is denser and more compressed and is darker in color and contains a higher proportion of darker-colored rock types and fine-grained matrix than the overlying, upper drift, due to its northeasterly provenance in the Narragansett Lobe of the glacier. Facies include basal till (the Montauk Till), lake beds, and outwash. At Ditch Plains the drift is well indurated, probably due to groundwater activity. The lower drift platform extends southward from the upper drift, kamic moraine to the coast and is covered by a thin veneer of younger outwash and dotted with small kettles supported by the impermeable till. This exposure indicates a terminus for the Illinoian glaciation well south of the present coast.

The Upper Drift. The late Wisconsinan glacier advanced to its terminal position around 22,000 years ago. The terminal moraine was a continuation of the Amagansett Moraine segment of the terminal moraine. This segment was eroded away during postglacial sea level rise. Lag debris from the moraine is encountered one to two miles south of the Montauk Peninsula. The truncated edge of the Amagansett Moraine abuts Montauk Highway just north of Beach Hampton. The upper drift is lighter in color and has a higher percentage of lighter-colored clasts and lighter matrix due to its provenance in more granitic terrane in eastern Connecticut and western Rhode Island and southeasterly flow of the Connecticut Lobe and Connecticut-Rhode Island Lobe of the late Wisconsinan glacier. The lobate ice sheet formed all of the surficial morainal and related deposits of Long Island as documented in the extensive pollen and radiocarbon record. Facies of the upper drift include outwash, meltout tills, proglacial lake beds, and meltwater channel gravels. The high morainal topography north of the lower drift platform along the coast is, therefore, not the terminal moraine of the late Wisconsinan, but the first recessional moraine north of the terminal moraine. The moraine is mainly kamic with thick outwash and thin meltout tills. Kames and other recessional deposits often show collapse or ice contact features.

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The Lower Drift-Upper Drift Contact. The contact between the drift sheets is mainly tectonic. It is placed at the top of undisturbed lower drift. Advancing late Wisconsinan ice ripped up and rafted masses of the lower drift, including the Montauk Till, as well as clasts of late Cretaceous strata. These detached blocks and thinner slices are engulfed in upper drift outwash, which is also injected into voids in the lower drift and thrusted southward. All of the deformed and engulfed strata are technically clasts in the upper drift. Stratigraphic evidence elsewhere on Long Island of a mid-Wisconsinan warm interval, or intraglacial, between the two drifts, confirms the age of the two glaciations (Sirkin and Stuckenrath, 1980; Sirkin, 1986, 1995).

The Postglacial Interval. The postglacial record includes recessional moraines, outwash plains, proglacial lakes, meltwater channels, kettle bogs and radiocarbon-dated pollen stratigraphy, and aeolian deposits, including a sand sheet and loess. The absence of an outwash plain between Amagansett and Montauk also documents the more southerly extent of the late Wisconsinan glacier and the face that the moraines of the Montauk Peninsula are not the terminal moraine. Rather, they are recessional moraine (the Prospect Hill-Hither Hills Recessional Moraine segment) overlying the older, lower drift. The system of proglacial lakes drained into the rising postglacial sea as early as 15,000 years ago (personal communication, Janet Stone and Ralph Lewis, research in progress). Meltwater channels can be traced from the north shore of Long Island and include Fort pond, the Ditch Plains lowland, and the Napeague Isthmus. Where bogs in kettle and meltwater channels have been cut into by coastal erosion, exposed peat deposits have been examined. Radiocarbon dates in the 12,000 to 15,000 year range and spruce pollen zone ages have been reported.

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Being elected chair of the Department of Geology at the University of Akron has put the damper on some of my research activities. I have begun to examine the drainage history of several northward-flowing rivers which have their mouths in Lake Erie. Their headwaters' regions show numerous examples of drainage reversals and piracy. Many of the streams began as southward-flowing meltwater streams. most have been pirated by northward-flowing streams incipient on the newly-exposed deglaciated landscape and controlled by a northward-inclined eroded bedrock surface. Holly Trembcynzski is investigating the relation of terraces in the river valleys to lake levels of the ancestors of Lake Erie. There are a few terraces which can be projected to these former lake levels.

Additionally, I serve on the thesis committee of Rebecca Kempthorne, who under the direction of Enriqueta Barrera, is examining two cores from the deeper parts of the central and eastern basins of Lake Erie. She is doing some isotopic studies of the sediments along with determining other parameters such as grain size and carbonate content. The isotopic studies will be used to reconstruct the Holocene climatic history of the basin including the influx of waters from the upper Great Lakes.

A third project involves the analysis of samples from beneath Tower City in downtown Cleveland. Mike Tevesz of Cleveland State managed to locate the original developer who has stored samples of sediments from the foundation borings for over 80 years. Preliminary analyses of samples from two borings indicates that there is some difference among the layers shown in the engineer's cross sections. However, the samples are not continuous and are only representative of each of the layers. It may take a while to make sense of the Pleistocene stratigraphy.

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GRASS ROOT GLACIERS

Glaciers offer wonderful opportunities for the popular writer to introduce the geological sciences to the general public. The images of familiar valleys flooded with ice, or of substantial mountaintops overtopped by advancing ice have a real impact upon people. I have been studying the glacial landscapes of the Catskills and Hudson Valley in order to present a series of articles to the Catskill/Hudson communities. Work in the Hudson Valley has focused on drumlin fields, alluvial fans, and glacial lake Albany deposits. In the Catskills, I have been describing the effects of the Grand Gorge ice margin on the central Catskill Escarpment and documenting the Grand Gorge event in the North/South Lake State Park. I am mapping all along the Catskill Escarpment (the Wall of Manitou).

Publications have been in regular columns ("The Catskill Geologist") in Kaatskill Life, the catskill regional magazine, along with columns ("On the Rocks") in The Woodstock Times, a Hudson Valley weekly newspaper.

None of this constitutes professional research and all of the resulting publications lie outside of the formal scientific canon.

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The largest archeological project with which I have been consulting in the past year has been survey and testing for the proposed Millennium Pipeline right-of-way. This pipeline will cross the entire "Southern Tier" from lake Erie, then parallel the Upper Delaware, cross the "Black Dirt" of the Walkill Valley, the Hudson Highlands, and the Hudson River itself on its way to metropolitan New York City. I have seen a number of outcrops or trench exposures of interest to glaciologists during these studies but those in western New York come to mind immediately. We looked at many areas in Chautauqua County which were previously mapped by Muller (1963). We noted extensive Holocene reworking of gravels flanking the Chautauqua Lake basin by small tributaries such as Dewittville Creek east of Mayville, New York.

In Cattaraugus County the proposed pipeline right-of-way crosses the headwaters of the Allegheny River, which reversed direction to its present southerly route during the retreat of the Laurentide ice sheet. The underfit Conewango Valley represents the Allegheny's abandoned former northerly course. A recessional moraine is found approximately 100 meters north of the proposed pipeline crossing, which is less than a kilometer south of the town of Conewango, New York on Route 241. This eastern valley margin is covered with prehistoric archeological sites, and artifacts were found stratified within a colluvial bench feature during the present study. It is likely that the crystalline erratics in the moraine were exploited as a source of hammerstones for flintnapping among other possible uses. We plan to conduct further geomorphological investigations here in conjunction with more intensive data recovery excavations. The prehistoric occupation surfaces will be related to these Pleistocene glacial deposits as well as to possible mechanisms of site burial.

Muller, E. H., 1963, Geology of Chautauqua County, New York, part II, Pleistocene geology: New York State Museum and Science Service Bulletin 392.

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The Middle Wisconsin site in the Genesee Valley has produced 11 new ages in the range from 39,000 to 48,000 BP from summer fieldwork. Several dates are still pending. A root zone in organic sands and silts under one exposure of the basal (H4) till unit has an apparent age of 39,000+1,100 BP, and is currentl interpreted as an interstadial floodplain sequence (pending additional dating). The Heinrich (H4) advance seems to have scoured off several feet of sediment and produced an hiatus of 3000 to 5000 years between the till and the underlying interstadial sequence. A brief description and interpretation of the site can be found in the Denver GSA Annual Meeting Abstracts (p. 258).

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