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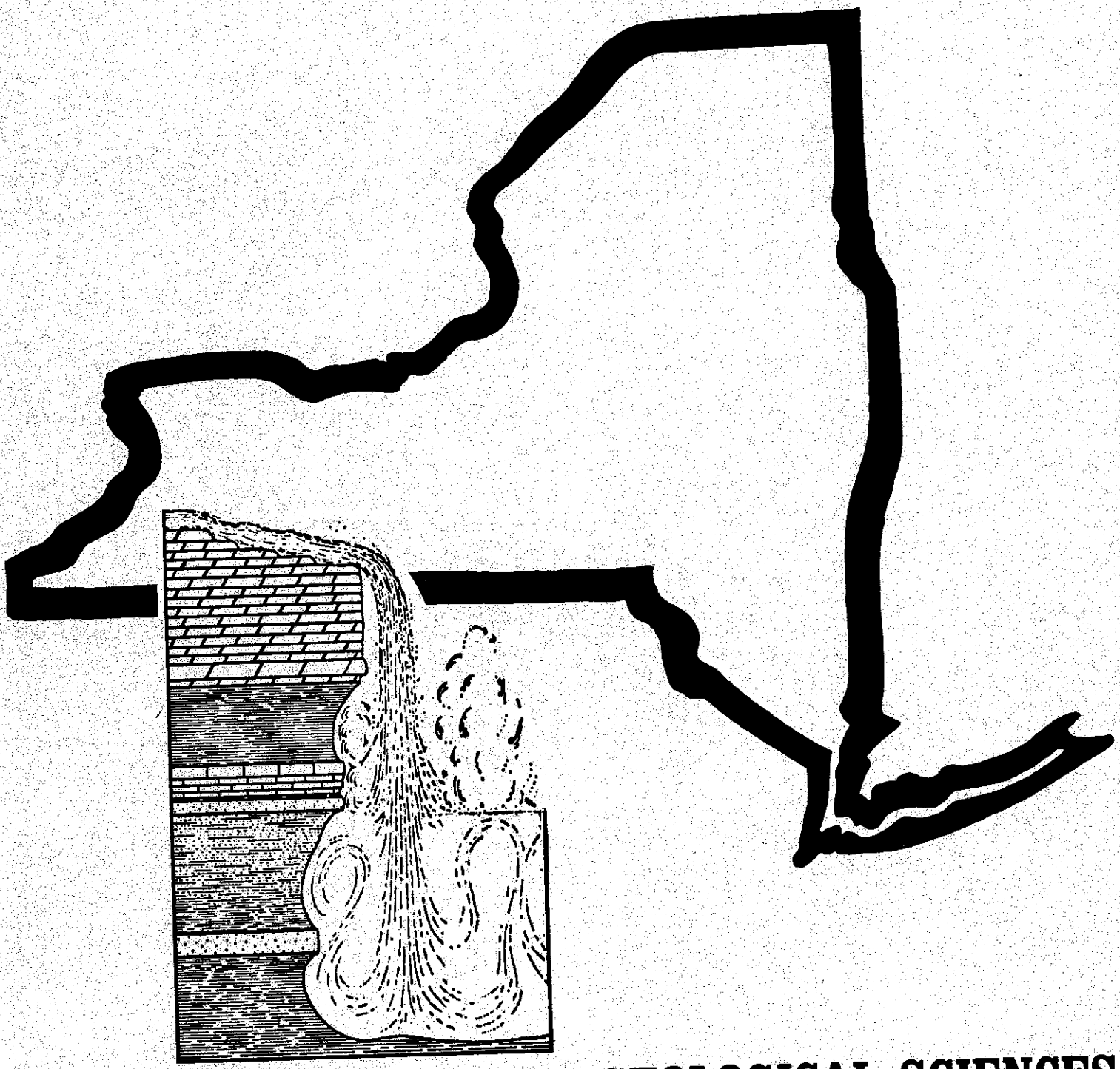
NEW YORK GLACIOGRAM



DEPARTMENT OF GEOLOGICAL SCIENCES
State University of New York at Buffalo
Buffalo, New York 14226

EDITORIAL POLICY

The GLACIOGRAM is intended to be a collection of informal notes concentrated on Quaternary work relating to New York either directly or indirectly. It is not a formal publication and is not circulated to libraries nor to individuals not engaged in Quaternary research. The information included is often of a preliminary and tentative nature and as such should not be quoted and certainly not without communication with appropriate authors. One of the charter contributors [Muller, v. 6(1)] has suggested that reference to information in the GLACIOGRAM be identified merely as informal communication.

I want to dedicate this issue of the GLACIOGRAM to Dr. Robert Ken Fahnestock who lost his life in the crash of a small plane near Fort Collins, Colorado on the 20th of April. Ken was an active contributor to Quaternary studies of New York. We will all miss him very much.

Parker E. Calkin

Mark Aldenderfer - Anthropology, SUNY/Buffalo

The Archaeological Survey, Department of Anthropology, SUNY/Buffalo, will initiate in the summer of 1980 a long-term archaeological project which may be of some interest to Quarternary geologists, palynologists, and biologists. The project, located in the drumlin fields and bogs of southern Wayne County, New York (near the towns of Palmyra, Macedon, Newark, and Lyons), has the potential of revealing new evidence about the early human occupation of this portion of New York. Drumlin fields and associated bogs in similar areas of New York are known to contain evidence of Paleo-Indian peoples (11,000-9,000 BP), as well as Early Archiac groups (9,000-7,000 BP), and thus it is likely that this area in Wayne County will produce similar remains.

Because we are interested in a very early period of potential human occupation of New York, we are pursuing studies in the detailed geology, palynology, and ecology of the project area. In many ways, a detailed environmental reconstruction of the area is a must for the success of our work. We have already contacted a number of people about our interests in this area, but anyone who would be interested in participating in this project (at any level) is strongly encouraged to get in touch with us at the Archaeological Survey. Our address is:

Department of Anthropology
581-L Spaulding Quad
SUNY/Buffalo
Buffalo, NY 14261

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Stephen Averill - Earth Sciences, Fairleigh Dickinson University

During October 10-12, 1980, N.Y.S.G.A. will host a symposium and a series of field trips at its annual meeting held this year at the Newark Campus of Rutgers University. I am now putting the finishing touches on the manuscript for the glacial geology trip. The trip will be in the northern segment of the Newark basin where the Ramapo Mts. and the Palisade ridge have protected the area from deep glacial scour. This has preserved the record of a middle Woodfordian readvance into the lower Hudson Valley region. This readvance occurred after a significant interstade during which the glacial Lakes Hudson and Hackensack had drained. Supporting evidence is stratigraphic, sedimentologic, geomorphologic and palynologic and is supported with a suite of C-14 dates.

Dick Pardi and Walt Newman from Queens College-CUNY and Bob Dineen of the NY State Survey are contributors and are junior authors. Dick has done the radiocarbon evaluation. Bob has examined the Sparkill gorge in detail and will discuss this area. Walt will discuss formation of the Piermont salt marsh at the Sparkill gap and the rise of sealevel in the Hudson gogre turned estuary. The existence of the Sparkill gap has been critical to the late and post glacial events in the Hackensack Valley.

We hope you'll join us in the Fall.

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Thomas M. Berg - Pennsylvania Geological Survey

We hope to have our new state map out before the end of 1980. We are planning a Field Conference for 1981 covering Tioga and Bradford Counties; we'll touch on some of the Pleistocene there.

* *

Robert F. Black - Geology, University of Connecticut

I have become intensely interested in the modes of deglaciation in Connecticut - witness my abstract in the regional GSA meeting this spring in Philadelphia. A paper is in preparation. However, the summer is expected to pass quickly in the Aleutions and in Greenland.

* *

Arthur L. Bloom - Geology, Cornell University

No new local research. AMQUA meeting will have my review of sea-level changes in the South Pacific, from which we're getting nice support for an interstadial at ~ 40,000 BP or a little older.

* *

Don Cadwell - New York State Geological Survey

Mapping of the Stephentown and Canaan 7½ minute quads is almost complete. I expect to continue mapping to the south during the summer. Depending on finances, I hope to be aboe to get started on the State Glacial Map - with workers in the Adirondacks and Hudson Valley.

My mapping supports the style of deglaciation suggested by Bob LeFleur. The Rensselaer Plateau was actively deglaciated long before ice left the main Hudson Valley. I hope to work out a chronology of the Upland Lakes for the Plateau.

* *

Parker E. Calkin - Geology, SUNY/Buffalo

A paper with Jock McAndrews titled "Geology and paleontology of two late Wisconsin sites in western New York State" has just been published in the Geological Society of American Bulletin, Part I, v. 91, p. 295-306. This paper presents among other things, the palynological data to support a minimum age of about 15,000 for the retreat from the outer ridges of the Lake Escarpment Moraine near Chaffee, New York (southeasternmost Erie County). There is still no hard and fast dating since there is a possibility that the peat dated at about 15,000 yr. B.P. contains recycled material.

Pierrette Turcotte-Roy, one of my Ph.D. students here is initiating a detailed study of the glacial stratigraphy in the northwestern New York area. Although our stratigraphy does not have the "depth" seen in the quarries of western Pennsylvania or northern Ohio, there are a lot of problems that need to be cleared up here. We will make an attempt to correlate with the "new" stratigraphic interpretations coming so rapidly from the work of the Ontario Geological Survey.

Lynn Doyle Ellis has completed a thesis titled "Geophysical reconstruction of the preglacial Allegheny Valley, western New York".

* *

Donald R. Coates - Geology, SUNY/Binghamton

There are now two more Ph.D.'s who have successfully completed their academic careers and written dissertations on New York glacial geology:

Richard Caprio's title was "Quantitative Analysis of Tills in Central New York".

Robert Gillespie's title was "Quaternary Geology of South Central New York".

Both works used heavy mineral analysis as one of the basic tools in deciphering glacial chronology and ice-flow directions. Other exotics were also used to confirm such data as derived from purple/red garnet ratios. When the manuscripts are back from the bindery I will provide abstracts for the next Glaciogram issue.

Another common denominator for these two researchers is they both have forsaken the wonders of glaciated terrane for the lucrative fields of black liquid gold in the West. Let's hope they find a lot of oil so that we can continue to use cars for our field work.

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Aleksis Dreimanis - Geology, University of Western Ontario

Last winter a joint paper with Hugh Gwyn was published that may be of interest to those who work in the northern part of the State of New York: Gwyn, Q.H.J. and Dreimanis, A., 1979, Heavy mineral assemblages in tills and their use in distinguishing glacial lobes in the Great Lakes Region: Canadian Jour. Earth Sci., v. 16, No. 12, pp. 2219-2235. Two graduate students completed and defended their theses lately: S.R. Hicock on Late Pleistocene stratigraphy in British Columbia (Ph.D.) and R.S. Geddes on indicator tracing in Saskatchewan (M.Sc.).

Six Ph.D. theses are still in progress on various Pleistocene problems in Ontario, New Brunswick and Quebec, and I have several unfinished projects, mainly in S. Ontario and N. Ohio. Steve R. Hicock remains at our Department as postdoctoral fellow, continuing his studies in B.C.

* *

William Farrand - Geology, University of Michigan

The outline below is for the upcoming AMQUA Meeting in Maine:

THE STRUCTURE OF AN ICE AGE (AMQUA SYMPOSIUM) PRELIMINARY PROGRAM

A. PRIMARY INPUT

1. Ice-Volume fluctuations as seen from variations in $^{18}O/^{16}O$ signature, the pattern of change seen over a single interglacial-glacial cycle, and long-term patterns from late Pliocene throughout Pleistocene time. (N. J. Shackleton)

2. Sea level changes as a function of glacier storage of H_2O loading and unloading the continental and oceanic lithosphere, calculation of the ice volumes from eustatic changes, and the question of sea level near the present level in mid-Wisconsinan time, amplitude or regressions within interglacials (e.g. stages 5b + 5d). (A. L. Bloom)

3. Sea-surface temperatures and salinites as determined from planktonic fauna and flora, establishment and solving the paleoecological equation, and comparison of the results with other paleotemperature methods; the amplitude of temperature changes. (J. Imbrie)

4. Wet-dry ("pluvial") cycles on land, their geographical and chronological occurrence, determination of the kind and amount of climatic change implied by pluvial phenomena and their chronocorrelation with glaciation or other kinds of climatic change (G. Singh)

5. Vegetation history as recorded in long cores (Grande Pile, Tenaghi Phillipon, etc.) and in deep-sea sediments (Heusser), its characteristic pattern of variation, differential development in different interglacials (in Europe), climatic controls vs. plant succession and migration. (Linda E. Heusser)

6. Preliminary synthesis of input data: The evidence for cyclicity in the data; interglacial-glacial cycles as delimited by "terminations," "marklines;" oxygen isotope vs. faunal paleotemperatures; criteria for distinguishing interglacials from interstadials.

B. SECOND-STAGE RECONSTRUCTION OF MODELING

1. Oceanic and Atmospheric circulation inferred from reconstructed sea-surface temperatures, land-surface albedos, etc. (a la CLIMAP), via current atmospheric climatic models; the changing variations in circulation patterns globally at points in time (0 and 19000 BP) and throughout a typical interglacial-glacial cycle (e.g. stages 1-5), especially in critical areas such as the North Atlantic sector. (W. Ruddiman)

2. Growth and disintegration of ice sheets with emphasis on the Laurentide and Antarctic ice sheets, comparing land-based vs. marine-based expansion of the ice; different histories of the arctic and temperate borders of the Laurentide ice, their implications for global sea levels and oxygen-isotope ratios, and inference to be drawn concerning nourishment patterns; the question of a Barents Sea ice shelf (sheet); estimates of areas (volumes) of ice sheets at their latest maxima. (J. T. Andrews)

C. DRIVING MECHANISMS FOR GLACIAL-INTERGLACIAL ALTERNATIONS

1. Extraterrestrial controls: intrinsic solar variations and/or variations in orbital parameters (Milankovitch); deterministic vs. stochastic mechanisms (functions, factors?) correlation of predicted cyclicity with observed patterns. (J. D. Hays)

2. Terrestrial feedback mechanisms: the ice sheet-ocean system as a function of changing albedo, sea-ice cover, sea-surface temperature and circulation pattern; the effect of volcanic and/or terrigenous dust screening, the correlation of explosive volcanic activity with glaciation; does glaciation cause volcanism or vice-versa? (R. G. Johnson)

D. HUMAN ACTIONS OF REACTIONS

1. The archaeological record of human adjustment to changing environments through a interglacial-glacial cycle: climatic change, changing flora and fauna, sea-level change, pluviation; and the question of cultural evolution engendered by environmental change. (A. J. Jelinek)

2. Man and environmental change in the present and future; how is man affecting global or regional climate? Is there coupling of the anthropogenic effects and natural causes of climatic change? What are the prospects for significant climatic change - and therefore significant change in vegetation, sea level, etc. - in the next few centuries? Will man's activity accelerate the onset of the next ice age? (S. H. Schneider)

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Jane Forsyth - Geology, Bowling Green State University

Jane Forsyth's Quaternary contributions remain meager, what with demands on her time, including those of graduate students (hopefully Jane become productive again in another year). None of her graduate students worked in New York, but a brief statement about the results of each might be worthwhile.

Diann Lind mapped tree vegetation against geologic substrate on the limestones of Drummond Island, Michigan, and found moisture availability to be far more important than liminess. Jack Tintera mapped karst feature between Bellevue and Castalia, northwestern Ohio, and recognized over 200 sinkholes formed only in the Devonian Columbus Limestone cuesta, with solution orientation eastward down the dip slope and toward the lake on the east and westward off the cuesta escarpment to the west. Mike Grube studied part of the sandy Oak Openings belt west of Toledo, with reconnaissance north into Michigan, and found the Ohio sand uniformly fine grained with eolian-type sorting, with a source in Glacial Lake Warren deltas near Ypsilanti and Plymouth, Michigan. Jack Klotz mapped the terraces along the Maumee River valley of northwestern Ohio, a river flowing into a lake that was rising isostatically through much of post-glacial time, and found some narrow, well-developed terraces that seem to correlate with one or more of the glacial lakes in the Erie basin, possibly Glacial Lake Warren. Finally, in Wyandot County in central northwest Ohio, where the Glacial Map of Ohio shows only ground moraine with one end moraine, soils scientists map lake deposits and associated materials indicating the presence of four different lakes, with associated outlets, dunes, and a kettled delta, so this county will be studied geologically by Valerie House this summer.

* *

Ralph A. Ibe - New York University Botany, New York University

I am constructing influx diagrams based on sedimentation rates derived from ^{14}C dating for 5 lacustrine basins in the Catskill Mountain region. Hopefully, it will tie in with Sirkin's work to the east and supplement the early work of Cox (unpedable). In addition, it will add info - to local and regional glaciation of the area.

* *

Paul F. Karrow - Geology, Waterloo University

E. Sado is writing up his M.Sc. thesis on the till stratigraphy of the Lucan area, Ontario. The area was affected mainly by the Huron lobe but lies near the interlobate line with the Erie lobe. The major tills of the area include Catfish Creek, Tavistock and Rannoch, the last forming the Mitchell, Lucan and Seaforth moraines.

W. D. Fitzgerald is writing up his M.Sc. thesis on the post-glacial history of Minesing Swamp, west ofLake Simcoe, Ontario. Algonquin, Nipissing and other lake shorelines have been surveyed and related to palynological study of cores which reveal evidence of Lake Hough (low-water stage in the Georgian Bay basin). Several radiocarbon dates range from 10,000 to 4,000 years. Molluscs were also studied.

P. U. Clark has mapped the Malone, New York 15' quadrangle and supplemented it with reconnaissance east and west to clarify water planes in the St. Lawrence valley. Till characteristics have been studied (texture, carbonates, and heavy minerals) and several marine fossil localities have been recorded. The resulting M.Sc. thesis is in preparation.

Barry Warner has just completed his M.Sc. in Biology, supervised by Richard Hebda. His topic was the palynology of two sites on Maintoulin Island related to Lake Algonquin.

Jeff Turner, post-doc with Peter Fritz and myself, is continuing his work on carbon isotopes in marl lakes so as to assess errors in radio-carbon dating of organic matter for such sites. A paper is being presented at the Geological Association of Canada meeting in Halifax, N.S., in May 1980.

Richard Hebda, palynologist in the Biology Dept., has left for a new position with the British Columbia Museum. He had been involved in study of the Guelph interstadial (paper at Toronto GSA '78) and several local postglacial bogs in or near Kitchener, Ontario. The Department is in the process of seeking a new palynologist.

Brenda Haun was a post-doc with me October 1979 to March 1980. She studied the Cladocera in several cores through the Don and Scarborough Formations at Toronto.

Recently I have been studying the stratigraphy and paleontology (particularly molluscs) from the Guelph interstadial (over 45,000 years) and several Lake Algonquin and Lake Nipissing sites near Lake Huron and Georgian Bay. A new interstadial site has been discovered at the corner of the University of Waterloo campus. Borings to 120' encountered organic sediments containing pollen, diatoms, and molluscs under several tills. A continuously-cored hole is planned for this summer to clarify the stratigraphy and allow more detailed study of the organics.

With John Greenhouse, stratigraphic and geophysical study of buried valleys near Fergus and Guelph is continuing. Drilling is planned for the Rockwood buried valley this summer. 1978 drilling in the Fergus valley has resulted in the recognition of Port Stanley, Tavistock, Maryhill, Catfish Creek, and four pre- Catfish Creek tills overlying pollen-bearing silts.

Besides stratigraphic drilling this summer with our Department drilling rig, I will be continuing Lake Algonquin - Nipissing studies with additional fossil collecting and shoreline surveys near Lake Huron. Looking ahead to the fall, we expect several new M.Sc. students who will likely be involved in thesis projects in eastern and northern Ontario.

* *

Alan V. Morgan - Earth Science, University of Waterloo

Randy Miller (M.Sc. Student) at the University of Waterloo is currently nearing completion of his thesis topic on an analysis of the Coleopterea of the Lockport Gulf Site, NY. Randy hopes to complete and defend his thesis by late summer 1980. He will then be embarking on a Ph.D. dissertation at the University of Waterloo on the subject of isotopic composition of chitin in fossil beetles, and its relation to paleoenvironments. Alan and Anne Morgan are continuing with paleoentomological research at Waterloo. They have recently finished a general paper outlining the uses of fossil beetles which was published in Geoscience Canada Vol. 7 no. 1. The article was written with the objective of providing a readable, illustrated overview of the subject of paleoentomological research.

Work also continues in curating a modern collection of beetles picked up by Alan Morgan on the north slope of Alaska in the vicinity of the Brooks Range during the summer of 1979.

We would be grateful if any Pleistocene workers in the States of Illinois, Indiana, Ohio, Pennsylvania and New York would notify us of sites which are believed to be of the same approximate age as the maximum Wisconsin glaciation (circa 23-14,000 before present). We would prefer these sites to be available for trenching operations, that is preference will be given to 'drier' sites which are suitable for the extraction of monolithic sections. These materials will be analyzed for insect assemblages since we are attempting to find out where the Canadian insect fauna resided during the maximum glaciation. Sites well outside the Laurentide limit in the northern United States (of the same approximate age) will also be used since we are hoping to determine climatic gradients away from the ice front. Sites post-dating the maximum Laurentide advance in areas north of the Laurentide limit also be useful, since it

should be possible to trace the movements of insect populations through time. We are especially interested in sites which are within several miles, or tens of miles, of the terminum of the ice. Our address is:

Department of Earth Science
University of Waterloo
Waterloo, Ontario
CANADA N2L 3G1

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Ernest H. Muller - Geology, Syracuse University

With Dan Merriam's resignation as Chairman of the Syracuse University Department of Geology last January, I have once again "inherited" chairmanship. Now, with commencement the second week in May, I leave on the 11th with ten students for the Department's Foreign Geology Field Course in Iceland and Austria. By the beginning of July I should be back and functioning again as a New York Quaternarist.

Although I am assured my "inheritance" is only on an interim basis, it has meant frustration during this academic year with respect to a number of projects which are within reach of completion. Among these are compilation of the Finger Lakes 1:250,000 sheet for the New York Geological Survey, and of the Hudson River 1:1,000,000 sheet for the U.S. Geological Surveys team efforts at Quaternary mapping. Field mapping in Oswego County has since last October fallen largely on the cooperating shoulders of Todd Miller.

Meanwhile, student research has continued, Mike Wilson, now on the faculty at the University of North Carolina in Charlotte, at the end of April defended his Ph.D. dissertation examining sedimentologic and morphologic evidence on the hlaup activity which carved the LeRoy Channels as proglacially imponded waters west of the Ontario Lobe drained east across the Genesee basin.

George Duchossois, now with the South Dakota Geological Survey, has the manuscript of his M.S. thesis on the glacial geology and sedimentology of glacial deposits in the Jamesville Quadrangle (SSE of Syracuse) in nearly final stage of completion, anticipating defense still this summer.

Dave Franzi looks forward eagerly to field work to study relationships during partition of the Adirondack, Black River, Mohawk and Oneida Lobes in the area of the southwestern Adirondacks centering around the Remsen Quadrangle.

Although I am pleased by Dave Andrews' note on an interesting glacitectonic structure exposed along Dinsmore Creek near Rochester, I have difficulty with his conclusion that permafrost was involved. Convincing evidence of permafrost (as opposed to seasafrost) features, remains sparse in the area of New York north of the Valley Heads Moraine. What about it? Does anyone have evidence still to be brought forward?

Likewise, I pose disclaimer of George Crowl's inference that radiocarbon dates establish late Woodfordian (e.g. 15,000 yrs or less) age for the Wisconsinan terminal moraine in the border quadrangles of New York and Pennsylvania. Irrefutable stratigraphic confirmation of MacClintock and Apfel's interpretations regarding age of the eastern limb of the Salamanca Re-entrant drift border remains similarly elusive. Resolution of this discrepancy between mapping and correlations in New York and Pennsylvania has become one of the crucial problems requiring early attention.

It has been pleasant to work with Bill Brennan in the field of connection with his paleomatnetic investigation of proglacial lake clays; with Parker Calkin in the draft of a couple of manuscripts; with Don Coates in joint supervision of Robb Gillespie's (SUNY/Binghamton) dissertation research. I acknowledge profound sense of loss in the unfortunate accident that took the life of Ken Fahnestock, one of my first Ph.D. students at Cornell University more than 20 years ago.

* *

Walter Newman - Geology, CUNY, Queens College

Dick Pardi, Les Marcus and myself continued our work on Holocene sea level changes along the shores of the Hudson Estuary. We now have secured more than 100 basal peat dates. The effort confirms a decreasing relative transgression rate with a surprising amount of noise. The noise may be those Fairbridgean fluctuations that Don Colquhoun and our team have confirmed from South Carolina.

Led by Steve Averill of Fairleigh Dickinsin University, Dick Pardi of the Queens College Radiocarbon Laboratory, Bob Dineen of the New York State Geological Survey and myself are preparing a field trip guide for the New York State Geological Association's annual field trip out of Rutgers at Newark next Fall. Steve has developed firm evidence for two late Wisconsinan glacial advances in northeastern New Jersey and nearby New York. Within a radiocarbon-dated framework (and some difference of view among the authors), it appears that the latest advance was prior to 13,000 YBP while the main (Harbor Hill) advance was prior to 16,000 YBP. We will also review our latest sea level techniques at the Piermont tidal marsh as well as our new data from the Sparkill Gap and Gorge. We look forward to hearing your comments on the glorious field trip.

Dick Pardi, Les Marcus and myself are continuing our investigation of Paleogeoidal configurations. We have submitted the following abstract for the AMQUA meeting this coming August.

ABSTRACT

Contemporary sea level approximates a gravitational equipotential surface - the geoid. The present global marine strandline is the location of organisms possessing a firm relationship to the local datum. These strandline indicators exhibited similar relationships throughout the Holocene and can be measured relative to the local datum in time and evaluation. Since past isochronous surfaces must also have been gravitational equipotential surfaces, they describe the paleogeoid at that point in time.

The idée fixé of the Quaternary hydrologic budget is that ice volume must be related to sea level. We have catalogued some 3000 radiocarbon-dated sea level indicators back to 12,000 YBP (years before present). An elevation-time plot of the data indicates those points which might be expected to be eustatic in nature have a spread of nearly 20 meters at 5000 YBP and more than 50 meters at the base of the Holocene. It follows that "Z" axis eustasy is an elusive and improbable model.

Dividing the data into millennial cohorts, we constructed world-wide sixth-order trend surfaces. We also analyzed the residuals and find they have three major sources: areas of postglacial isostatic rebound, plate boundaries, and apparently erroneous data. The trend surfaces demonstrate a number of transient anomalies such as the progress of glacial isostasy through time, a decaying "equatorial bulge", and a "hole" centered on the northern Hatteras and Sohm Abyssal Plains.

The relation of glacial ice volume to sea level remains a riddle. The data demonstrates that the Holocene geoid has apparently suffered chronic instability. Thus mass distribution within the earth must have changed significantly during the past 12,000 years. Finally, since many aspects of rheological studies depend upon sea level data, both fields will remain naive until additional information is gathered from those areas which are still data deserts.

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Bruce E. Raemsch - Anthropology, Hartwick College

During summer excavations of the Timlin site at Hyndsville, New York (1979), charcoal from an ancient stream channel (that had been cut through a gravel deposit as the gravel was being dissected) yielded a date of 16,040± 170 BP years (SI-4128). This charcoal was found in close association with flake (pre-Paleoindian) tools though, because it dates only the channel, it does not necessarily date the tools some of which were derived from another near-by source. The sample was taken from beneath

the gravel (which two of us view to be glacial till, in some places reworked by water) about 95 cm in depth from the surface of the site being dug and resting on an oxidized clay. It should be added that other geologists view the gravels as representing terrace building activities of flow water. On the other hand it has been demonstrated that some of the gravels indicate patterns of extensive weathering which could only result after their deposition at much earlier times than represented by the radiocarbon date.

Work is expected to continue this summer, budget permitting, and we expect to follow up the studies that have been going on regularly, though somewhat interruptedly since 1970.

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J. P. Schafer - U.S.G.S., Reston, Virginia

An intensive effort to finish data collection for maps of the glacial geology and surficial materials of Connecticut was carried out in the field seasons of 1978 and 1979 by USGS personnel Phil Schafer, Elizabeth London, Janet Stone, Woodrow Thompson, and William Langer. Detailed or reconnaissance surficial mapping at 1:24,000 has been accomplished for the entire state. Preliminary compilation on the state base map at 1:125,000 is to be completed in mid-1980. As example of the kind of material to be included has been released as USGS Open-File Report 79-232, Surficial Geologic Maps of the Upper Connecticut, by Langer and London. One detail discovered during reconnaissance of the southwestern corner of the state is that the minor moraine that constitutes the Norwalk and Captain Islands continues on its westsouthwest trend into Rye, New York, where it makes up part of Manursing Island.

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William D. Sevon - Pennsylvania Geological Survey

Only a few items since the last Glaciogram. The contribution on page one of the last Glaciogram (vol. 14, Nov. 1979) attributed to Thomas M. Berg was really contributed to me.

A map of the surficial geology of Pike County is now compiled at 1:50,000 and will be the first detailed surficial map of a whole county published by the Survey. I am working on text now and have a completion target of October, 1980.

The glacial border by Crowl and Sevon is now at the printers under the revised title "Glacial border deposits of Late Wisconsinan age in northeastern Pennsylvania," and should be out in July.

The bedrock map continues to be hampered by delay and the end of 1980 is now a hopeful publication date.

* *

William W. Shilts - Geological Survey of Canada

This year I will be leading a project in an area that adjoins New York, so I thought that it would be worthwhile to let you and your readers know what our plans are and why we are doing the project. The field work will be carried out mostly by Inex Kettles who has returned to us from the University of Illinois.

As you know, the northeastern U.S. and southeastern Canada are recipients of increasing amounts of acid precipitation, a situation that will certainly worsen markedly as the nuclear power program slows down and conversion to power generation by fossil fuels particularly coal, accelerates. The effects of acid precipitation are likely to be most profound on areas of metamorphic or igneous rock where soils and waterbodies are naturally acid except where underlain by calcareous rocks, such as carbonate iron formation, marbles, or carbonatites. It is also in such geologically complex areas that the chemistry of "soils" is likely to vary significantly over short distances. Lowering the pH of ground water is likely to mobilize some elements in the soil, and it is important to known where noxious elements, such as As, Hg, etc. are most concentrated. Likewise, it is important to know where soils formed from rocks with minerals that produce some buffering capacity (i.e. carbonates) are located.

In unglaciated areas predicting sensitivity of terrane to loading by acid precipitation is largely an exercise in translating a geologic map showing lithologies into a map showing geologic units in terms of "sensitivity ratings", which are essentially based on the degree to which a lithologic unit can produce soils which significant can be related directly to the chemistry of different rock types.

In glaciated areas, however, the "soils" are composed largely of detritus that has undergone physical transportation with the obvious consequence (with respect to evaluating potential effects of acid precipitation) that material with high buffering capacity, such as marble or limestone debris, may be displaced onto bedrock such as granite that might produce soils with little buffering capacity. Bill Coker and I have demonstrated this for the Canadian Shield north of Lake Superior, where a huge train of calcareous debris extends hundreds of kilometres southward and southwestward onto the Shield from the Paleozoic carbonates that floor Hudson Bay (GSC Paper 79-1C, pp. 1-15). Lakes throughout most of this area are alkaline as a result of the calcareous drift cover, whereas lakes on similar bedrock lithologies elsewhere on the Shield are normally pH 5.5-7.0 (depending on depth, season, etc.).

Our summer, 1980 project is specifically designed to map those chemical and physical properties of the major types of surficial sediments lying on the Frontenac arch and eastern part of the Grenville structural province that may have some relationship to the effects of acid precipita-

tion. The bedrock in this area is likely to have produced glacial debris with widely varying sensitivities to acid loading, since granitoid rocks are interspersed with major marble belts. We will attempt to measure the effects of glacial dispersal of various lithologies onto mineralogically contrasting adjacent lithologies. We will start in the Thousand Islands region and work northwestward to Algonquin Park, sampling till and associated sediments from natural and man-made exposures. We hope to use backhoe excavations in selected areas to measure and sample 3-4 m profiles so that weathered and unaltered sediments can be compared. It is expected that a pretty complete picture of regional dispersal patterns will fall out of this work. We intend to finish the field portion this fall and have analyses completed by next spring. The analyses we intend to do on most samples are: (1) Ca - carbonate equivalent on 44μm-63μm fraction by Leco carbon analyzer; (2) C.E.C., <2mm fraction; (3) Sulphur on 44μm-63μm fraction (Leco); (4) pH on <2mm; (5) Gravel-sand-silt-clay %; (6) bulk magnetic susceptibility (63μm-250μm fraction); clay mineralogy (selected samples); (7) surface area (<2mm fraction); (8) pebble lithologies (>2mm<6mm); (9) Trace and minor element concentration in <2μm fraction (Cu,Pb,Zn,Co,Ni,Cr,As,Fe,Mn,Mo,Cd,U, etc.); (10) major element concentration for selected samples.

Of course, we will be measuring flow direction indicators in the field and will be keeping an eye open for stratigraphic information.

This letter probably gives much more detail than you would normally want, but we regard the problem of acid precipitation as having potentially serious effects on Canada, and the type of terrain in which this project is being done is geologically similar to the Adirondacks and adjacent areas of NE New York. Some of the techniques and results of our work may be of interest to glacial geologists in the Northeast, an area equally threatened by acid precipitation. We do not know exactly how to quantify the relative sensitivites of glaciated terrain, but we hope to learn enough from this pilot project to permit others to build on our experiences. Above all we hope to be able to demonstrate convincingly the critical need to evaluate the effects of glaciation when attempting to predict the effects of acid loading in complex bedrock terranes like the Canadian Shield or northern Appalachians.

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Jaan Terasmae - Geology, Brock University

"Some problems of late Wisconsin history and geochronology in southwestern Ontario; was published in the Canadian Journal of Earth Sciences, v. 17, p. 361-381. An article titled "Late-Wisconsin White Spruce (Picea glauca (Moench) Voss) is in press. This letter paper presents evidence to support the Port Huron stadial age (~ 13,000 yr. B.P.) of Halton Till 30 km west of Toronto, Ontario.

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Richard Young - Geology, SUNY College at Geneseo

Several detailed well logs (including self potential, gamma ray, and resistivity measurements) have documented a significant low water stage in Lake Ontario near Irondequoit Bay about 100 m below the Iroqouis Beach (Ridge Rd.). The information generally supports the observations of Sutton et al. (1972) and Sly and Prior (in press) concerning low stages following the draining of Lake Iroquois. Other information indicates that the old Irondequoit-Genesee "channel" in Irondequoit Bay extends to at least 125 feet below sea level but is filled with a complex section of tills and stratified sediments. A paper will be presented at the Great Lakes conference in Kingston this spring. (C^{14} age determinations are being run.)

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CONTRIBUTORS