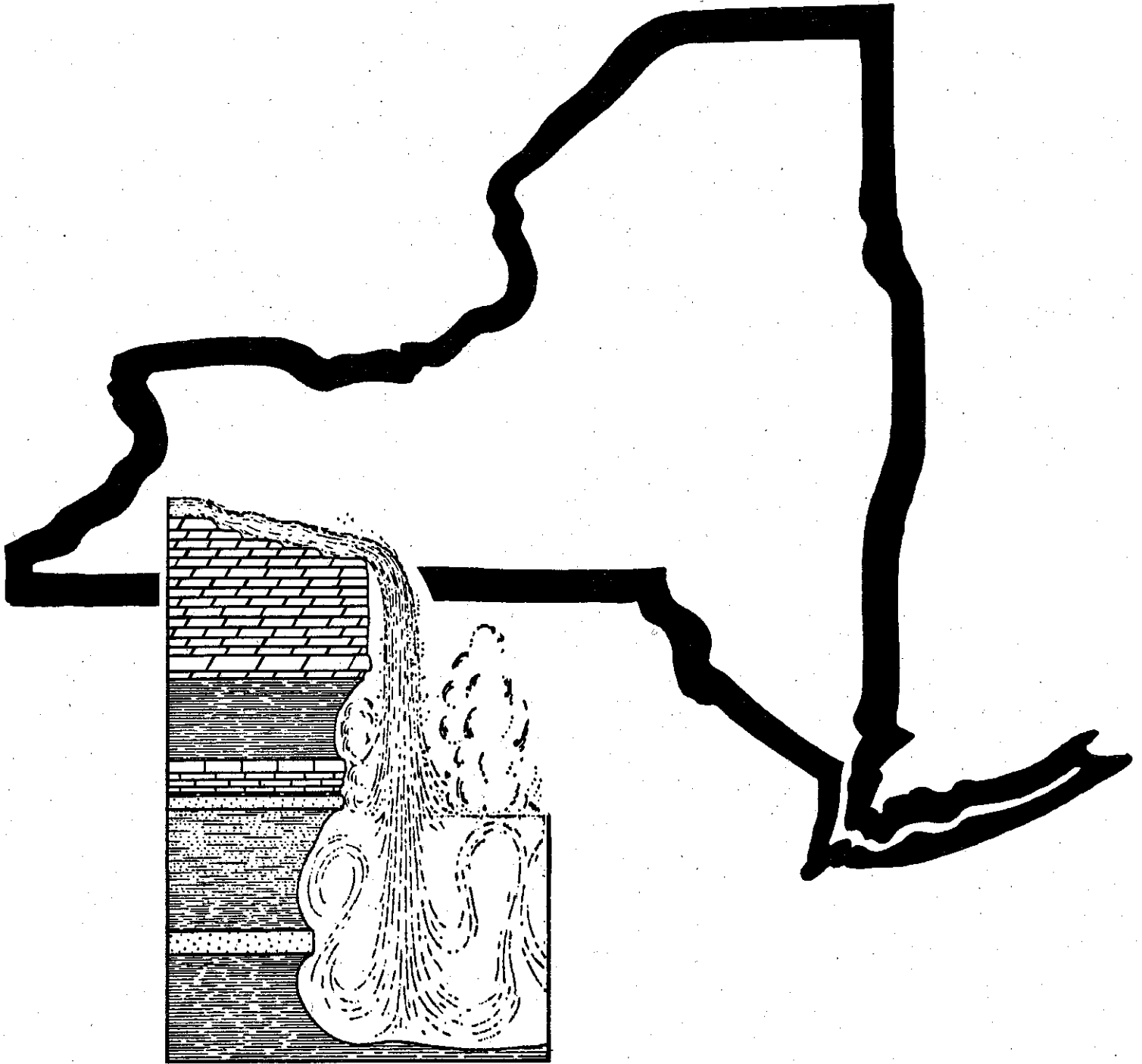


VOLUME 11, NUMBER 2 • DECEMBER 1976

# NEW YORK GLACIOGRAM



**DEPARTMENT OF GEOLOGICAL SCIENCES**

State University of New York at Buffalo  
Buffalo, New York 14207

## 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.

Parker E. Calkin

Steve Averill - Chemistry/Earth Science, Fairleigh-Dickinson Univ.

GLACIATION IN THE HACKENSACK AND HUDSON VALLEYS: A PROGRESS REPORT

There is no doubt in my mind nor in the minds of any others that have seen the field evidence that there was a glaciation subsequent to the draining of glacial Lake Hackensack. It left a widespread blanket of yellow-brown cobble/boulder till and stratified drift over the very compact red angular fragment till and varves of the Lake Hackensack glaciation. Interstadial deposits of clay and/or peat are known from five localities. Rock lithologies and over 100 drumlins indicate this most recent ice advanced from the north down the Hudson Valley and at Haverstraw, NY, spilled into the Triassic basin overwhelming the northern end of the Palisades in the process. Ice contact deposits of this latest glaciation have been found only as far south as Tenafly and Hackensack in the Hackensack Valley.

While the sequence of events is secure, their absolute chronology remains in question. A C-14 date of 9125±150 B.P. (1-6286) was obtained in Hillsdale early in this investigation from a peat layer in 1.3 meters of interstadial grey clay beneath the yellow-brown drift and above a thick sequence of red Lake Hackensack varves. The date together with other evidence indicates the possibility of a very late Valdres glacial pulse. This necessitates the existence of a rejuvenated local ice center adjacent to the Hudson Valley.

Varve counts, clay sedimentation rates in post-glacial lakes and glacial retreat rates allow for calculations yielding rough estimates of the minimum time for the duration of glacial Lake Hackensack and the following interstadial. The total minimum time calculated is about 6500 years. The terminal moraine in western Long Island, Staten Island and in the Triassic basin in New Jersey is the Harbor Hill. It is believed to be slightly younger than the Ronkonkama moraine which formed about 17000 y.a. The Roslyn Till of western Long Island overrides both the Harbor Hill and Ronkonkama. (Connally & Sirkin, 1973). Proglacial lakes Hudson and Hackensack certainly formed after the retreat of the Roslyn Ice. If the 17000 year figure is correct, the 9125 date is reasonable within 2 standard deviations. If the C-14 date is much too young, the date of 17000 must also be too young.

The 17000 year date is based on the assumption that the Ronkonkama formed at about the same time as sea level began to rise rapidly. In the light of what we have learned about glacial advances and retreats and their vagaries correlation of general rise in sea level to the onset of retreat of glacial ice at a specific locality is very risky. Certainly any single C-14 data must be viewed with some care even skepticism but not so much so as a no date date.

The C-14 date that provides the maximum limit of possible age for the terminal moraine in the Delaware River Valley and ostensibly for the same moraine in eastern New Jersey and Long Island, is on intra-glacial peat that yields a date of 26,8000 B.P. (Connally & Sirkin, 1973). The age minimum is established by a cluster of dates the oldest of which is 14,3000 B.P. (Davis, 1969). The most recently reported date is 19000 B.P. (Caldwell in Glaciogram, April, 1976). It is the oldest date found on top of the terminal moraine in New Jersey. It has yet to be correlated with the moraines in eastern New Jersey and Long Island where bog bottom dates are considerably younger.

Field evidence gathered last year shows a glacial re-advance of at least 5 miles into Lake Hackensack and strengthens my belief of the approximately 6500 year hiatus between Roslyn Till deposition and the later glaciation. Three recent C-14 dates from peat and a mastodon from Norwood, NJ, are 6433±100 B.P. (QC-142) or younger. Large samples of peat have been submitted for dating from near the mastodon site in an effort to check the dates. Two dates published by Perlmutter (1964) on non-basal peat over glacial Lake Hackensack varves are 5600 B.P. and less. The thickness of the underlying peat indicates an age of several thousand years more at the base.

Early paleo-indian artifacts are found in the Hudson Valley just south of the Catskills. Caribou bones at the Dutchess Cave site associated with points of the same typology have been dated at 12,530±370 B.P. (1-4137). No evidence of any kind of middle or late paleo-indian or of early archaic man has been found in the Hudson Valley. The oldest C-14 date in the valley below the Catskills stratigraphically higher than glacial lake varves dates about 7000 y.a. (except on Staten Island where several dates indicate habitation around 9000 y.a.). The situation is interesting since the nearby Delaware Valley has been occupied continuously since before 11000 y.a.

Finally I have returned to the bog in Hillsdale where this all began. This bog is almost 6 meters deep and is in the yellow-brown drift, overlies the stratigraphy described earlier and is above the sequence from which the questionable C-14 date was obtained. A core almost 6 m deep was sampled at one half meter intervals. The pollen so far has been a classic post-glacial sequence. Tundra (almost completely Ambrosia) with 2 to 20% A.P. (mostly small pine) occurs up to 4.5 m. At 4.0 m it is a park-tundra with 37% A.P. (pine, birch). At 3.5 m the Ambrosia decreases markedly in percent and total sum while A.P. (birch, pine and poplar) increases to 69% while the total pollen sum triples in amount over the 4.0 m. level. Work continues on the higher levels. When complete, samples will be taken at more frequent intervals and enough peat collected from one or more levels for radiocarbon analysis.

References

Averill, S.P., 1975, Multiple Wisconsin Glaciation in the Hudson and Hackensack Valleys: Abstracts with Programs, Northeast Section, Geol. Soc. Am., vol. 7, no. 1, p. 23.

Connally, G.G., and Sirkin, L.A., 1973, Wisconsinian History of the Hudson-Champlain Lobe: In the Wisconsinian Stage, Black, R.F. et al., Eds.

Perlmutter, N.A., 1964, Isotopes Inc. Radiocarbon Measurements IV: Radiocarbon, vol. 6, p. 273.

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Peter Barnett & Bern Feenstra - Ontario Ministry of Natural Resources, Division of Mines

Presently B.H. Feenstra is completing a "final" report on the Quaternary Geology of the Niagara-Welland area, Ontario (including n.t.s. maps 30M/35+W, 30M/6E, 30L/14E+W, 30L/15W). This report will include discussions and illustrations on the bedrock topography and drift thickness (outlining Spencer's Erigan Valley), glacial stratigraphy and the inventory of abandoned glacial lake shorelines of this area (8 levels identified from 580' to 830' asl.). He has also

completed mapping of the Grimsby-Dunnville area (30M/3E+W, 30L/13E+W) at a scale of 1:50,000, preliminary maps are available.

During 1976, P.J. Barnett mapped the Quaternary deposits of the Tillsonburg (40I/15) map-area, a preliminary map will be available in January, and has completed a "final" report of the Quaternary Geology of the Simcoe Area (40I/16).

We're looking forward to a "meeting of the minds" on the Quaternary Geology of the eastern end of Lake Erie basin. A recent index to the Quaternary Geology of Southern Ontario is appended (next page).

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Donald H. Cadwell - Geology, Lafayette College

I have been working on the Terminal Moraine near Belvidere, New Jersey. A new radiocarbon date has just been received on the Terminal Moraine: ~19000. This is a bog bottom date from a bog in the uplands of Jenny Jump Mountain, N.W. of Belvidere.

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Parker Calkin - Geological Sciences, SUNY at Buffalo

Things have been a bit slow with me research-wise; however, Sandy Brennan and Gary Weir are finishing up their studies on the Lake Ontario Bluffs and Sandy Pond Baymouth Bar areas respectively (see Spring '76 Glaciogram) and a new student (yet to be decided on) will continue historic recession measurements from maps and photographs of the New York shore of Lake Ontario. Graduate student Jim Ellis and I will team up with Larry Onesti and one of his students to work on a project titled "Past and Present Hydrologic Regimes In A Permafrost Environment, Atigun Pass, Brooks Range, Alaska" during the next two summers. I am also in the process of working up local Sea Grant and Glacial materials. A paper on the "Ancestral Niagara Drainage, New York: Stratigraphic and Paleontologic Setting" is nearly ready to go to press (I hope).

Chet Langway has just returned from Antarctica where he was involved in the Ross Ice Shelf Drilling Project.

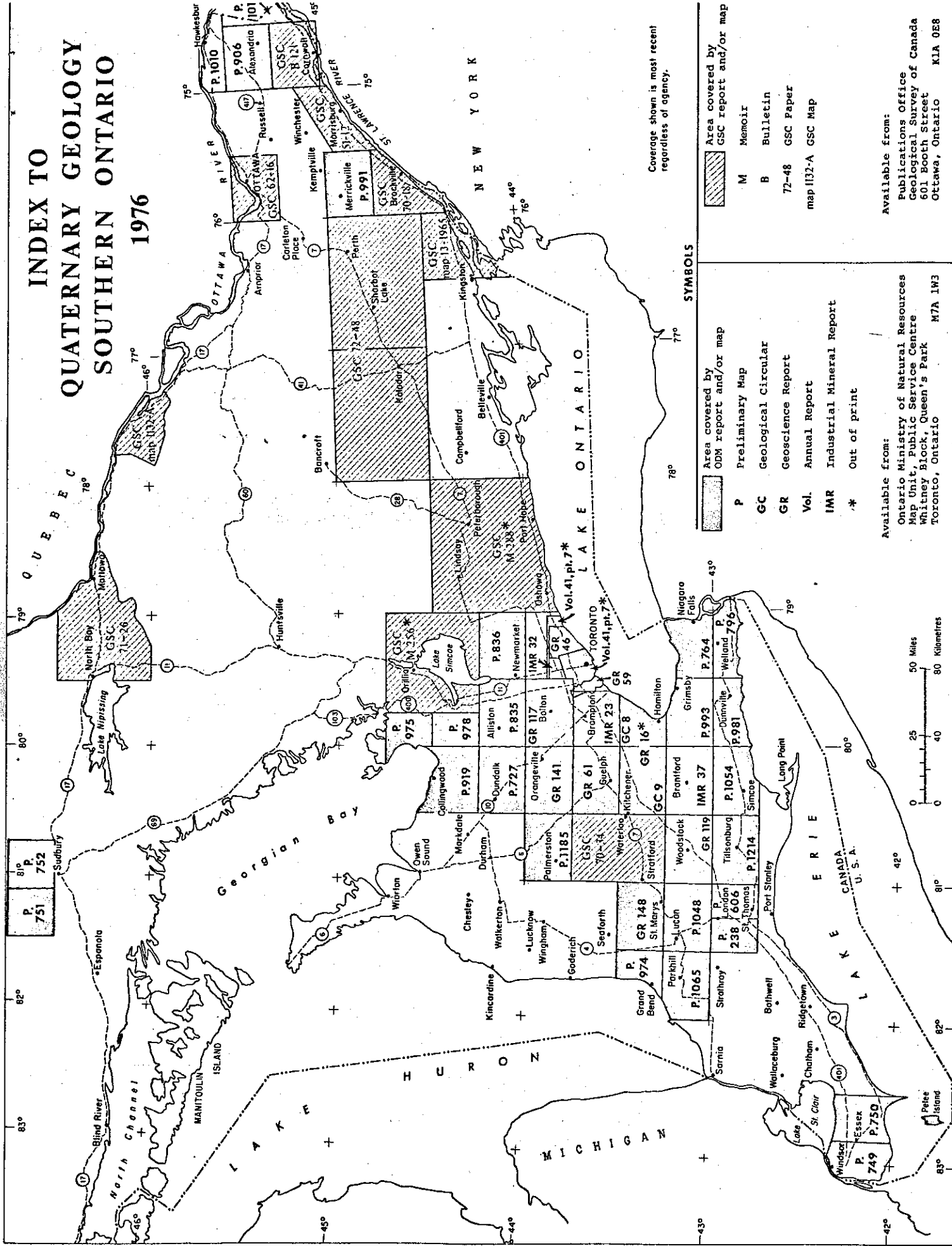
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Donald R. Coates - Geology, SUNY at Binghamton

My principal activities have included:

1. Writing and editing the volume on Landslides for the Geological Society of America.
2. Completion of work on Urban Geomorphology. It is Special Paper 174 of G.S.A
3. Providing guidance to several M.A. studies on glacial geology. Several of these are follow-ups of the reconnaissance work done a year ago on the St. Lawrence Project.

# INDEX TO QUATERNARY GEOLOGY SOUTHERN ONTARIO 1976



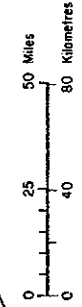
Coverage shown is most recent regardless of agency.

### SYMBOLS

Area covered by	Area covered by
	ODM report and/or map
	GSC report and/or map
M	Memoir
B	Bulletin
72-48	GSC Paper
map I132-A	GSC Map
P	Preliminary Map
GC	Geological Circular
GR	Geoscience Report
Vol.	Annual Report
IMR	Industrial Mineral Report
*	Out of print

Available from:  
 Ontario Ministry of Natural Resources  
 Map Unit, Public Service Centre  
 Whitney Block, Queen's Park  
 Toronto, Ontario M7A 1W3

Available from:  
 Publications Office  
 Geological Survey of Canada  
 601 Booth Street  
 Ottawa, Ontario K1A 0E8



4. Direction of the recent Binghamton Geomorphology Symposium on Geomorphology and Engineering. I was also busy on the writing and editing of the volume which has now been published. As pointed out in the last issue of Glaciogram several of the articles include glacial topics.

5. Preparation of several Geologic Source Reports for New York State Department of Transportation. Also updates were made on several gravel operations that had previously been mapped.

6. I am currently working on seven sand and gravel law cases for the New York State Attorney General's Office.

7. Our group also continues our work on the south shore of Long Island. To date I have been involved in providing court testimony on four different law cases that pertain to analysis of the fragility of the coastal environment.

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Jesse Craft - Penn. Geol. Survey, Pittsburgh

The N.Y. Friends will be happy to hear that my work on the Adirondacks is now completed. The abstract of the thesis is included for your information.

I am now in the writing stage of an evaluation of aggregate quality problems associated with Pleistocene terrace gravels in the upper Allegheny River and its tributaries. I hope to expand this study into a regional mapping program of gravel deposits starting this spring.

PLEISTOCENE LOCAL GLACIATION IN THE ADIRONDACK MOUNTAINS, NEW YORK

Jesse L. Craft, 1976, Ph.D. Thesis,  
University of Western Ontario, London, Ontario, Canada

ABSTRACT

The purpose of the study was to find evidence for or against the hypothesis that local glaciation occurred in the High Peaks area of the Adirondack Mountains, New York, following recession of the Late Wisconsinan Laurentide ice sheet.

The air photo and field studies identified 224 cirques in the High Peaks region. Detailed analysis of these features indicates that bedrock jointing and faulting are the primary controlling factors in the position and aspect of cirque development. Topographic position and elevation influences the degree of development of the glaciated valleys. Schrund elevations, a possible indication of snowlines, were determined for all cirques. The schrund elevation studies indicate two possible snowlines: one at 1700-2700 feet ASL, and another at 2400-3400 feet ASL. The lower values of schrund elevation for each possible snowline are associated with cirques which are located on the west, north and east sides of mountain masses and open northward. Cirques located on the south sides of the mountains have higher minimum schrund elevations.

The distribution of erratics from north of the Adirondacks and striae in the main valleys demonstrate that the Laurentide ice sheet overrode the mountains. The most conclusive evidence of the time relationship between local glaciation and continental glaciation was obtained from the studies of the light mineral (quartz, orthoclase and plagioclase) fraction of the tills. Quantitative analysis demonstrates a correlation between sources of glaciation and till composition. Materials deposited from local ice sources within the Anorthosite Massif if contain less than 20 percent quartz, less than 35 percent orthoclase and from 50 to 85 percent plagioclase. Continental tills contain less than 55 percent plagioclase with nearly equal amounts of orthoclase and quartz.

Striations on bedrock and elongate pebble orientation studies provide evidence of ice movement at nearly right angles to the Laurentide ice flow direction in Roaring Brook on the west side of Giant Mountain, at the Coon Pit on Whiteface Mountain and at Newcomb. A northward flow of ice is recorded at the McIntyre Development, Tahawus, N.Y. Lithology distributions indicating ice flow in directions other than that expected by the Laurentide ice advance have been found in White Brook Valley.

End moraines formed by local glaciation have been identified at St. Huberts, below Giant Mountain; Cooperkill Pond; Weston Mountain Cirque; Blue Ridge; Boreas Mountain and Redfield Cirque. Lateral moraines were observed in White Brook Valley, Styles Brook, Johns Brook and Boreas Mountain.

The approximate time of the last episode of local glaciation has been established by the existence of an outwash delta into Glacial Lake Warrensburg at Blue Ridge, N.Y. Glacial Lake Warrensburg is correlated to the Luzerne Readvance of Connally and Sirkin (1971) at 13,200 years BP. The oldest glacial event is established by a date of greater than 55,000 years BP (Muller, 1969) for lacustrine sediments overlying till at Tahawus, N.Y.

A climatic model is proposed to explain the existence of local glacial activity south of the Laurentide ice sheet.

The history of local glaciation in the Adirondack Mountains is believed to comprise the following episodes:

During Early Wisconsinan time, the Adirondack Mountains probably became a local ice center. This early ice melted away and the lake deposits at the McIntyre Development were formed. A major Laurentide ice advance then completely overrode the High Peaks. The Laurentide ice mass melted from the High Peaks region possibly during the Erie Interstade. The local ice probably redeveloped during the Port Bruce Stade and receded to some extent during the Mackinaw Interstade. Deglaciation of local ice to recessional moraine positions is related to the Two Creeks Interstadial. Rapid valley deglaciation occurred with the draining of Lake Iroquois. All glacial ice was probably gone by the time of the completion of the Champlain Sea phase of deglaciation.

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Thomas M. Cronin - Museum Comparative Zoology, Harvard Univ.

Lots to report. First two new Champlain Sea radiocarbon shell dates from the Champlain Valley: 11,900  $\pm$  120 (GSC 2338), and 11,800  $\pm$  150 (GSC 2366). Both samples were from high elevations (ASL) and *Macoma balthica* was dated in each case. These are the two oldest Champlain Sea dates from the U.S. When



several others are obtained, a short paper will be written on the age of the Champlain Sea in the U.S. Any comments or pertinent information would be appreciated.

Some results of my paleoenvironmental study of the Champlain Sea and its Foraminifera and Ostracoda will appear in Quaternary Research in a few months. A paper was presented at GSA in Denver on these results. A brief paper on Champlain Sea Foraminifera from Ontario will appear in Canadian Journal of Earth Sciences in December 1976. A synthesis of the microfossils was presented at the 3 e Colloque sur le Quaternaire du Quebec in Trois-Rivieres in October, and the paper will come out in a proceedings volume.

Speaking of the AQQUA conference in Quebec, it was very successful, particularly because it was bilingual, with simultaneous translations of each talk to either French or English. Besides the numerous French Glacial Geologists (who are doing extensive work on the deglaciation of Quebec), other participants included Dreimanis, Morner, Grant, Prest, Andrews, Ogden, Borns, Mott and other familiar names. It was a little surprising to see so few New York Quaternary Geologists attending since the deglaciation history of New York is so intimately related to that of Quebec. Perhaps it was just a busy time of year, or many simply did not know about it. I would suggest that anyone wishing information about the proceedings volumes contact Claude Hillaire-Marcel, or Serge Occhietti at the University of Quebec at Montreal, 110, Que. of U. of Q. at Trois Rivieres.\* I'm sure many of you would like to keep informed on some of the excellent work going on in Quebec, since it may be very pertinent to your own research.

In case anyone is not aware, Ian Brookes, York University, Downsview, Ontario is organizing a symposium for the 1978 joint meeting of GSA GAC in Toronto. The theme is the extent of Wisconsin glaciation in eastern and northern Canada emphasizing horizontal and vertical glacial limits, environmental conditions of ice free areas, significance of glacial limits for glacier dynamics, isostatic and eustatic adjustments, and for biotic distributions. Contact Ian Brookes for more information, or to lend him your ideas.

\*Occhietti at Trois Rivieres.

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George Crowl - Geology, Ohio Wesleyan

I spent September mapping the Wisconsinan glacial border in North Central Pennsylvania from the New York state line southeast to Galeton. I now have more detail than is available in Charlie Denny's Potter County report--USGSPP288. This border seems to continue into the Woodforkian border of NE Pennsylvania, but there is still a gap in the mapping. Ernie Muller maintains that this portion of the border is Altonian in age. I am not yet convinced of this. So we have problems!

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Jim Davis - N.Y. Geol. Survey

The following paragraphs outline projects with which I am involved in the state Geological Survey. This information will also appear in the upcoming Geogram research issue.

Co-workers: Jeffrey Pferd, Robert Fakundiny, Richard Monheimer, John Matuszek, Tom Cashman, Robert Dingman.

Radionuclide Pathways at West Valley Low Level Waste Burial Site (New York)

Investigation of the pathways for radionuclide migration in the shallow radioactive waste burial site at West Valley, N.Y. This investigation includes monitoring and analysis of water in radio-active waste burial trenches, surface water, groundwater and soil gases. Additional investigations include mapping of "mock trenches" to detail till fabric and potential migration routes, characterization of till sorption coefficients, evaluation of radionuclide interactions with stream sediments during transport and slope stability conditions at the site. Work on computer simulation of radionuclide pathways is in progress. This work is supported by the U.S. Environmental Protection Agency and the State Geological Survey is the lead agency.

Co-workers: Robert Fakundiny, Richard Monheimer, and Edgar Reilly

Natural Resource Information in Land Use Decision

Evaluation of the effectiveness of geological and biological reports and publications which have been consciously produced for informing by land-use decision makers. Study areas are located in New York and Connecticut and field surveys of data product use by decision makers were undertaken during 1976. The project is supported by the National Science Foundation. The feasibility of cost-benefit analysis for natural resource reports and publications is being evaluated.

Co-worker: Robert J. Dineen

Paleo-drainage of Eastern New York

Work on evaluation of the paleodrainage significance of exposed and buried bedrock valleys in and near the modern Hudson River drainage system.

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Kernan Davis - N.Y.S. Dept. of Environmental Conservation

During the past few months I have encountered work by some other geologists which impressed me and which should receive the attention of glacial geologists. Bob La Fleur (RPI) has some very interesting information regarding the area between Springville and Ellicottsville in Cattaraugus County and Dick Young (SUNY College, Geneseo) has some new concepts about the history of the Genesee River. I had done some site-specific work in each area and am delighted to see some of my half-baked ideas, generated a good number of years ago, being proven out by their recent work. I make no claims of authorship or collaboration: We each have seen the same things, only they took time to explore further. Maybe, it is that now I am feeling the pinch of site-specific assignments.

For example, in the near future there will be some drilling and sampling done in the valley of the West Branch of the Delaware, upstream from Walton, where an ice contact deposit nearly chokes the valley. It has been chosen as a landfill site and details of the hydrogeology must be learned before the geohydrology may be worked out and accounted for by the design engineers. This data will be on file in our Department some time in early 1977. I have specified that explorations should extend to bedrock or to river bottom elevation, whichever comes first. I realize that there would be research value to fully penetratir

holes throughout the site, but the 40,000 or so citizens of Delaware County should be required to finance only those explorations absolutely necessary to assure environmental integrity and public safety. Something of academic interest may come of this. Those who inquire will be informed. Early drilling at the site revealed "no till"; this piqued my curiosity and led to the opinion that the early drilling had been insufficient to identify the hydrogeology. What will result is a pocket of knowledge, not coordinate with other geologic problems of the valley or region---but, that's the way it is.

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Aleksis Dreimanis - Geology, Univ. of Western Ontario

Last summer and fall were spent mainly travelling to various geologic meetings and excursions in Europe, U.S., and Canada. However, the Pleistocene history of New York and the adjoining areas were kept in mind, particularly when dealing with the stratigraphy of the last glaciation. Such an occasion arose, for instance, in May, when Jesse L. Craft defended successfully his Ph.D. thesis at our University, on "Pleistocene local glaciation in the Adirondack Mountains, New York", or when I had to prepare and present a paper on "Correlation of Wisconsin glacial events between the Eastern Great Lakes and the St. Lawrence Lowland" at the 3rd Symposium on the Quaternary of Quebec, which was organized by AQQUA at Trois Rivieres on 14-17 October, this year.

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Rhodes Fairbridge - Geology, Columbia Univ.

NEW HOLOCENE CHRONOLOGY MODEL

Rhodes Fairbridge (Columbia University, N.Y. 10027) and Claude Hillaire-Marcel (Universite de Quebec a Montreal) have recently analyzed a series of 185 isostatically emerged beach ridges from the last 8000 yr ( $C^{14}$ ), that is, almost back to 9000 BP (sidereal years). Using a dozen radiocarbon dates as control, and based on the essentially uniform spacing of the beach ridges, a cycle of 45 yr is suggested. In high latitudes the 11.2 yr sunspot cycle tends to show up best in groups of four (45 yr) and  $0^{18}/0^{16}$  in Dansgaard's Greenland ice core has a 90-180 yr cycle (the full sunspot repeat pattern, corresponding to the major "tidal" planetary conjunction effect on the sun).

Minor anomalies in beach ridge spacing indicate increasing or decreasing rates of relative sea level change on Hudson Bay. Times of decreasing rate correlate with eustatic sea level fall in tropical regions, major glacier advances in both hemispheres and with arid phases in the Sahara and the American Southwest. In contrast, the times of accelerated rate of sea level change on Hudson Bay match the tropical sea level highs, high levels of tropical lakes and rivers, and indications of warm stages in high latitude palynology.

A full report is in preparation. Dr. Claude Hillaire-Marcel can be reached at Dept. des Sciences de la Terre, Universite de Quebec a Montreal, B.P. 8888, Montreal.

Professor Fairbridge will be on sabbatical this winter (November 1, 1976, to May 1, 1977), in care of: Geographisches Institut, Albertus-Magnus-Platz, 5-Köln-Lindenthal, West Germany. He has received a Humboldt Foundation award for his sabbatical, and in March will be delegate to the 500th Anniversary celebration of the University of Uppsala, Sweden.

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Nelson Gadd - Geological Survey of Canada, Ottawa

Nelson Gadd, in association with colleague Peter B. Fransham, has been conducting a long-term study of the relationship between geomorphology, geology and geotechnical properties of 'Leda' clay. To date research involving a large number of stratigraphic borings of Champlain Sea and younger deposits has been restricted to the Ottawa Valley portion of Champlain Sea with interesting results.

Although much data remains to be compiled and evaluated, regional studies and visual inspection of lithologies encountered in borings have allowed Gadd (1977 in press) to formulate a concept of off-lap sedimentation. In brief, he recognizes the migration through the region of a prograding delta system later incised by the fresh-water system of the proto-Ottawa River.

Fransham's studies on geotechnical relationships will provide the basis of a thesis to be submitted to the Dept. of Civil Engineering at McGill University in Montreal.

Recent and forthcoming related publications are:

Fransham, P.B. and Gadd, N.R.: Geological and geomorphological controls of landslides in Ottawa Valley, Ontario", in "Slope Stability", 29th Cdn. Geotech. Conf., Conference preprints, 13-16 October, 1976, Vancouver, B.C.; p. vi - vii.

Gadd, Nelson R. (1976): "Geology of Leda Clay", in "Mass Wasting", 4th Guelph Symposium on Geomorphology, 1975; Geo Abstracts Ltd., Univ. of East Anglia, Norwich, NR4 7TJ, Eng and; p. 137-151.

\_\_\_\_\_ (1977a): "Surficial Geology and landslides of Thurso-Russel map-area, Ontario; Geol. Surv. Canada, Paper 75-35, in press.

\_\_\_\_\_ (1977b): "Off-lap sedimentary sequence in Champlain Sea"; in Report of Activities, Geol. Surv. Can., Paper 77-1A; in press.

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Carl Koteff - U.S. Geological Survey, Reston

Moving to Reston, Virginia\*, after such a long and delightful time in Boston, is proving less traumatic than I anticipated, but it still hurts. The idea of looking out of my window and seeing red dirt never in its life in contact with ice is nearly incomprehensible. To ease the pain, Skip Pessel and I are preparing an expanded version of the morphologic sequence concept, adding an historical review. Hope to publish it soon.

\*Note new address on back page

Peter Martini - Dept. of Land Resource Science, University Guelph

At Guelph we are involved in a series of research projects which, while they do not relate directly to the New York area, may be of some interest to readers of Glaciogram.

Bowmanville Bluffs Project. Dr. M. Brookfield and I, from the Department of Land Resource Science, University of Guelph and Dr. H. Gwinn from Erindale College (Toronto) have initiated a long term project on detailed sedimentological and stratigraphic studies on Pleistocene sequences exposed on the coastal bluffs on the north shore of Lake Ontario between Port Hope and Scarborough. Two major objectives of the study are: to analyze processes that are active in proglacial lakes; and to understand processes relating to emplacement of tills and erosion of interglacial sequences by glaciers.

Wasaga Beach Project. This is a project of mine that has been going on for three years. (Latest publication is - Martini, I.P. and Hoffman, D.W., 1976, Geology, land use, and conservation of the Quaternary barrier system of Wasaga Beach, Ontario: Geoscience Canada, v. 3, p. 45-53). One of the objectives is to analyze transgressive and regressive events of the Great Lakes, and the formation of coastal barrier systems. By studying recent processes, analyzing sedimentary features that are being formed, and studying their preservation on the shelf sediments and on the fossilized environments exposed along river and quarry sections, it is the ultimate goal of the research to build sedimentological models of lacustrine environments. Recent processes in nearshore areas of Wasaga Beach and other areas along the Canadian coasts of Lake Huron, are being studied by Dr. R. Davidson-Arnott, who joined the Guelph Geomorphology group this year. A second aspect of the work at Wasaga Beach relates to the study of impact of human activities on the coastal dunes of the Barrier system. These studies that include experiments on the biological carrying capacity of the dunes and studies on the formation and stabilization of wind blowouts, will help in the proper planning of activities in a recently established Provincial Park a few miles inland from the coast.

James Bay Lowlands. In collaboration with several Federal Agencies among which The Canadian Center for Inland Waters and the Lands Directorate, Dr. R. Protz and I have initiated a research project to look at the sediments and soils of the James Bay Lowlands between Moose River and Albany River. Last summer a preliminary survey was conducted (by helicopter), research problems were identified and preliminary sampling was conducted. The program for next year calls for the extension of the exploratory look at the remaining Ontario coasts and initiation of detailed work on tidal flats and beach ridges.

Alan Morgan - Earth Science, University of Waterloo

Quaternary work at Waterloo is continuing in the absence of Paul Karrow (last seen with geological pick and surfboard) heading for Scripps at La Jolla, California. Paul is working with Dr. J.L. Bada on amino acid dating of materials whilst on sabbatical leave from Waterloo. Cam Baker is continuing his M.Sc. work on microfibrils of the Maryhill Till, an Ontario-Erie lobe till which is well developed in the Kitchener-Waterloo region. Bill Robetson is conducting studies on the subsurface analysis of till units in the area in respect to their groundwater productivity. Donald Schwert is almost into his final year of a doctoral programme, examining the insect faunas from two sites, one in Kitchener, Ontario, the other from Winter Gulf, south of Buffalo, New York. This programme should be near completion in early 1978. Anne Morgan has been working with Alan Morgan on a number of different sites in southern Ontario and in the northern United States. The initial results of the beetle fauna data from the Don and Scarborough Formations in Toronto were presented at the G.S.A. Annual Meeting in Denver in November. The Don beetles indicate a deciduous forest environment, with interspersed conifers, growing beside a slow moving river flowing into a high level lake basin. The mean annual temperature was similar to Toronto today. The overlying Scarborough faunas indicate a treeline situation with the mean annual temperature about 17°F. (approximately 30°F cooler than the Don). Other sites which are almost complete include Beaver Valley (near Collingwood, Ontario) which contains a true tundra fauna, and Two Creeks, Wisconsin, which is a good Boreal forest environment. Alan Morgan is continuing work on the distribution of fossil permafrost features in southern Ontario with the aid of a 4<sup>th</sup> year student at Waterloo, Phil Hammill. A paper on this topic will be out shortly in the Canadian J. of Earth Sciences, whilst another paper on fossil Caddisflies from the Don Formation is in press in C.J. of Zoology. He has been asked by Fred Shotton, General Chairman of INQUA, to remind all persons planning to attend INQUA at Birmingham that confirmations for field trips and registration should have been sent in in late September. As a result of poor initial confirmations a number of field trips have been cancelled. Remember that the 1978 G.S.A. will be held in conjunction with the Geological Association of Canada and M.A.C. in Toronto and that field trips and Quaternary Sessions will be held at this meeting.

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Ernest H. Muller - Geology, Syracuse Univ.

\* The following was received last May too late for the Spring Glaciogram.

With the spring term over and Syracuse University's Commencement the first weekend in May, I am eagerly anticipating the more open schedule of summer. Not that the past term was all frustration, for there was slow progress along a number of lines:

The Niagara Sheet (1:250,000) of the projected Quaternary Map of New York State moved slowly through several further steps toward publication by the State Geological Survey.

Compilation of the Finger Lakes Sheet (1:250,000) moved ahead a little. As a crude reconnaissance map the compilation should be essentially completed in another year--provided harmonious relationships can be reestablished with the northeastern Pennsylvanians.

Data on the New York portion was completed for Eric Henderson's map of the surficial geology of the Ontario Basin to be published by the Canadian Geological Survey as part of the International Field Year on the Great Lakes--which took place so long ago I have forgotten when it was.

Walt Newman's "Conference on Amerinds and their Paleoenvironments" provided the stimulus for a status report on "Late Glacial and Early Post-glacial Environments in Western New York" which will appear in the near future along with the rest of the conference papers in Annals of the New York Academy of Sciences.

Nena Salomon defended her M.S. thesis on "Stratigraphy of Glacial Deposits along the South Shore of Lake Ontario, N.Y." in late April. She finds solid stratigraphic evidence for glacial oscillation marked by the Carlton Moraine.

During May and June 1976 (See above note by Editor.\*), I expect to be working out of Syracuse, checking into the office a day or two each week, and dividing attention among a number of projects:

The Genesee Valley study, begun last summer in cooperation with Dick Young at Geneseo, Dallas Rhodes at the University of Vermont, and Paul Willette and Mike Wilson, graduate students at Syracuse University, will get first attention, with focus on Quaternary geology, both glacial and fluvial, on history and correlations, sediment sources, and present processes including particularly the role of unusually high discharge events. The area under study reaches from Belfast to the outskirts of Rochester.

Dick Jordan and Tom Chambers, two graduate students at Syracuse University will begin mapping in the Tug Hill with a view to eliminating a large blank in Quaternary mapping and to determine what relationships exist between Quaternary geology and hydrologic regimes of Tug Hill wetlands.

Excavation for the beltway around southeastern Syracuse is uncovering hlaup deposits which Bryce Hand and I spoke of a few years ago. Vik Thrivikramaji, working under Bryce's supervision in sedimentologic interpretation of this event or events will keep trace of these developments.

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Walter S. Newman , Queens College, Flushing

Last summer's field season in eastern Main (sponsored in part by the Maine Geological Survey) was aborted after two weeks when I tore the long tendon in my left leg playing basketball on Sunday afternoon with some of our students. Limping about campus with ace bandage and cane, we also have some 900 radiocarbon dates purporting to indicate the level of the sea within the interval 1000 through 6000 years B.P. Datum, Laboratory Number, elevation, date, latitude and longitude were key-punched and all data fed into our computer memory. Cooperating with Les Marcus a biometrician, Richie Pardi, Joe Paccione and Steve Tomacek, we have so far managed to prove that everybody's sea level curve is essentially correct. It depends upon where in the world you happen to be carrying out your studies. Rhodes Fairbridge shines at low latitudes while Art Bloom is properly drowning us in northern mid-latitudes. However, curves from similar latitudes north and south of the equator not only do not match but are often out of phase. What we appear to be seeing is that distortion of the geoid is more important than eustatic fluctuations. We'll present some of this data at the Neotectonics Symposium in Stockholm next summer and more at the INQUA meeting.

Lenny Cinquemani, Howard Craig, Barry Cirolli and myself have been boring tidal marshes on both sides of the Ramapo Fault Zone to obtain basal peat samples for radiocarbon dating. The tentative sea level curves from either side of the fault zone don't exactly match and may suggest the block to the north has moved down relative to the southern block. It may be that we will develop a method for determining both the date and through magnitude of faulting in littoral environments by comparing discordancies of transgression curves on the opposite sides of faults and fault zones. We also believe that some of the ponds along the Ramapo Fault Zone may be sag ponds and will attempt to date the ponds by pollen zonation and radiocarbon dating. If the basal sediments of these ponds are mid-Holocene rather than late-glacial in age they may well be sag ponds.

The "Amerinds and their Paleoenvironments in Northeastern North America" volume, soon to be published by the New York Academic of Sciences is coming through me in galley and many of the galley are already in the hands of the respective authors. Let's hope we all see our copies early next year.

The Queens College Radiocarbon Laboratory continues to turn out about four dates a week. Our financial situation has improved considerably and, while still in the red, we are managing to cover many of our expenses. Our second date list will be published in RADIOCARBON early next year.



Vic Prest - Geological Survey of Canada, Ottawa

Jaan Terasmae and Vic Prest spent some ten days on the Magdalen Islands in September as a follow-up to short visits in previous years. Once again they could find no evidence of overriding glaciers but only of floating ice. This ice (probably both shelf and berg ice) came from at least two different sources; a bouldery mantle on low parts of the northern islands had a source in western Newfoundland whereas the red, sandy diamicton fringing the southern islands was brought from the Magdalen Shallows (shelf) by ice from New Brunswick and Nova Scotia. These deposits overlap only the lower, outer parts of the islands, reaching a maximum of about 90 m in the southeast and 30 m in the north. These deposits are probably of different ages. Although the Magdalen Islands are surrounded by the sea, the fringing deposits need not be marine; they could be glaciolacustrine. Glacial lakes could form if Newfoundland and Cape Breton or other ice masses plugged Laurentian Channel in Cabot Strait. In any case the upper limit of these deposits does not conform to the isobase data on marine overlap from western Nova Scotia and Prince Edward Island, from eastern New Brunswick and Gaspesia, nor from south-western Newfoundland. Another reason for this lack of conformity may be the difference in age(s) of the overlap on the Magdalens relative to these regions. Also, tectonism may be a factor, for the Islands are largely underlain by thick salt deposits.

The Magdalen Islands are a geomorphologists paradise. Study of the surficial deposits provides a complex record of sedimentation separated by erosional intervals that together may span the greater part of late Pleistocene time. At least two interglacial intervals are recognized. Periglacial phenomena are widespread and no doubt denote one or more glacial stages. The island's surely merit a field trip, though remote from the normal haunts of New Yorkers.

The story of the glaciated-unglaciated controversy about the history of the Magdalen Islands, together with biological information on an interglacial deposit found there, is given in a forthcoming paper Prest et al. (1976). The ever-developing picture of restricted glacier ice in the Gulf of St. Lawrence region supports the long-held concept that Late Wisconsinan ice did not cross the Magdalen Islands (Prest, 1957). It may now be stated that no Wisconsinan ice crossed the islands. It is important that the old concept of overriding Laurentide ice give place to the recognition of local Maritime centres of glacier activity and at least one unglaciated enclave.

Reference:

- Prest, V.K. (1957): Pleistocene geology and surficial deposits; in Geology and Economic Minerals of Canada, Ed. C.H. Stockwell, Econ. Geol. Ser. no. 1, 4th Edition, Geol. Surv. Can.
- Prest, V.K., Terasmae, J., Matthews, J.V., Jr., and Lichti-Federovich, S. (1976): Late Quaternary history of Magdalen Islands, Quebec; Maritime Sediments, v. 12, no. 2 (in press).

Bill Sevon and Tom Berg, Penn. Geol. Survey, Harrisburg

We have relatively little to report about pleistocene work we have done in Pennsylvania since the last Glaciogram. We have concentrated mainly on revision of the State bedrock map, a project which is coming along very well. The new State geologic map will be significantly different than the 1960 edition and will have more accurate boundaries for various glacial maxima, mainly because of the work of Crowl and Marchand.

"Geology and Mineral Resources of the Brodheadsville quadrangle, Monroe County, Pennsylvania", by T.M. Berg, has been published and includes a separate surficial geology map. The reports on the Pocono-Pines and Mt. Pocono quadrangles (Berg, Sevon & Bucek) and the Skytop quadrangle (Sevon and Berg) are now in the editorial mill and should be out within a year.

Sevon is compiling the Quaternary Map of Pennsylvania (Scale 1: 1,000,000) for Gerry Richmond's U.S.G.S. project and hopes to have it in final form by May, 1977. This compilation may result in the publication of a simplified surficial map of Pennsylvania by the Survey.

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George White - Dept. of Geology, Univ. of Illinois

George White and Stanley Totten have completed their maps and report on the glacial geology of Ashtabula County. A considerable part of the report deals with environmental and economic glacial geology. It includes a long section by Totten of a very detailed study of the lake beaches and cliffs.

White is in the process of revising his unsophisticated 1953 report on the glacial geology of Summit County (Akron). A quite different model is emerging.

Totten has completed the mapping of Medina County and Lorain County and the reports on these are in preparation.

Richard A. Young - Dept. of Geology, SUNY College at Geneseo

The findings below have resulted from my ongoing studies funded in part by the U.S. Environmental Protection Agency and the State of New York through the U.S. Geological Survey and the N.Y. State Geological Survey (IJC, Task C, Pollution from Land Use Activities Reference group). Portions of these studies have been completed as a joint report to the N.Y.S. Geological Survey by Muller, Young, Rhodes, Willette, and Wilson.

1.) The suspected buried channel of one of the preWisconsinan Genesee River courses which bypasses the falls area at the south end of Letchworth Park (near Portage) has long been substantiated by borings done in 1908-9 by the N.Y.S. Water Resources Commission. At least six documented holes to bedrock demonstrated the existence of a channel which is 180 feet below the floodplain opposite Portageville. Kernan Davis (DEC, Albany) called to my attention other borings done by the Core of Engineers in 1952 which did not extend to bedrock but which contain fairly detailed descriptions of the materials encountered in a 236' section. Fairchild was apparently unaware of the 1908-9 survey at the time of his writings on the geologic history of the Genesee Valley. The steep northsloping gradient on the buried channel also suggests the existence of falls in the old channel, and is in agreement with findings reported in an earlier Glaciogram of northward flow from fluvial gravels beneath the glacial deposits near the center of the park.

2.) There is clear evidence of 2 ice advances in the broad drift plug filling the Genesee Valley north of Geneseo. The younger till overlies varved sediments near the latitude of Salt Creek. Excellent exposures of ice thrust deformation features were discovered along Salt Creek and south of the Oxbow Lane landslide (1973) area.

3.) Eight samples from the Genesee Valley area between Dansville and Avon have been submitted for radiocarbon dating. These include marl, peat, hearths, and logs from as deep as 35 feet below the floodplain surface. Results of these dates will be used in a U.S.G.S. special study of the Mill Creek Basin-Canaseraga floodplain near Dansville. The emphasis is on the long term sedimentation and erosion rates in the Genesee Valley. This study is being directed by Larry Mansue from the U.S.G.S. Ithaca office.

4.) Detailed mapping of portions of the Dansville and Wayland Quadrangles for the U.S.G.S. studies mentioned above have shown that the Valley Heads Moraine can be clearly subdivided into a minimum of 4 subunits representing successive stages of ice withdrawal. Each stage is clearly marked by end moraines, kame terraces, and outwash channels along a distinctly lobate ice front. A strong case can be made for an initial readvance of two opposing lobes from the Canandaigua and Genesee Valleys meeting in the main east-west valley between Wayland and Naples to form an unusual "interlobate" moraine. This event makes it much easier to explain the thick lake clay sequence logged in wells near Wayland which otherwise would have no obvious means of impoundment.

LATE ARRIVALS

Steve Averill - Addendum to p. 2.

At the top of the glacial Lake Hackensack red varves in Norwood, N.J. was a thin sequence of grey varves. Pollen extracted is pine, birch, spruce, fir and grass. A. P. is about 65%. This is a lower(?) A zone assemblage. C-14 in this area on the A, 1-3 zones date from 10-12 thousand y.a. Glacial Lake Hackensack must have drained less than 12,000 y.a.

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Bob Black - Geology, University of Connecticut, Storrs

In Aleutian Islands last summer with stop at Juneau Ice Field on return. From there I went to Australia and New Zealand while on sabbatical leave this fall.

A short paper on deglaciation of the Shetucket River basin, northern Conn. is in press (GSA Bull.).

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Hal Borns - Quaternary Studies, University of Maine, Orono

Field Activities

Glaciology:

1. Dr. Terence J. Hughes and Dr. Robert H. Thomas started a study of the dynamics of the calving Jacobshaven Glacier, West Greenland this past summer. Dr. Thomas is expanding his study of the dynamics of the Ross Ice Shelf, Antarctica, as a part of the Ross Ice Shelf Project of the U.S. Antarctic Research Program, NSF, this current Austral summer. He is being aided by Dr. Hughes.

Glacial Geology:

2. Dr. Wibjorn Karlen continued his work on Holocene glacial fluctuations northern Sweden and Norway. Dr. George Denton is continuing his study of the McMurdo Sound region, Antarctica, this Austral summer as part of the U.S. Ant. Research Program.

3. Dr. Harold W. Borns Jr. continued his work on the Late Wisconsin history of Maine this past summer with emphasis on east central Maine.

Oceanography:

4. Dr. Thomas Kellogg is continuing his study this Austral summer of the history of the Ross Sea, Antarctica in reference to the history of the West Antarctic Ice Sheet - Antarctic Research Program of NSF.

5. Dr. Detmar Schnitker served as the shipboard palynologist aboard the Glomar Challenger in the northeast Atlantic area for approximately 3 months during the early summer. The research entailed the evolution and history of stable continental margins and Tertiary paleoceanography in the northeast Atlantic.

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Marie Morisawa - Geological Sciences, SUNY at Binghamton

Recently published a report on studies of the impact of man on some local tributaries of the Susquehanna. The report is entitled "Multi-objective planning and environmental evaluation of water resource systems". This was done under the auspices of the OWRT, USDI.

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Page No.

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(Note--This Glaciogram has no page 5 - e d.)