# NEW YORK
# GLACIOGRAM

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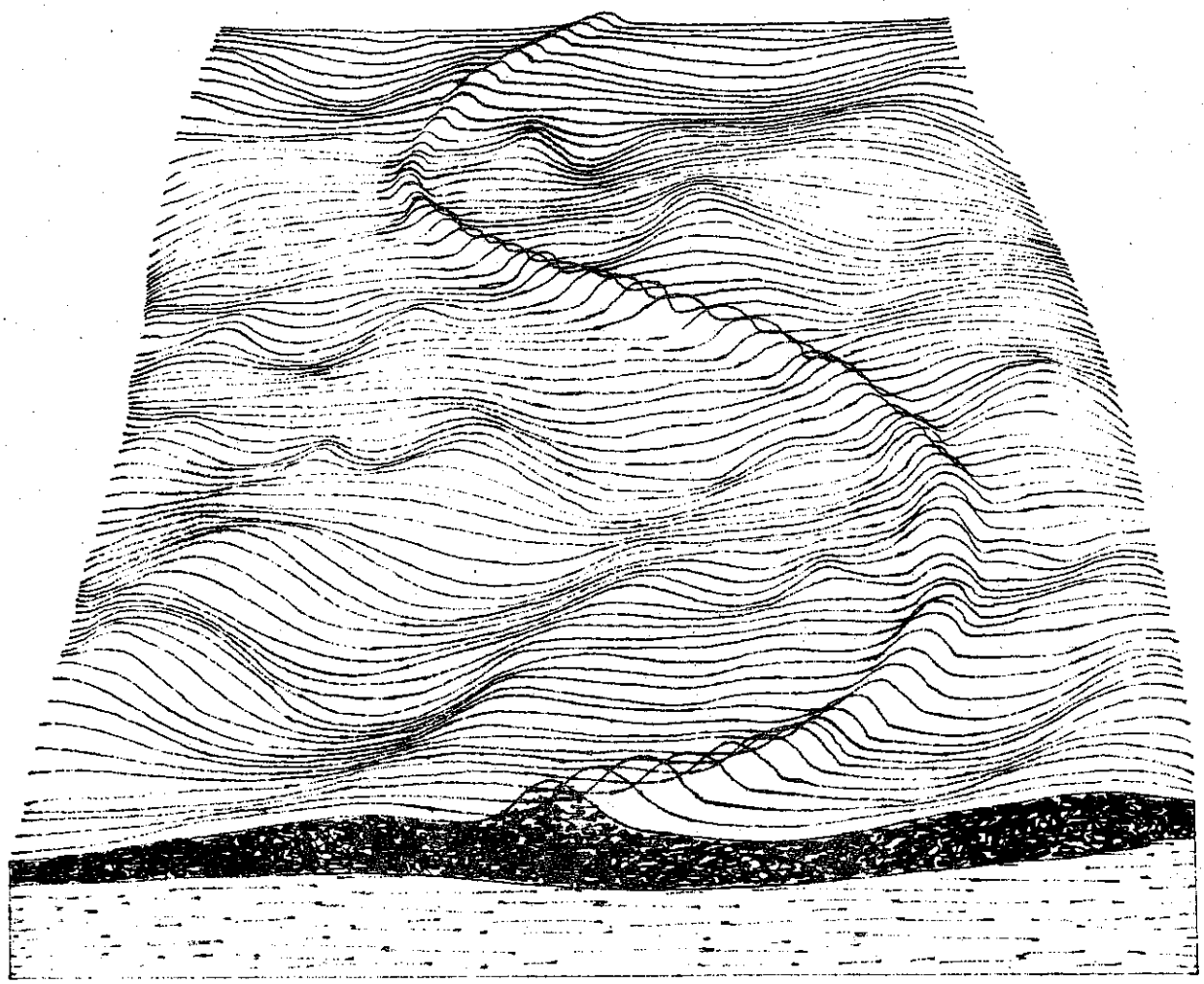

Department of Geology
State University of New York at Binghamton
Binghamton, New York 13901

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For further information write to the editor:

Donald R. Coates

Department of Geology

State University of New York at Binghamton

Binghamton, New York 13901

# EDITOR'S PAGE

Rhodes Fairbridge has made the suggestion that Glaciogram might serve as the vehicle for publishing "notes and impressions" on the INQUA, Paris field trips. He proposes that the Glaciogram members who took various field trips should send in their contributions on glacial and periglacial trips and emphasize any possible relation to the New York region. He is doing a similar job for Coastal Research Notes. Therefore, while still fresh in your minds why don't you prepare something now for the May issue of Glaciogram.

Linc Washburn writes that Dr. Cynthia Irwin-Williams is planning to edit a newsletter for the ANQUA membership. It will be interesting to see how it develops, for it could very easily put Glaciogram out of business. I see no reason to proliferate the postal explosion, but would appreciate your comments on the matter. Talking about publications, I suppose you have received notices of the initiation of a new journal Quaternary Research published by Academic Press and edited by A. L. Washburn with J. S. Creager co-editor.

The cover design was again done by Chris Neuzil, I hope we can retain him in geology.

Again I wish to call to your attention the many good questions that are being asked by the contributors. I am sure they would appreciate your response and suggestions. It is this type of interplay that can strengthen the purpose of this service. As always, Glaciogram welcomes your comments and is open for improvement at all times.

# PART I NEW YORK AND ADJACENT REGION

JOHN NICHOLAS 9/27/69

I am continuing palynological investigations of late-Pleistocene bog and lake sediments in northern New Jersey. As a follow-up to my studies in the Sterling Forest, New York area I chose the High Point State Park area of northwestern New Jersey located some 15 miles to the northwest of the Forest. This area was chosen because of its comparatively high elevations of between 1500 and 1800 feet. It was felt that the extremes of altitudes in this area might show up in the past vegetation as revealed by pollen analyses. During the past winter, therefore, I cored several lakes in the High Point area including Glacial Lake Marcia, the highest of all New Jersey lakes with an elevation of approximately 1600 feet. Four cores, the longest some 7 meters, were obtained from Lake Marcia by means of a Hiller Peat Borer from an ice cover of up to 2 feet thick. Coring through this thickness of ice often proved to be the most difficult part of the entire operation!

On the basis of preliminary pollen analyses it would appear that the past vegetational histories of the High Point and Sterling Forest areas were almost identical despite their geographical and altitudinal differences.

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ARTHUR L. BLOOM 9/29/69

"Jack McAndrews tells me that he has almost finished the floral macrofossil analysis of the"Fernbank" interglacial site. He is very skeptical about the former identification of the wood in the section as fir, because fir pollen is practically absent, and fir is not represented by cones, needles, etc. He suspects the wood may be cedar. Considering the intense flattening of the wood, I am sympathetic with the wood anatomist who first helped me on that problem, and expect Jack is correct. We'll recheck the wood identification. Mats of cedar needles are common in the Fernbank beds, Jack says. We should have a report published within the academic year. I still haven't decided on the best hypothesis to account for an interglacial Cayuga Lake at least 60 feet higher than the present. An ice dam is totally incompatible with flora and fauna that indicate a climate as warm as or warmer than the present.

"Have others noticed that most of the Pleistocene fills in buried valleys of central New York are water laid, and not till? Why did the Wisconsin ice override

proglacial and preglacial sediments without removing them, when obviously some earlier glacier did a lot of bedrock erosion? If I had answers, I'd publish them, but Glaciogram seems a good place to ask questions!"

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JOHN E. HARRISON 9/29/69

Last summer I completed the field work on the North Bay - Mattawa project, first reported in detail in these pages in November, 1968. Two $C^{14}$ dates came back from the lab last winter. The first confirms that the Mattawa River was ice-free at least 8,670 $\pm$ 140 years B. P. (GSC - 1097), while the second sample indicates that the North Bay sill probably emerged prior to 5,250 $\pm$ 210 years B. P. (GSC - 1162). Four new $C^{14}$ dates are in the works. A bottom date from a core in Kilrush Lake, situated on the divide in the Fossmill channel, should prove to be the most significant. Two other cores were taken in lakes in the area and will be dated. Bits of wood and carbon from a beach deposit at 710 feet a.s.l. near North Bay may give a date on the Nipissing beach in the area.

Detailed mapping of flights of beach scarps developed on a hill near Powassan, Ontario indicates considerable variation in elevation. The beach scarps are not continuous but when careful measurements, taken at the base of the scarp, are plotted, they fall into three distint groupings. My present thinking is that the groups represent one lake phase while the range represents differential uplift during the duration of the lake phase. I'd like to hear from anyone else who's studied this problem.

This coming winter I hope to emerge from under a pile of maps and field notes with a report for the G. S. C. and a thesis. Come spring I hope to receive my degree at Syracuse and find a new locale to hang my hat.

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PARKER CALKIN 10/1/69

At the Northeastern sectional meeting of the GSA last Spring, Jack McAndrews and I reported a 12,700 B. P. date which we interpret as a minimum date for recession from the Gowanda Moraine and also as a possible date for transition from Glacial Lake Whittlesey to Lake Warren. We also reported a preliminary date of 13,600 B. P. for peat under outwash immediately south of the distal portion of the Lake Escarpment Moraine at the Cherry Tavern site of Ernie Muller (1963, 1965)

in southeastern-most Erie Co., New York. The latter date has been finalized with little change and a second sample dated from the same section to give pre 14,000 B.P. minimum time for withdrawal from the outer Lake Escarpment Moraine. The significance of these dates will be discussed by McAndrews and I in a publication in preparation. They will also be considered in an Ohio Journal of Science paper to be published early in 1970. The latter publication will discuss the "Strand lines and chronology of the Glacial Great Lakes in Northwestern New York".

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GEORGE W. WHITE 10/1/69

HOGARD'S EARLY GLACIAL ATLASES AND DIAGRAMS OF DRIFT ANATOMY

The Louis Agassiz books and atlases, Etudes sur les glaciers, 1840, and Systeme glaciere, 1848, are as famous among glacial geologists as they are rare. Jean Charpentier's Essai sur les glaciers, 1841, is also well known and hard to find. Less familiar is a series of books and atlases by Henri Hogard. He was a keen observer and a skilled artist, and produced four different atlases, three of which have extensive texts. Copies are sometimes found in Continental book stores and are sometimes listed in catalogues. The atlas of Coup d'oeil sur le terrain erratique les formations erratiques, 1858, is a book on deposits, illustrated by black and white plates. Glaciers de la Suisse (ca. 1855) is a great portfolio of 16 colored plates, some of them almost 2' x 3', of glaciers and moraines. They would be magnificent for framing.

Hogard's cross sections show details of the deposits and of the anatomy of the structures. Indeed, it was to be almost 100 years before similarly detailed and perceptive anatomical sections of such detail were to become commonplace. (Agassiz only dimly understood internal structure. John Fleming in 1859 had provided very detailed diagrams and descriptions but was very doubtful of their glacial origin). Hogard deserves recognition as the "first anatomist of glacial deposits."

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"The paper by me entitled "Pleistocene deposits of the north-western Allegheny Plateua, U.S.A." has now appeared in the Quarterly Journal of the Geological Society of London, Vol. 124, pages 131-151. This is a summary of the surface and subsurface distribution of tills and a discussion of their stratigraphy.

Pennsylvania Geological Survey Bulletin G-55, "Pleistocene Stratigraphy of north-western Pennsylvania" is momentarily expected.

Some interesting pre-Woodfordian and probably pre-Wisconsin deposits are described in a recent paper by S. M. Totten, S. M. Moran and D. L. Gross, "Greatly Altered Drift Near Youngstown, Ohio", Ohio Journal of Science, Vol. 69, pages 213-225.

Dr. Stanley M. Totten, Professor of Geology at Hanover College, has just returned from a year at the University of Birmingham where he studied Pleistocene beetles with Professor F. W. Shotton and Dr. Russell Coope. Dr. Totten has completed his study of the beetles in the Titusville Till and that paper will probably appear along with the paper of Albert Berti of the University of Western Ontario, who is completing work on the pollen in the Titusville Till. Beetles are very sensitive ecological indicators and may be more sensitive than pollen, because beetles fly and/or walk to favorable localities whereas trees do not and thus take longer to migrate.

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MICHAEL H. FRIMPTER 10/2/69

Since last contributing to the New York Glaciogram I have resigned my position of Hydrologist with the U.S.G.S. and assumed the charges and challenges of Assistant Professor of Geology for Wisconsin State University at Superior. During the 69 summer-field season Jim Davis, John Johnsen and I beat the ground in a five county area of central New York for the State Geological Survey. A report on the economic geology of the area for the Central New York Regional Planning and Development Board will be forthcoming.

During the process of collecting field data for this study many interesting Pleistocene stratified sand and gravel deposits were observed. Some of these in the vicinity of Oswego were thin deposits lying on the tops and east flanks of flat-topped drumlins. The deposits are lag gravels formed by wave action of Lake Iroquois on the till of the drumlins. The waves flattened the tops of the drumlins and winnowed out the fine silt and clay from the till leaving coarse sand and gravel behind. The flattened tops of the

drumlins are approximately 470 to 490 feet above sea level, the lower ones lying to the north toward the open deeper part of the lake. The sand and gravel beds on the eastern slopes of the wave-truncated drumlins lie directly on till and dip to the east at an angle equal to that of the land surface. Similar sloping sand and gravel deposits are not found on the western slopes of the drumlins indicating that the waves traveled from west to east over the flat tops of the drumlins and that prevailing westerlies predominated over Lake Iroquois. The wave working of the drumlin tops probably occurred below the surface of the lake as suggested by the gradual decrease in elevation of the truncated tops toward the northwest, the open part of Lake Iroquois. Presumably the wave action would have been strong and effective to greater depths toward the open part of the lake and weaker to the south after crossing over these more northerly submerged drumlins.

While none of the deposits are of sufficiently large volume to be of more than local economic importance, this understanding of their genesis permits successful prospecting and provides a model for reasonable predictions of the volumes of individual deposits.

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PAUL F. KARROW 10/2/69

I spent two months in Europe this summer, visiting Ernie Muller in Iceland, and several laboratories, field localities, and geologists in Sweden, Germany, and England before a three-week period on field excursion A-9 and Paris meetings of the VIII INQUA. I expect to take sabbatical leave during 1970, but plans for this are still incomplete.

A Ph.D. thesis by Thane Anderson in the Department of Biology here, but under my supervision, involving the study of several lake and bog bottom cores in southwestern Ontario, is progressing well. Several lake and bog bottom cores in southwestern Ontario, is progressing well. Several radiocarbon dates have been obtained, and more are expected, but we are beset with dating problems

apparently involving reworked carbon (old carbonates). The difficulty is knowing which dates are valid. Once this problem is overcome it will be our hope to have minimum dates on ice retreat, date various points in the pollen record such as the spruce-pine break, and date some of the Lake Algonquin stages.

The Department of Earth Sciences here is seeking a new chairman to develop its graduate program in environmental geology, (including Quaternary, groundwater, engineering, and industrial minerals geology), which is in the process of final approval by government and university bodies. The new chairman is to commence duties July 1, 1970.

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JANICE WHIPPLE 10/3/69

I'm presently involved in a project called "Remote-Sensing of Lake Resources" for the USGS-WRD.

This study is oriented toward use of the ERTS Satellite which should be aloft in 1971 or so, and has been undertaken to identify and develop sensing techniques and processes best adapted to learning about lakes. Lakes Oneida, Onondaga and Delta now serve as prototype targets for overflights provided by the Rome Air Development Center, Griffiss AFB. At this time a camera and an infrared scanner are being utilized. I did request imagery of Canadarago and Otsego Lakes, and the land area immediately to the north, an area in which I did surficial mapping. If the instrument operator made suitable adjustments of settings for the scanner gain control, there may be interesting pictures.

So while I cast a nostalgic eye toward dusty gravel pits, please keep me informed of activity in glacial geology. It may be that I metamorphose into a paleolimnologist through the remote-sensing process.

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JESSE L. CRAFT 10/3/69

This has been a very busy summer as I have been writing my thesis. Therefore I didn't get into the field to gather more information on the Adirondack glacial history.

John Killen, a graduate student in Geography at Carleton, is starting a study of the Beach terraces and drainage channels on the Au Sable Forks 15' Quadrangle. We hope to get a better understanding of the time relationship between the High Peaks glaciation and Lake Vermont stages of the Champlain Valley.

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NORTON G. MILLER 10/5/69

ABSTRACT[1]

LATE- AND POSTGLACIAL VEGETATION CHANGE
IN SOUTHWESTERN NEW YORK STATE

Pollen stratigraphy in sediments from four small lake basins was determined and used as evidence for vegetation change on the Allegheny Upland of southwestern New York State. The sites studied are within 35 mi of the unglaciated Salamanca reentrant and are on an important migration route for species spreading northward following the Late Wisconsin glaciations.

Forests of the hemlock-northern hardwoods type occur in southwestern New York at the present time. Point-quarter sampling of upland stands shows Acer saccharum, Fagus grandifolia and Tsuga canadensis to be the leading species in order of decreasing Importance Values. An analysis of bearing-trees recorded in the original lot survey notes for areas around three of the sites studied palynologically revealed the pre-colonial forests to be dominated by the same leading species, except Fagus was first in importance and Acer second. R values were calculated using the

1. Ph.D. Thesis Michigan State University. 325 pp. 1969.

STATE UNIVERSITY OF NEW YORK AT BINGHAMTON

Binghamton, New York 13901

Department of Geology
Telephone (607) 798-2265
Cable Address: GEOBING

M E M O R A N D U M

September 24, 1969

To: Original round-robin constituency and a few newcomers

Subject: Informal communications

This memo is being sent to a small and select group of those glacial geologists who were initially interested in a round-robin type of communication system, and to some newcomers who have expressed wishes to be included in this grouping.

Several of you feel the necessity for a more informal type of communication than NEW YORK GLACIOGRAM is able to provide. Therefore, I am willing to try the following experiment:

If in addition to your normal contribution to GLACIOGRAM, you will send me on a separate piece of paper whatever informal communication you wish to make....then I will xerox these and send them in the same mailing as GLACIOGRAM. However, these will only be sent to our group of about 25. Please type and single-space the informal communications in order to save me some xeroxing.

As always I am receptive to new ideas and suggestions, so if you have better ways of doing things please be very frank and let me know. Let me stress that I will not send the informal notes to just anyone...they will only go to the following people:

| | | | |
|---|---|---|---|
| Bloom | Dreimanis | LaFleur | Sirkin |
| Bugh | Fahnestock | Moss | White, George |
| Caggiano | Fleisher | Muller | |
| Calkin | Forsyth | Newman | |
| Coch | Fullerton | Randall | |
| Connally | Hartshorn | Wagner | |
| Craft | Heusser | Whipple | |
| Denny | Holmes | Schmidt | |

Donald R. Coates

Donald R. Coates

STATE UNIVERSITY OF NEW YORK AT BINGHAMTON

*Department of Geology*

*Binghamton, New York 13901*

September 24, 1969

Dear Quaternary Friends of the NEW YORK GLACIOGRAM:

That time of year is approaching when the fall issue of GLACIOGRAM should be assembled. Therefore, this is your only reminder that I need your contributions by November 1st, so don't put it off until the last minute. Any length from a few lines to 500 words about your recent work, ideas, and information that you deem of interest will be fine.

In my March 21, 1969, request for suggestions I received a great variety of answers, and have continued to obtain more comments during the summer and at INQUA. It is somewhat difficult to distill all of these ideas....especially when some are diametrically opposite....but the majority opinions should probably prevail, and it is on this basis that I make the following procedural statements:

1. The name NEW YORK GLACIOGRAM will continue to be used. There will continue to be two sections, as inaugerated in the May 1969 issue, namely: I. New York and Adjacent Region, and II. Relevant Information of Other Regions.

2. GLACIOGRAM's mailing list will be revised. The November issue will only be automatically sent to those who have contributed within the past year, and to those who respond to this request by indicating they wish to be continued on the mailing list. All information services seem to periodically request such assurance of interest, and I wish to send copies where they may do the most good.

3. Two issues a year of GLACIOGRAM will still be printed so long as there is sufficient interest and substantial numbers of contributions to make it worthwhile for all concerned.

Only you can make this service a success.

Sincerely yours,

Donald R. Coates

Donald R. Coates
Professor of Geology

DRC:pab

pre-colonial data and a recent survey of existing timber resources in the region.

The basins studied included the Genesee Valley Peat Works in central Allegany County--on Olean drift (pre-Cary), Allenberg bog in east-central Cattaraugus County--near the Kent terminal moraine (pre-Cary) and Hougton and Protection bogs in southeastern Erie County--on Valley Heads drift (+ Port Huron). The profiles obtained were divided into A, B and C zones following the Deevey classification. In addition, a T zone characterized by high nonarboreal pollen (NAP) percentages occurred at Allenberg bog. The T zone pollen assemblages compare well with the modern pollen rain at Fort Churchill, Manitoba.

The A zones differ according to the age of the drift on which the basins are situated. Most unique was the Genesee Valley site where spruce (ca. 25%) occurs with abundant NAP (40 to 45%). Spruce values decreased upward. The significance of the assemblages is obscure, but taken at face value, the presence of an open vegetation type, perhaps similar to park-tundra, is indicated. At Allenberg bog, fluctuations in Fraxinus nigra and Quercus percentages suggest correlation with climatic modifications associated with glacier advance and retreat. However, absolute pollen frequency data from this site indicate that the fluctuations occurred as a response to increasing deposition rates for pine and spruce pollen. Wood at the bottom of zone A at Houghton bog has been dated at 11,880 $\pm$ 730 years B.P. (I-3290). Upper A zone spectra, except for the presence of pollen from temperate deciduous trees, are similar to surface spectra occurring today in the boreal woodland of central Quebec.

The spruce woodland disapppeared around the Valley Heads sites about 10,500 years ago and was replaced by B zone forests dominated by Pinus strobus. At several sites lower pine-birch and upper pine-oak subzones can be distinguished. At Protection bog where the pine peak has been dated at 9030 $\pm$ 150 years B.P. (I-3551), a P. strobus cone was recovered from sediments deposited about 10,500 years ago.

Zone C-1 records the development of hemlock-northern hardwoods forests. With the exception of gradually increasing Fagus values, the profiles demonstrate stability in the regional vegetation during the interval between about 8000 and 4400 years B.P. An abrupt decline in hemlock percentages marks the end of the C-1 which was dated at 4390 ± 100 years B.P. (I-3550) at Protection bog.

Increased relative numbers of Acer saccharum, Betula, Carya, Fagus and Quercus occur in zone C-2. Tsuga percentages remain low. Absolute pollen frequency determinations affirm the C-1/C-2 hemlock decline but show only slight increases in the numbers of broadleaf tree pollen types being deposited. This fact and the tendency for hemlock to exhibit high drought mortality indicate that a series of severe droughts occurring over a relatively short time span may explain the relative frequency fluctuations in C zone sediments from western New York.

Zone C-3 which began 1270 ± 95 years ago (I-3549) at Protection bog was divided into the following subzones: C-3a across which Tsuga regains its position of prominence in the profiles and C-3b in which abruptly increasing percentages of NAP, including Ambrosia, Plantago and Rumex, record European settlement and attendant forest clearance.

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Plans are in progress for the N.Y.S. Museum, which in part has sponsored the field work connected with this research, to publish my thesis.

Not included in the abstract is a summary of my study of organic debris uncovered near Lockport (Niagara Co.) N.Y. beneath gravels at the southern edge of Lake Iroquois. Mr. Richard L. McCarthy of the Lockport Board of Education, who took me to the site, has obtained a radiocarbon date of 12,100 years B.P. on a buried piece of spruce wood from the organic bed. Moss subfossils are particularly abundant and well-preserved at this location and to date I have identified 30 taxa, all of which can be assigned to extant species. The most significant finds are Aulacomnium acuminatum and A. turgidum, two arctic and subarctic species which

are of exceptionally rare occurrence in the Great Lakes region and the eastern United States today. Only the latter presently occurs in New York State where it was collected years ago near the summit of Mt. Marcy. The most southern existing station for A. acuminatum is on the north shore of Lake Superior in a region otherwise well known for its disjunct arctic plants.

The occurrence of these mosses in northwestern New York State in association with a pollen spectrum characterized by a high percentage of non-arboreal pollen (41%) suggests that limited areas of tundra may have been present in this region 12,000 years ago. However, this interpretation is complicated by the presence of a significant amount of spruce pollen and wood indicating that a mosaic of forest and non-forest communities more likely occurred in this region. As my research on this site continues, certain refinements in my interpretation will undoubtedly be made.

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FORREST DURHAM 10/6/69

For the first time in ten years I was able to work this past summer with a fairly good size group of my majors in extensive glacial studies of Long Island and central New York. Although the efforts on Long Island terminated each evening and each went home, we were able to put in a solid week's work in central New York, camping out for the duration in Filmore Glen State Park. I can't exactly call it roughing, for everything, including electric-hot air dryers is at that place. My young stalwarts really went for the "bush country" with tremendous enthusiasm. I say "bush country" not in any derogatory sense, for "urban crushed" students such as mine, this was taken in a spirit of liberation!

Each student wants to get back to the Finger Lakes Area and continue with his initiated studies. Hopefully we can have something worth reporting.

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10/7/69

RICHARD GOLDTHWAIT

For three months I attended INQUA and the Hydro Glaciology Symposium, then I got first hand acquaintance with tills, drift sequences and related shores-terraces in all the British Isles with the intent of leading a class here (as well as giving advice!) and now I'm lecturing vigorously at Cambridge University, Scott Polar, and in Austria then Poland. All the while the till symposium volume goes ahead some.

Ted Rosengreen working in Highland County of southern Ohio has fairly demonstrated Early Wisconsin by stratigraphy now and will finish all in 1970. Marc Hoyer is drilling the Minford Silts again to try to solve the age and glacial relation of those extensive fingering lake deposits; no new answers yet. Much further away, many will be interested in the study of origins of eskers, kames, washboard moraines, drumlins, channels next to a dying broad ice mass (Burroughs Glacier) over hills in Alaska. We have good documentation and the products look just like New York or New England. At the very least we are getting some rates of formation. Dave Mickelson is key man.

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10/15/69

KERNAN W. DAVIS

It is difficult for me to make a contribution to the Glaciogram, since I am a consumer rather than a producer of geologic information. In New York State, it is usually the glacial deposits which comprise the foundations and the construction materials for the structures associated with the development of our water resources. The major ground-water reservoirs are often the more permeable of the extensive glacial deposits. Therefore, we need a great deal of information about these feature much more information than our small staff ever could accumulate.

From the Glaciogram, we are able to keep track of work being done by others in areas for which water resource development is being planned by our Division. Occasionally we contact workers from the academic community in order to trade information, discuss

ideas or suggest new areas of research.

We look for descriptive information; the areal extent and thickness of a deposit; its constituents and characteristics; even its history can be of use to us as a guide to evaluating the geologic aspects of our development programs.

We seldom conduct very detailed investigations, but must rely upon the good notes and documentations of the academic researchers. For their cooperation, we are most grateful and to the Glaciogram for introducing them to us, our thanks.

During these fall months, we are conducting a somewhat detailed exploration program at a proposed reservoir site near Alden, New York. Our drill holes penetrate Lake Warren deposits, the Alden and Marilla moraines as well as shale bedrock (Middle Devonian; Hamilton group).

Final disposition of the samples and drilling logs remains uncertain, but it is possible that they might be available for examination by interested researchers.

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DONALD R. COATES 10/15/69

The 1969 summer was a very busy one and in most ways rewarding. I had seven graduate students (4 Ph.D and 3 M.A. candidates) doing geomorphic field work.....four on glacial topics and three on hydrogeology and/or quantitative geomorphometry. Jack Conners finished his M.A. thesis of the Genegantslet area and I will print the abstract in the May issue of Glaciogram. Jim Kirkland is doing his Ph.D. thesis on glaciation in the western Catskills. Surprisingly, no one seems to have done much glacial work in the Catskill's since John Rich. Jim's area slightly overlaps Rich's and it appears that many changes may be needed. Don Cadwell is doing his Ph.D. thesis on glaciofluviatile deposits and planar features in the major valleys east of Waverly. Although Peltier studied terraces in northern Pennsylvania, no one has apparently studied terraces in the northeastern Susquehanna basin Nelson,1965-66 (Annals, AAG, V. 55, pp 404-448 and V. 56, pp 24-32)

makes some remarks on the western Susquehanna.

Peter Rideg is doing an M.A. thesis of the Catatonk basin. Hydrogeology properties will be stressed but these are greatly influenced by the style of glaciation. He installed four automatic water recording gaging stations on streams with different characteristics in addition to making numerous seepage runs throughout the basin.

This was the final summer on my grant to determine geomorphic characteristics of the Owego Creek basin. This data will be plugged in to a broader program for assessment of water resources and decision-making processes. I continue to be amazed at the striae orientation in this area...I know of no other part of the Appalachian Plateau where such a density of readings with east-west direction occurs. Of course the Lisle esker which adjoins the region is also an east-west feature.

As mentioned in V. 3 n. 2, p. 18, (1968) of Glaciogram, Drs. William Lipe, Stuart Landry, and I have been working on a publication that will discuss the mastodon pelvic bone discovered in a valley train deposit near Chemung, N.Y. Minze Stuiver dated the bone as 13,320 $\pm$ 200 years B.P. It is of interest that of the 39 mastodon dates listed by Dreimanis (Ohio Jour. Sc, 1968, v. 68 (6) pp. 257-272) this one is second oldest to the 14,650 $\pm$ 500 date of one from Alabama. Allan Randall drew my attention to wood in stratified deposits more than 6 feet deep in the Susquehanna valley. On first examination it was difficult to tell if the wood was part of the glaciofluviatile sequence. The wood was dated by Stuiver as being 1,690 $\pm$ 100 years B.P. which happily agrees with detailed study of the area which showed the wood to be part of a silty-sandy phase of alluvium that represents the first postglacial sediments to be retained on the glaciofluviatile unconformity.

At INQUA, Paris, I presented a talk "Geomorphic Geometry of the Glaciated Appalachian Plateau", and after the Congress spent two weeks in the British Isles, most of the time touring Scotland with an eye for comparing its glaciation style with that of New York. I now have 340 kodochromes that attest to the great beauty of the lochs, mountains, and moors.

By the time this issue is received I hope to have seen many of you at GSA in Atlantic City. Perhaps even a few hardy souls will wander in and hear my presentation on "Terrain Comparison of the Glaciated and Non-glaciated Appalachian Plateau". In these studies I am attempting to provide a new quantitative framework for this region with the extensive use of computer methods.

I was able to spend one week at our place on Cape Hatteras and during that time Secretary of the Interior Hickel visited the Cape to see the severe erosion problems first hand. If something isn't done rather quickly for the protection of Cape Hatteras Lighthouse, the tallest in the country, it will soon become the shortest lighthouse.

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PETER P. HUDEC 10/16/69

As part of a mineral exploration project, I have spent close to two months in the Arctic barren lands of the Northwest Territories, Canada. Although our principal object was to explore the country for ore, one could not help noticing the magnificent spread of glacial features in otherwise featureless land.

The lack of trees or any other vegetation higher than a few inches facilitated the recognition of multiple beach terraces; even minute drops in the water level could be recognized by well-preserved and continuous beach lines. Eskers, moraines, roches moutonnée, in short, all features of glaciated terraines are preserved just as if ice had left yesterday. Newer features, such as pingos and stone rings are also abundant. Some areas had the look of lunar landscape-large, angular boulders strewn about in great profusion and confusion.

I have a number of slides from the area, not all of them illustrating the glacial processes. If anyone is interested in adding to their teaching collection, copies can be made of some of the more interesting ones. Just let me know.....

CHAUNCEY D. HOLMES 10/17/69

Something new in palynology has been added locally,--four Junior High students, inspired by their teacher, are undertaking an extracurricular study of a swamp bordering one of the Tully kettle lakes. I have helped them collect two sets of samples and will soon get them started on microslide preparation and at least a beginning on pollen identification and counting techniques. "The best time to set a hen is when she wants to set," and the best time to start youngsters on a scientific adventure is when they want to investigate a problem which promises some measure of satisfying individual achievement. It's an ambitious experiment but these youngsters have both high ability and enthusiasm for the project.

My own summer harvest of new knowledge consists chiefly of many minor observations relating to the late-glacial topographic history of the central New York area, which had hitherto escaped my notice. They augment and confirm the major interpretations in pleasing fashion. I have yet to collect a suite of peat samples from another swamp before the advent of cold weather, for study during the winter.

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GEORGE H. CROWL 10/19/69

The Pleistocene Geology of the Delaware Valley, Matamoras to Shawnee on Delaware is now in final editing stage.

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BRUCE E. RAEMSCH 10/20/69

Report on Research at Adequentaga, 1969

In a discussion of the Early Man finds from Wisconsin and earlier sediments in the New World, L.S.B. Leakey commented during an NBC program last winter (as he considered reasons for the peculiar attitude of some of us American archaeologists, confronted by paleoliths) that without the experience in ancient cultures known by Old World archaeologists, the American is often at a loss when it

comes to recognizing ancient stone tools. This is far more true about all of us than we care to admit. And I think archaeology in this country will profit if not just a few of us are ready to acknowledge the existence of such a need in dealing with the ancient customs of man.

The Glaciogram function, as I understand it, is concerned with reporting, and not polemics; therefore, in response to the Ritchie-Funk comments on my Early Man material,I will limit my remarks to just three suggestive observations and say no more.

1. At lunch one day all of two years ago (in the absence of Dr. Ritchie), Dr. Funk informed me that there was never any doubt in the minds of Ritchie and himself that the paleoliths I showed them (upon some of which I have since reported) were genuine artifacts -- all of them! that the only real question about them involved their temporal associations, or the age of the kame terraces and deltas in which they were found. It is a very strange about face that makes its appearance now.

2. In studying the nature of these materials I have used, out of possibly several approaches, one methodological procedure that is standard in all areas of anthropology for handling such data, namely, the comparative method. I have never been sure just what method or methods Ritchie and Funk employ in their present analysis of my artifacts, but whatever the case their recent observations have become increasingly subjective. Thus Funk attempts to dismiss a Hell Gap type point because, "it isn't flaked right." And just what criteria does Ritchie use for suggesting (in raising the question of the random patterns sometimes seen in the paleoliths) that man, working cherty materials, is free of fault of craftsmanship, and never random, and never awkward or careless? Is aboriginal man's behavior free of enviromental controls and personality variables?

My point is that the comparative method in our publication comes closer to explaining the presence of eccentric cherts than do the random ideas presented by Ritchie and Funk.

3. Finally, it should be noted also that Ritchie was not

the first to point out the natural fracture planes appearing in some of these tools (Raemsch, 1968, p. 3). I suggested that the men making the tools were intelligent enough to use these planes in an attempt to reduce work time im making the tools. We have any amount of known type artifacts in our museum (and so has Dr. Ritchie in the State Museum) illustrating this simple fact.

Besides this, our work in the gravels over the past four years has shown quite clearly that a continuity of culture materials runs temporally down beneath sediments (of both soil and gravels) never before methodically investigated at such depths in New York State.

During the summer we worked on a horizon running to one hundred (100) inches below the surface of the ground, finding artifacts at this level suggesting a butchering station, largely because of the extremely large size of tools, associated with bone and without shell. We have actually excavated one small area to 106 inches where one retouched blade, chips and fire-cracked rock were found; and to 115 inches (nine and a half feet) where another single blade was found, before we stopped working for the season. We were able, with the help of a water pump, to explore all four black deposits ($MnO_2$) described in last spring's Glaciogram. We have been able to work out a tentative sequence of cultures running either into, or very close to what appears to be till.

Perhaps the most interesting of all our finds this last season involved the above-cited, large chert tool assemblage found in association with two fire hearths, running from 90 to 100 inches deep and in gravels of half that depth. Among the large tools this assemblage contained seven bifacially pitted hammerstones of fine-grained sandstone that appeared to be in a late stage of weathering (with their cortices cracking apart). Moreover, another feature of the tools is their exceedingly sharp edges, which are in marked contrast to nearly all other tools found in this region. We feel that the slightly rounded edges of many tools found in the immediate area are a function of water transport to the area from nearby. The same observation may be made with respect to fire-cracked rock, so plentiful in all these sediments. In any event the brown chert

(or jasper) assemblage does not appear to have been moved from the time it was left behind, and it lies below Black Deposit II, between water deposited gravels and another rock component of boulders and decaying gravels that appears to be a till formation.

Details of the findings so far made will be found in the Yager Museum Publications in Anthropology (Bulletin 2), due to come out this winter, and available to those interested, on request.

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WALTER S. NEWMAN 10/20/69

David H. Thurber, Harvey S. Zeiss, Allan Rokach, Lillian Musich and myself published a paper in the May issue of the Transactions of the New York Academy of Sciences entitled "Late Quaternary of the Hudson River Estuary: A Preliminary Report". Several flaws have already been noted by gleeful colleagues and undoubtedly other faux pas will be brought to light by astute readers. Nevertheless, it seems to us that the fate of Lake Iroquois drainage through the Mohawk-Hudson valleys is poorly understood and involves more than just draining into Lake Albany. We still don't know what sill held up Lake Albany or, more mysterious still, where this dam was located. Bob LaFleur in his field guide for the October 12th NEIGC Pleistocene Field Trip notes that "Final disappearance of ice from the Mohawk permitted the development of Lake Amsterdam with a water elevation of 420 to 450 feet". Furthermore, Bob believes that "....meltwaters from Port Huron ice in the western Mohawk or Lake Iroquois discharge may have finally destroyed the sill" that held up Lake Amsterdam on the east. Where did Lake

Amsterdam debouch?

The day following LaFleur's field trip, I drove through the several quadrangles south and southwest of Albany. In the Clarksville Quadrangle, I confirmed a well-defined double sill 2 miles south of New Salem and about a mile west of Diamond Hill. Here one can trace a well-defined drainage channel trending southeast. Is this where Lake Amsterdam drained? Curiously, on this and the adjacent quadrangles to the east, southeast and south, there are several additional conspicuous channels at both higher and lower elevations. The point I am trying to make is, that while ice still occupied the Hudson lowland around Albany and for some miles south (before the construction of the Mohawk Delta into Lake Albany), water from the Ontario Basin may well have sluiced through the Mohawk Valley and around the Helderberg Escarpment adjacent to the ice front and then on down the west side of the Hudson Valley and finally into the valley itself cutting the several channels that one finds along the valley sides. We further speculate that this may represent the "coulee-like" episode recorded in our paper. Mega-thinking, no?

While mapping in the Sharon Quadrangle (Connecticut-New York) this past summer, I found several small areas of karst topography. Linc Page asked me whether I believed that the karst was post-glacial or earlier. I naively assumed the karst was pre-last glacial. However, when I visited the Alps the past August while on an INQUA field trip and observed micro-karst already developing on pavements deglaciated within the past 100 years, I had to admit that Linc's question was rather more profound than I initially considered it.

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WILLIAM D. SEVON 10/27/69

Most of this summer was spent working on bedrock geology with the result that glacial geology was slightly neglected. I did have a few very pleasant days mapping Wisconsin 'terminal' moraine deposits in the Hickory Run State Park area (Carbon County). Two small boulder fields intimately related to the moraine were the most

interesting things observed. One field is bedrock derived, low in gradient (2-3°), immediately adjacent and parallel to the moraine front and overlies outwash sands and gravels. The other field has a steep gradient (10° +), overlies till and is derived from very bouldery till.

Boulder fields and boulder talus slopes are extremely common in Carbon County. I have discussed them generally in a short paper in the Geological Society of America Fieldtrip Guidebook for the 1969 Atlantic City meeting and will show the Hickory Run Boulder Field to the field trip participants on November 9th. The Hickory Run Boulder Field was dedicated as a National Landmark on October 8, 1969, in a short ceremony at which I talked briefly about the geology of the field.

Other items of interest from northeastern Pennsylvania:

George Crowl spent three weeks in the Delaware Valley this summer finalizing his report on the area. The report is now in the editorial mill.

Mrs. Milena Bucek mapped the surficial geology of the Mt. Pocono Quadrangel (7½'), Monroe County, this summer and her report on the adjacent East Stroudsburg Quadrangel is in the editorial mill.

Jack Epstein's report on the surficial geology of the Stroudsburg Quadrangle (7½'), Monroe County, is now available from the Pennsylvania Geological Survey and Jack is rapidly completing field work in the Saylorsburg Quadrangle.

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JANE L. FORSYTH 10/27/69

During the summer of 1969, my graduate student, Miss Beth Evans, under my guidance, mapped the Pleistocene Erie-basin beaches that extend across northwestern Pennsylvania. All the beaches are tilted here, the elevations on the beaches rising to the east, the increase in elevation being greater for the higher beaches. Beaches recognized were: Maumee (II?) at 770' in the western part only, Whittlesey at 740-790', and Warren at 690-720' elevation. In addition, only in the east, she found a beach at 760', intermediate between the Warren (720') and Whittlesey (790') beaches. This has been called Arkona by Taylor (1915), and "higher" Warren by Calkin

(1970), but,because this beach lies mostly outside Pennsylvania (Beth's study area), she will make no detailed investigation of it. Finally, in the area just east of Erie, where the high bedrock hills, their north sides capped by end moraines, lie relatively close to the lake, she found three local higher levels at 820', 910', and 960' elevation. These presumably represent the positions of small, local, narrow, ice-marginal lakes dating from an early time when most of the area where the rest of the beaches occur was under ice.

This project dealt mainly with the beaches. However, an attempt was also made to identify properly adjacent Pleistocene moraines. Beth's work was in detail only in the 7 1/2' quadrangle just east of Erie, where several moraines were present. In order to name them, though, it was necessary to correlate all the moraines eastward from the area in Pennsylvania east of Erie where Leverett (1902) shows this mapping in detail. Difficulties in establishing this correlation led us to the interpretation that the name "Ashtabula Moraine" on his Plate XVIII (p. 652), where it occurs just east of "Weis Library", is incorrectly placed. If moraine outlines and crests are traced eastward, according to Leverett himself, that labelled spot has to be just an eastward extention of the Girard Moraine. Actually, there is no moraine at Weis Library, as he shows, (it is located in a shallow outwash-filled valley!) and the main crest of the Ashtabula Moraine lies well to the south, crossing Walnut Creek at the <u>next</u> more eastern southward extention of the morainal mass north of the stream. This label of "Ashtabula Moraine" was just put on a mile and a half too far west, a fact made clear by the topography shown on the Swanville 7 1/2' quadrangle.

This mapping will be written up as a Master's thesis this year and hopefully will be published by the Pennsylvania Geological Survey.

One additional brief note---I have been working with some biologists concerned with the post-glacial history of the Erie Islands. In cooperation with research by Mike Lewis (Canada GS), it appears that the "Great Flood", produced when almost all of the Lake Erie waters first poured eastward (12,000 years ago or more) over the isostatically low (by 100' according to Lewis) Niagara

sill, brought about a "dry" bottom to western Lake Erie that lasted until about 4-5000 years ago! Evidence is in the form of radiocarbon dating on subaerial-type vegetation from the bottom of Lake Erie. We still haven't recovered from the shock of this interpretation! This is especially interesting to biologists interpreting the original flora and fauna of the Islands!

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LON D. DRAKE 10/30/69

Last August, Robert S. Nelson (graduate student at U. of I.) and myself successfully cored a group of filled lakes in Pinedale moraines, in the Bighorn Mtns., Wyoming. We are now anxiously awaiting the return of the first group of radiocarbon dates because it looks like we will be able to date all three Pinedale advances with internal crosschecks between sample sites. Nelson is completing his dissertation on the glaciation of part of the east flank of the Bighorn Mts. Next summer I intend to work on a small area of the "Iowan" surface in hopes of unravelling some of the details of its origin. A buried bog on the Iowan surface has yielded a date of greater than 39,000 years - older than the Iowan surface is supposed to be according to Ruhe's recent work. Stephen Hall (graduate student at U. of I.) has begun working on another peatbog on the Iowan surface (undated so far) and has uncovered a complete Bison antiquus? and a profilic snail fauna. His masters thesis will be on the ecology of the bog and erosion of surrounding area. I am still working on my attempt to standardize till fabrics and to determine the minimum amount of labor necessary to get a useful fabric. My poll of fabric people, for this standardization, is continuing.

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ROBERT E. FUNK 10/30/69

In a previous issue of The Glaciogram (Vol. 2, No. 1, May,1967), I summarized recent archeological discoveries concerning the occupation of New York State by Paleo-Indians in late Wisconsin times. During the summer of 1969, two new developments took place in this area.

The Dutchess Quarry Cave near Florida, in Orange County, which as I mentioned earlier, yielded traces of Early Man in the form

of a fluted projectile point and several bones of the woodland caribou in its lower levels, has now provided the oldest radiocarbon date for archeological remains in eastern North America (Funk, Walters, and Ehlers, 1969). The caribou bones were submitted last spring to Isotopes, Inc. through the efforts of Edgar M. Reilly, Jr., Curator of Zoology, New York State Museum and Science Service. The date of 10,580 B.C. ± 370 years (I-4137), while exceeded in age by a small number of other dates in western North America, is by far the oldest yet attributed to a fluted point. It fits very nicely into the deglacial sequence proposed for the Wallkill drainage by G. Gordon Connaly (Funk, Walters, Ehlers, Guilday, and Connally, 1969).

In early August, my State Museum field assistants and I spent a few days in further excavation, at a new locus, on West Athens Hill in Greene County. This is a large, unique, quarry-workshop-habitation site of Early Man. In addition to considerable quantities of flint wastage and hammerstones, we recovered a number of typical scraping tools and two fluted points (bringing the total number of whole, broken, or unfinished fluted points from this site to 50). The site was inundated by Lake Albany waters and therefore postdates this late-glacial feature. Gordon Connally (personal communication) believes the lake was drained by about 10,000 B.C., which would push back considerably the initial estimates for earliest possible human occupation of the area.

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10/30/69

LAURIE B. GILLETT

On the basis of his studies of striae and till fabrics, Gadd has claimed that northward glacial flow did not occur in the St. Sylvestre area south of Quebec city. An indicator fan of unique fine-bedded quartz-magnetite-pyrite-hematite erratics mapped this summer supports Gadd's hypothesis. The fan covers an area of about 2000 by 1000 feet just south of the crest of a hill and rests on a 2% slope. It is 1½ miles south of St. Elzear-de-Beauce and about 30 miles south of Quebec city. The indicator source is concealed by a thin layer of till but is evidently the cause of a small circular anomaly shown on aeromag map 1936G. Delimitation of the source was accomplished with the help of ground magnetic and electromagnetic surveys. The associated indicator fan occurs at elevations ranging from 1375 to 1425 feet. The distribution of the erratics with respect to their bedrock source is not sufficiently definitive to permit more than the general statement that the ice sheet had a southward flow component.

Determination of the flow direction of the ice sheet is particularly important in this general region as Gadd has outlined a zone of glacially deposited asbestos-bearing erratics within a mile of the indicator fan described above. These erratics lie to the north of all known asbestos deposits in the Eastern Townships.

My thanks to Phil Goldsmith of Terra Nova Explorations for allowing me to release this information. Further data on ice flow directions that anyone might have for this region would be appreciated. Also, has anyone ever heard of "iron formation" of the type mentioned occurring in this part of the world?

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10/31/69

LESLIE A SIRKIN

I regret that I have no discoveries to relate to the readers of the Glaciogram, however, I would like to announce that the Eastern section meeting of the NAGT will be held at Adelphi University next spring and that we hope to run field trips on Long Island which will hopefully be new and exciting and will not duplicate the trips run during the recent NAGT meeting (1966) or

the NYSGA meeting in 1968. Further details of this meeting will be circulated well in advance of the meeting which will probably be held in mid-April.

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P. JAY FLEISHER and JOHN SALES

10/31/69

Evidence of Periglacial Activity in the Oneonta-Cooperstown Area, Otsego Co., N.Y.

We have found well exposed and well developed features near Oneonta, which we interpret to be clastic wedges of periglacial significance. These features occur in bedrock on a divide mantled by a thin veneer of ledgment till. The exposure includes a view of 3 feet of tightly compact clay rich, boudery till, with a possible fabric (all the data isn't in yet) and a well developed soil profile. The wedge pattern is controlled in plan view, by a well developed, near vertical bedrock joint system and contains a minimum of eight wedges within an area of a few thousand square feet. Each wedge consists of a compact, pebbly sand filling that decreases in grain size downward and shows grain size zoning toward the center. All of the tabular pebbles are oriented parallel or subparallel to the near vertical margins of the wedge walls. Pebble counts are presently being made to determine the source or sources of the wedge fillings. The wedge-till contact and bedrock-till contact continguous to the wedges are both badly disturbed by repeated freeze and thaw.

One of the eight wedges is well exposed and exemplifies the others in a quarry wall 8 feet high. It can be observed to thin gradually downward from a width of 8 inches at the top to a fraction of an inch at a depth of 8 feet (quarry floor). Along the wedge margins the bedrock is clearly deformed upward against the wedge, and on one side is overturned near the surface, possibly as the result of subsequent creep. The deformation is greatest at the bedrock-till contact and decreases with depth. Striae and grooves are abundant at the base of the till several feet away from the wedge where cryoturbation has not effected the bedrock-till contact, and give a preliminary ice flow direction of N8E.

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FREDERICK D. LARSEN 10/31/69

During the summers of 1968 and 1969 I worked for the U.S. Geological Survey mapping the surficial geology of the Mt. Tom quadrangle located in the Connecticut Valley of Massachusetts. The area is located in the Triassic and is divided by the north-south trending Holyoke Basalt ridge. Next summer, I will be working in the Easthampton quadrangle which is adjacent to and north of the Mt. Tom quad.

Direction of ice movement in the Mt. Tom quadrangle was due south as shown by striations and the long axes of drumlins. Studies of an indicator fan are incomplete, but erratics of Belchertown Tonalite have been carried due south from a small area in the Easthampton quadrangle. Erratics of the tonalite are found on the Mt. Tom ridge indicating a vertical uplift of at leatt 1000 feet.

During deglaciation west of the Holyoke Basalt ridge pauses in the retreat of the last ice sheet or minor readvances are well marked by three separate outwash heads. East of the basalt ridge evidence for readvance of glacial ice is found over a north-south distance of 3 miles. Eleven feet (max.) of till over outwash or lacustrine sands is the most common evidence, however there is one pit which shows the sequence SAND-TILL-SAND-TILL-SAND. The upper till grades from reddish gray lodgment till to gray "till quivalent", i.e. redeposited lacustrine silts and clays, and back. This effect is just about what you would expect if glacial ice readvanced or pulsated in a lake, in this case glacial Lake Hitchcock. Another pit has an example of what I feel is a glacio-tectonic feature. Lacustrine sands and varves have been overturned and thrust-faulted to the south in the form of a large nappe-like structure. In an exposure 50 feet long and 12 feet high an envelope of gray varves and olive lacustrine sands surround a core of red till all of which are truncated at the base and thrust-faulted over brown lacustrine sands. The gray varves reappear in an auger hole at a depth of 5 feet below which is olive sand. If this were not spectacular enough, a fulgerite was found in thrust-faulted sands 50 feet south of the above described exposure!

The relationship of the minor readvance described here to the work of Gordon Connally and others in the Champlain-Hudson Lowland can only be conjecture at this point.

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JOSEPH A. CAGGIANO 11/1/69

With no financial support and little assistance, progress in mapping the surficial geology of the Mt. Holyoke and Belchertown quadrangles was very slow. The few exposures of till and the till texture, and the nearly ubiquitous sand and gravel of western Massachusetts contrast sharply with the Finger Lakes region in which I spent several years.

Reconnaissance study of the Mt. Holyoke and Belchertown quadrangles reveals a tremendous volume of sand and gravel suggesting a complex deglaciation, the details of which remain to be studied and interpreted. Detailed field mapping of approximately 1/3 of the Mt. Holyoke quadrangle suggests that the east-west striking Holyoke Range became a nunatak during downwasting of the ice, with medium to coarse sand deposited in locally imponded waters surrounding the range. With further deglaciation, the local lakes grew in size, decreased in elevation, coalesced and became a part of Lake Hitchcock as its waters spread northward in the Connecticut Valley. Meltwater channels and other evidence of drainage of local lakes before invasion of Hitchock waters have not been found.

An extensive, sloping plain of medium to coarse, poorly bedded, and moderately to well sorted quartz and feldspar sand occurs on the north slope of the Holyoke Range and extends from about 550 feet down to the varved clays of Lake Hitchcock. The contact of the sand and the varved clays where observed suggests facies change rather than superposition. Since this contact occurs 50 feet or more below the projected Hitchcock strand, and since catabatic winds presumably created waves in Lake Hitchcock waters which broke against this sloping sand body, beaches should exist. To date, I have yet to map any beaches. Development of beaches on well sorted sand, and the contour interval of topographic maps have made beach mapping difficult. Analysis of air photos will hopefully provide some clues to the nature, location, and extent of beaches.

That's it for this epistle. Keep up the good work in providing us with a medium for communication of news and dissemination of information.

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PHILIP WAGNER 11/5/69

During the 1969 summer I concentrated on:

(1) tying-up the loose ends of lake and marine water level fluctuations;
(2) tracing some of the high lake levels in the Winooski and Lamoille Valleys;
(3) mapping of cirques, cirque moraines, and related features of an independent Green Mountain glacial episode;
(4) till fabric and stratigraphy of exposures along and near Lake Champlain.

Bill Parrott completed a thesis study of surficial deposits in northwestern Vermont, near the Canadian border. Phil Johnson mapped deposits in the area north of Burlington and south of Parrott's area. Bob Switzer worked on features of the Winooski Valley. John Mullen, Woody Thompson, and Burt Waite plan to begin glacial geology dissertations in Vermont - New England, adding to previous studies but with emphasis on enviromental geology.

In response to your request for the"round-robin" forum, I would like to add the following:

Till fabric analyses indicate an apparently widespread vertical sequence similar to that found by Barrie McDonald in Quebec - does this warrant extension of Barrie's stratigraphy into Vermont?

In order to evaluate the meaning of till fabric in this area, I considered the particle size and shape, exposure orientation, and vertical versus horizontal fabric variations with single exposures. Surprisingly, I found that the strike and dip of shale and schist particles* indicated strong orientation maxima, generally with the strike oriented parallel to the known or assumed direction of ice movement. This raises many questions and sheds some light on the meaning and significance of "long axis fabrics". I'm curious if any of the "round-robin" people have found similar or different relationships; or know of any published studies of "flat particle fabrics."

*Note: long axis is not involved in this consideration.

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PART II RELEVANT INFORMATION AND OTHER REGIONS

RHODES FAIRBRIDGE 9/26/69

A Cry from the Heart (several, in fact).

Those of us who have had the pleasure of attending recent INQUA field trips in France, and other Quaternary oriented excursions in various parts of the world, are now reasonably accustomed to being told that they are standing on the Riss-Wurrm terrace or some such. Then we look at a homogeneous 30 foot profile of "recent" talus and they mark it out into 13 horizons, dating back to 9000 years B. P. And they say, what about your Holocene periglacial stratigraphy in the eastern U.S.? Precious little, I regret....

I wonder if some Pleistocene-Holocene stratigraphers could not be uncovered in this part of the world?

While we are at it, here is a second cry! The Europeans and the Canadians have been producing fine geomorphic maps. Is there anyone in the United States interested in this subject?

And a third cry! There is a vigorous INQUA Commission on Neotectonics. They have made me a member, but what am I to report? I would be grateful if interested bodies would get in touch with me.

Another Bibliography nearing completion.

Prof. Fairbridge and Dr. Horace Richards (Academy Natural Sciences, Philadelphia) report nearing completion of an annotated bibliography on world Quaternary shorelines for the period 1965-1969, a supplement to their bibliography issued for INQUA in Denver 1965. That one is still available from the Academy of Natural Sciences, Philadelphia, Penna.

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RICHARD J. RUSSELL 9/29/69

Having worked on coasts of all continents but Antarctica, I have been deeply concerned with the Pleistocene. On the basis of major fluctuations in sea level, however, I have growing doubts about Penck and Bruckner's ideas as to the number of major glacial advances, also about the now sacred Midwest chronology. For many

years I have believed that the major chapters of Quaternary history are exhibited along sea coasts where they may be read with much greater ease in terms of major fluctuations in sea level than in areas covered by glacial deposits, outwash, etc. What we have been finding is evidence for five, rather than four, major glaciations, separated by shorter and shorter time intervals. Unfortunately, C-14 dates cover such a brief part of the story that they are relatively uninteresting. Uranium-series dating is coming to the rescue but we still need something better for placing events within a time of at least two million years long, probably longer, to separate the Quaternary from the Tertiary.

It is heartening to read in the Glaciogram so many accounts by people, particularly yougsters, who are doing really detailed work. When the pieces are all put together we will probably get away from many accepted dogmas.

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ALAN M. JACOBS 9/30/69

I attended the recent INQUA Congress (Paris, 1969) and especially enjoyed a field excursion through the French Alps. The exposures of Pleistocene deposits, valley glaciers, and glaciated topography were spectacular. The severe physical requirement for the journey was the ability to ingest two seven course meals with wine each day. Many of the participants buckled (or unbuckled) under the pressure. It is difficult to generalize the differences between French and American approaches to Pleistocene studies, but the geography backgrounds of many French Quaternary scientists were noticeable in their emphasis on topography, elevation, and location for correlation purposes.

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ROBERT F. BLACK 10/1/69

My main activities that would concern geologists interested in the New York area would be a relatively short note being published by the International Association of Great Lakes Reasearch. This

is entitled "The Valderan Glaciation in Western Upper Michigan". My other activities have been concerned with the writing up of material on my Aleutian studies in connection with ancient man and my Antarctic work on patterned ground and related topics.

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JOHN T. ANDREWS 10/7/69

In 1969 my research activities were divided between the Colorado Front Range and northern Cumberland Peninsula, east Baffin Island, N.W.T., Canada.

In the Front Range of Colorado I initiated a glaciological program on the small glaciers. D. Lloyd is currently working on his Master's Thesis dealing with the mass budget of the Isabelle Glacier; while I was undertaking similar research on the Arapahoe Glacier. This summer we took in Arikaree Glacier and D. Alford, who has had experience in Greenland, the U.S. and Canadian Rocky Mountains, will begin a more detailed investigation. B. Fahey is studying the altitudinal gradient of freeze-thaw in an east/west transect across the Front Range. Instruments have been devised and erected that measure the vertical ground movement which is recorded on a moving drum. A reconnaissance is being planned on the origin of stratified slope deposits that are so prevalent in the canyons of the Front Range.

Work in Baffin Island was supported by the National Science Foundation Grant No. GA 10992 and a Grant from the Army Research Office, Durham DA-ARO-D-31-124-G1163. During 1969 summer, D. Pheasant and G. Miller studied the late and postglacial chronology of Quajon Fiord (67°45'N, 65°W). A detailed survey of the marine limit and lower beaches was successfully carried out and numerous shell samples collected for radiocarbon dating. A number of whaler's graves enabled a lichen growth rate curve to be drawn which will be used to date Neoglacial advances. John England and T. Sookocheff continued their study of Broughton Island (67°30'N, 64°W) and the adjacent mainland and concentrated specifically on the postglacial uplift and the height of the last main glaciation. I studied the postglacial uplift and late-glacial chronology in Narpaing Fiord (68°N, 65°20'W) and Maktak Fiord (67°20'N, 64°45'W).

Meanwhile, back in Cortland, Richard Launderslager is continuing a till facies anaylsis.

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## LIST OF CONTRIBUTORS

31. Andrews, Dr. John T., Institute of Arctic and Alpine Research, University of Colorado, Boulder, Colorado 80302

30. Black, Dr. Robert F., Department of Geology, University of Wisconsin, Madison, Wisconsin 53706

1. Bloom, Dr. Arthur L., Department of Geological Sciences, Cornell University, Ithaca, NY 14850

33. Bugh, Dr. James, Department of Geology, State University College, Cortland, NY 13045

27. Caggiano, Mr. Joseph A., Jr., Department of Geology, University of Massachusetts, Amherst, Mass. 01002

2. Calkin, Dr. Parker E., Department of Geological Sciences, State University at Buffalo, Buffalo, NY 14214

12. Coates, Dr. Donald R., Department of Geology, State University of New York at Binghamton, NY 13901

33. Coch, Dr. Nicholas K., Department of Geology, Queens College of C.U.N.Y. Flushing, NY 11367

7. Craft, Mr. Jesse L., Department of Geology, Carleton University, Ottawa 1, CANADA

15. Crowl, Dr. George H., Department of Geology, Ohio Wesleyan University, Delaware, Ohio 43015

11. Davis, Mr. Kernan W., State of New York Conservation Department Division of Water Resources, State Office Building Campus, Albany, NY 12226

22. Drake, Lon D., Department of Geology, University of Iowa, Iowa City, Iowa 42240

10. Durham, Dr. Forest, Department of Geology, Hofstra University, Hempstead 11550

29. Fairbridge, Dr. Rhodes, Department of Geology, Columbia University, New York City, NY 10027

25. Fleisher, Dr. P. Jay, Science Department, State University College, Oneonta, NY 13820

20. Forsyth, Dr. Jane L., Department of Geology, Bowling Green State University, Bowling Green, Ohio 43402

4. Frimpter, Dr. Michael H., U.S. Geological Survey, Box 948, Albany, NY 12201

22. Funk, Dr. Robert, New York State Museum and Science Service, Albany, NY 12224

24. Gillett, Dr. Lawrence B., Division of Science and Mathematics, State University College, Plattsburgh, NY 12901

11. Goldthwait, Dr. Richard P., Department of Geology, Ohio State University, Columbus, Ohio 43210

2. Harrison, Mr. John E., Department of Geology, Syracuse University, Syracuse, NY 13210

15. Holmes, Dr. Chauncey D., P.O. Box 277, Tully, NY 13159

14. Hudec, Dr. Peter P., James R. Dunn & Associates, Box 187, Averill Park, N.Y. 12018

30. Jacobs, Dr. Alan M., Illinois State Geological Survey, Natural Resources Bldg., Urbana, Ill. 61801

5. Karrow, Dr. P. F., Chairman, Department of Earth Science, University of Waterloo, Waterloo, Ontario, CANADA

26. Larsen, Mr. Frederick D., 1394 South East Street, South Amherst, Mass.

7. Miller, Mr. Norton, The Arnold Arboretum of Harvard University, 22 Divinity Avenue, Cambridge, Mass. 02138

18. Newman, Dr. Walter S., Department of Geology and Geography, Queens College, Flushing, NY 11367

1. Nicholas, Mr. John, Department of Geology, CUNY City College, New York City, NY 10031

32. Péwé, Dr. Toy L., Department of Geology, Arizona State University, Tempe, Arizona 85281

15. Raemsch, Dr. Bruce E., Yager Museum, Hartwick College, Oneonta, NY 13820

29. Russell, Dr. Richard J., Coastal Studies Institute, Louisiana State University, Baton Rouge, La., 70803

25. Sales, John, Science Department, State University College, Oneonta, NY 13820

19. Sevon, Mr. William D., Pennsylvania Geological Survey, Harrisburg, Penna. 17120

24. Sirkin, Dr. Leslie A., Department of Physics, Adelphi University, Garden City, NY 11530

28. Wagner, Dr. W. Philip, Department of Geology, University of Vermont, Burlington, Vt. 05401

6. Whipple, Janice M., U.S. Geological Survey, RWD, P.O. Box 948, Albany, NY 12201

3. White, Dr. George W., Department of Geology, University of Illinois, Urbana, Ill. 61801