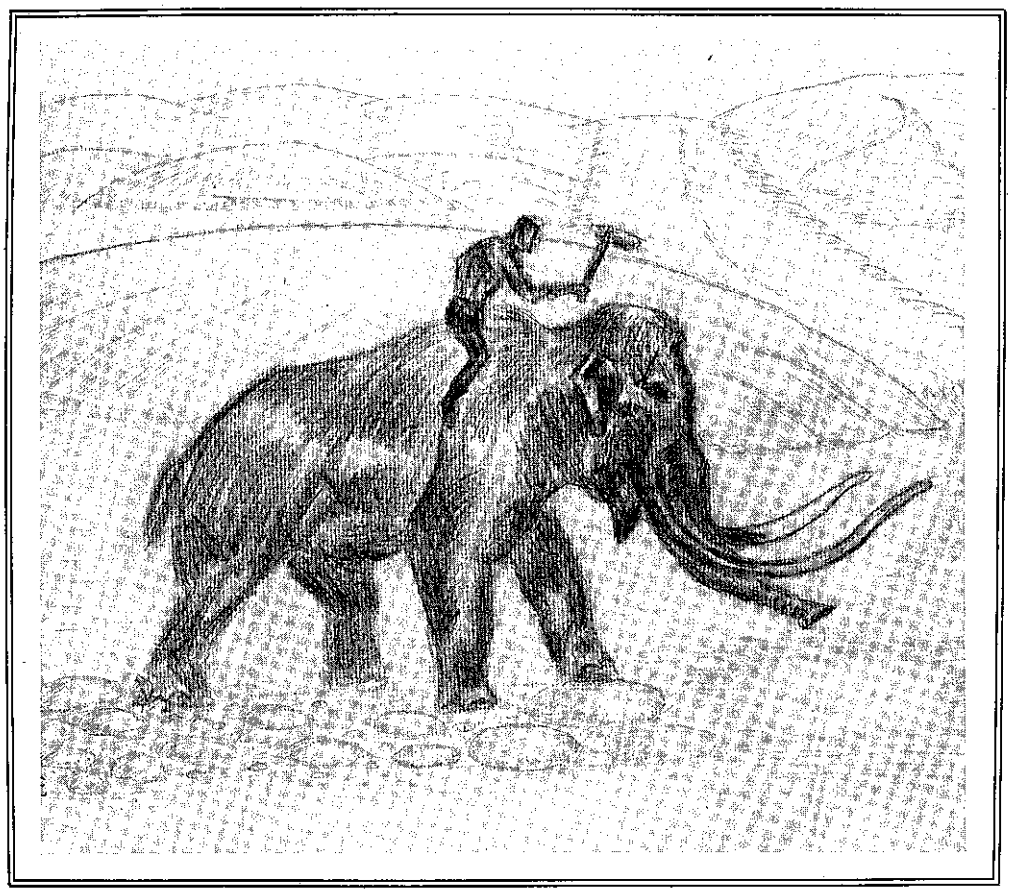
NEW YORK GLACIOGRAM



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Binghamton, New York 13901

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For additional information
write to the compiler of this Glaciogram:

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December 30, 1965
Syracuse, New York

Friend of New York Pleistocene:

We have talked from time to time of improved means of keeping in touch with others engaged in New York Quaternary research. We have talked, but we haven't done anything.

The idea was a round robin or newsletter, circulating rapidly enough to be current, yet informal enough to have the advantages of conversation; without the strictures of copyright, yet providing immediate availability of information to those who can best use it.

Now, with an act of faith, Gordon Connally has flung out a paragraph--for whatever use it may be to whomever it may be of use. With no more pretention than this, your round robin is in motion.

For the moment you are the bearer of the torch. The round robin will serve its purpose, if you will!

1. Whip out a brief statement, preferably a single sheet, communicating that which is of current interest to you in Pleistocene research.
   Perhaps it is the work you have been completing; perhaps the work of one of your associates; perhaps it is a problem you wish you could get down to; or it may be the latest techniques, or the latest find, or the latest publication--anything that relates to New York Quaternary investigations.

2. Read, extract, photocopy or make whatever use you desire of any of the information contained in any parts of this letter.
   Use the information as you might use any item received in private conversation. Respect the writer's interests but feel no concern about using the information. Show any parts of the letter to persons concerned with similar work.

3. Forward all sheets received, together with your added sheet to the next person on the accompanying list, checking off your name with date to show you have seen items from persons above and before you on the list.
   If we can circulate at a rate of a week or less per person, the cycle will be brief enough to be useful to all concerned. Add the names of persons whom you feel may wish to contribute and benefit from this circulating newsletter at the end of the list.

GORDON CONALLY SHOT AN ARROW INTO THE AIR
IT WILL FALL TO EARTH. LET'S SHOW HIM WHERE.

EHM

Following the INQUA Congress in Boulder in September, I spent a week in Nova Scotia (Cape Breton Highland) before returning to the onslaught. Haven't had a breath of fresh air since -- other than Hal Bornes NEIGC field trip in the Kennebec Valley, Maine, last October.

In November, Alex Nagy at Saunders gravel pit in South Onondaga pulled a 22-inch long fragment of tusk from a truckload of gravel -- the third "elephant" remain recorded in Onondaga County (so far as I know). TV and radio played up the find, but search has so far revealed no other remains. Interesting thing is that the beast, probably a medium-sized mammoth, apparently died on or immediately adjacent to the dead ice margin, so that his bits and parts were incorporated in the foreset beds of a kame delta.

By coincidence, Don Krall, now teaching in Painted Post, N.Y. had just defended his N.S. thesis on "Fluvioglacial drainage between Skaneateles and Syracuse, N.Y." including the South Onondage delta complex, two or three weeks before.

With Minze Stuiver of the Yale C-14 Lab and David Rhoades of National Lead Company, I collected material for extended range dating and hopefully also for pollen analysis from interglacial lake beds (age greater than 40,000 yrs, B.P. per W-1520) between tills in the Sanford Pit of National Lead Co. at Tahawus in the central Adirondacks. (Nov. 9, 1965).

Jim Street reached New Orleans in time to lose his roof to "Betsy" last September. Until November he worked on his Ph. D. dissertation on the Tug Hill Plateau (in part) and adjacent Black River Valley. With the draft in good shape he went to work with Texaco in November. Hopes to submit final draft for degree this year.

Norbert Faltyn at Onondaga Community College had an oversize vertebra shown him by a student. The vertebra seen in picture by Graham Heaslip of Cortland College appears to be that of a marine vertebrate, e.g. a whale. Reported to have been collected in lake silts on shore above Irondequoit Bay, Rochester. If so, this indicates marine connection with freshwater Lake Iroquois, as is reasonable on basis of so-called Gilbert Gulf features and whale vertebra formerly found near Brocton (?), Ontario.

For attention of those relating Quaternary research to early man, is the new book by W.D. Ritchie, State Archeologist on "The Archeology of New York State" Natural History Press (Am. Museaum of Nat. Hist.), Central Park West at 79th St. New York 10024, $12.50, 355p.

The find of a plausible artifact in intrastadial loess in Illinois (Science, about mid-December) is exciting. Wonder when cave archeologists in New York will uncover cave stratigraphy that documents late Pleistocene environmental succession beyond that recorded in surface deposits and topography?

If the above potpourri suggests I haven't accomplished much on my own during the fall, the suggestion is correct. But keep me on your list; there's still hope.

Gordon Connally 12/26/65

Upon returning from working for the Vermont Survey last summer, I got back to my own research in the mid-Hudson Valley. I have finished reconnaissance mapping and am convinced that detailed mapping is needed to decipher the history.

I have mapped several ice-front positions from the N.J. line to New Paltz. In the south these may very well be remnants of stagnant ice whose front is accentuated by meltwater channels; however, there are push moraines from Wallkill on north. These appear to have been formed by ice from the Catskills, coming over the Shawangunks rather than from a "Hudson Valley lobe."

Adams (1934) discussed two lake levels in the Wallkill at 500 and 400 feet. There is at least one more at 225' near New Paltz. A delta at Tillson, either from ice to the north, or from a lake outlet in the Rondout Valley, dammed the Wallkill and forced it to cut into bedrock east of its original channel. The Wallkill channel is excavated at least 100' below sea level.

Dave Fullerton 1/5/66

Weeks of painful pondering over field notes, air photos, maps, and literature since September and particularly during the holidays force me to wave my white flag so that all can see.

The glacial stratigraphy in the Utica-Herkimer-Little Falls-Trenton-Remsen region is far from simple and the exposures are too large and too numerous to be studied as carefully and as critically as they should be. There are five or more tills in some sections, and lithology is useful only occasionally. Incorporation of black shale, older drift, and fluvial gravel make an otherwise possibly straight-foreward study difficult to unravel. Thick units of lake clay (as great as 90 feet) separate the tills, so it's a question of "who's who among New York lakes and tills?"

Kames, unfilled kettles, till moraines, and other till features of undetermined origin do not allow Fairchild's Amsterdam and Schoharie Lakes to have occupied the region during the last deglaciation. At this point it is mandatory that I expose myself to the wrath of the FNYP's and to suggest that on the basis of everything I now know (which is negligible compared to that which I obviously don't know), at the time of the last glacial advance in the Utica-Trenton-Herkimer region the Mohawk Valley east of Little Falls was ice-free and there was free eastward drainage. The "Valley Heads" ice reached nearly to Little Falls in the Mohawk valley, moved into the Fulmer Creek valley south of Herkimer, banked against Dairy Hill east of the West Canada Creek valley (covering and crossing the hills between Herkimer and Middleville west of West Canada Creek), and abutted against the sand plains in the vicinity of Newport, Poland, and Trenton. The interlobate moraine margining the Hinckley reservoir (Fairchild's Herkimer Lake terraces) is the product of an earlier glaciation. Only the terraces below 1100 feet near Trenton and in the vicinity of Poland and Newport are related to "Valley Heads" glaciation. Ice in the Black River valley may have reached only as far south as Alder Creek, and Starr Hill may have been ice-free. Tug Hill was ice-covered - haven't heard Jim Street's final dictum, however. Ice movement seems to have been directly out of the Ontario Basin via Oneida and Rome, rather than over Tug Hill. Perhaps this is in keeping with Chauncey Holmes' concept of a local center of outflow in the eastern end of the Ontario Basin.

If this is the case, the last ice advance here is (or was) Port Huron in age and the Mohawk valley was ice-free during the Cary-Port Huron interval (not in conflict with Hough or Fairchild as quoted by Hough). Regardless of correlation, there was an ice-free interval prior to "Valley Heads". Lake Albany, therefore, may have antedated and/or have been contemporaneous with the "Valley Heads". I believe that the morainal complex between the Catskills and Utica (Chamberlin, 1883, and others) marks the terminal position of the eastern equivalent of the Kent drift. The Olean drift may be Early or Middle Wisconsin, and I may be able to do something with that, we'll see. It looks as though the "Mohawk Lobe" is a Kent equivalent, and that the "Valley Heads" is younger.

At this point I will take the liberty of passing along a word relative to Paul MacClintock's study in Vermont. This past summer he traced the Burlington drift border (readvance) into New York in the vicinity of Fair Haven. Note that Woodworth (1905), Flint (1953) and Hansen et al. (1961) found evidence of readvance over clays as far south as Whitehall or thereabouts.

I, therefore, am speculating that the Kent, Almond, and Hamden (Conn.) tills, the Ronkonkoma-Harbor Hill (and Belvidere?) moraines, some or all of Rich's Catskill moraines, and the moraines between the Catskills and Utica are post-Plum Point, pre-Port Huron in age, that during the Cary-Port Huron interval southern New England, the lower Hudson valley, part or all of the Champlain Lowland, and the Mohawk valley were ice-free, and that the "Valley Heads" in the Utica area and the Burlington drift of Vermont are products of a Port Huron readvance.

I may be treading upon Bob LaFleur's toes with size 18 shoes; if so, I hope he will set the record straight. So far, nothing conveyed to me from Charlie Denny or Paul MacClintock is in conflict. John Moss has hinted that he may work on the Plateau in the Helderberg region - if he can be persuaded to determine the significance of the moraines between Utica and the Catskills, he may be able to clarify the picture. Detailed studies in the Lassellsville-Canajoharie and Boonville regions would be extremely valuable and rewarding and might give someone the opportunity to wipe me off the map. I NEED HELP!!!!

1/10/66

R. G. LaFleur

Congratulations to the inventer of the floating newsletter! I hope this will become a permanent thing.

My summer was spent with the USGS Albany Groundwater Branch working in the Susquehanna Basin of N.Y. with Bob MacNish, Al Randal and Pat Hollyday. Detailed mapping of the valley bottoms is largely complete, with water well information providing some challenging problems not apparent from the surface. Some interesting concepts about the deglaciation are beginning to emerge but it is premature for firm conclusions at this writing. Perhaps by the time the letter reaches Al Randall he will be willing to stick his neck out on our behalf. There is some advantage in being near the beginning of the list.

My area included the Tioghnioga and Chenango Valleys with Mac Nish covering the eastern Susquehanna and Unadilla. The Valley Heads forms the northern divide through most of our areas. I would call attention to the existence of this mapping to those interested, as we are, in the Valley Heads problem. Bob and I have about 50 7½ minute sheets compiled and I imagine Al and Pat have a comparable number in the remaining area. The water resources study will continue this year.

Mrs. Janice Keegan, a Ph. D. student at RPI will begin field work this season in the area east from Bridgewater and Clayville, ending hopefully in the Schoharie Valley. We should learn something of the Mohawk deglaciation in the next year or two.

The thought struck me that if someone on the list has access to a free Xerox machine, those folks toward the beginning of the list might profit from a circulation in reverse of the info which follows theirs. I know our USGS group would be pleased to hear comments about the Susquehanna basin in the near future.

Happy digging to all.

C. S. Denny 1/20/66

I have completed mapping the surficial geology of the N.Y. portion of the Plattsburgh quadrangle and the Dannemora quadrangle, and I expect to complete field work in the Rouses Point and Mooers quadrangles in 1966.

The till is generally a sandy loam. Striae and pebble counts show that Ice movement was generally from the northeast. Near Lake Champlain, southward movement is recorded by striae. Northward movement of ice from the mountains previous to the last glaciation is one possibility suggested by abundance of fragments of Precambrian rocks in a small area near Ellenburg on north side of mountains. About a quarter of the stones in the till that covers a few square miles are crystalline rock types similar to those that form Ellenburg Mtn. to the south. The stones, some are boulders 6 feet in diameter, appear to be more weathered than those in the drift of the surrounding area. In a few places (within the area mapped) the till has a grooved or fluted surface consisting of parallel swales and ridges, only a few feet high, that parallel the striae on nearby bedrock outcrops.

The most conspicuous belt of moraine, about 3 miles wide, crosses the Saranac river near Cadyville. Discontinuous patches of moraine also occur in the southern part of the Dannemora quadrangle and north of Saranac River on the north slopes of Dannemora and Ellenburg mountains. These are retreatal moraines formed near thin margin of downwasting ice sheet when its foreward movement was impeded by steep slopes near the edge of the crystalline uplands. For these conspicuous patches of moraine that surround the northeast prong of the Adirondacks I propose the informal name, Mountain-front morainic system.

In St. Lawrence lowland, the southern limit of P. Mac's and P. Stewart's Fort Covington drift is 10 to 15 miles north of my mountain-front morainic belt and extends east to L. Champlain just south of Canadian border. Near Burlington, P.S. believes that surface till is Fort C. because it has a northwest fabric. Thus, the drift east of Lake C. is younger than that to west, an unlikely possibility it seems to me. I suggest that after deglaciation of most of northeastern N. Y. and Vt., ice still covered St. Lawrence lowland and projected as a lobe down the Champlain Valley. Perhaps the marginal kames in Burlington and Camels Hump quads. mark eastern edge of this lobe and the M.F.M.B. its western edge. If this be so, then Nelson Gadd's "highland-front morainic system" is a related feature.

My lake and ocean history of the Champlain valley is essentially that of Chapman.

Rapid mechanical analyses of samples of sands were made in the field and suggest that sand laid down in fresh water lake is slightly better sorted than either the glacial or morine sands (Lake level more constant than sea level?).

I had the good fortune to see many actively worked borrow pits opened in Wentworth's Ingraham esker. (I think it is one). The ridge has a central core of ice-contact stratified drift overlain by fossiliferous deposits of Champlain Sea (sand to boulder gravel). Fossils include mollusks, crustaceans, Foraminifera, and ostracods. Shells give C-14 date of about 10,500 years (W-1109). In some exposures, marine beds are separated from core by unfossiliferous sand and gravel, probably fresh-water deposits of Lake Vermont. Original esker was higher and steeper than present ridge. It was modified by wave action that eroded away upper part of esker and deposited materail on its lower slopes, especially on its western side, to produce the existing ridge.

(More of this will appear in a spring issue of the N.Y. Geogram)

Jesse L. Craft 1/28/66

Base camp was set up the last week of May at Raquette Lake, New York. During the period from June 1 to September 1, two cirques were located and mapped in detail on the Raquette Lake quadrangle (Otter Pond el. 2130, and Pine pond el. 2100). Fifteen cirque-like depressions were visited in the vicinity of Raquette Lake. These depressions were found to be either kettle lakes or bedrock lakes formed by some mechanism other than cirque glaciation. The proglacial lake drainage of Ancient Raquette Lake was mapped. Numerous drift deposits were measured, and samples collected for later laboratory study.

The valley occupied by 7th and 8th Lakes was deglaciated before Raquette Lake Valley. Proglacial lake drainage from Ancient Raquette Lake flowing over a divide at elevation of 2020 feet deposited a large delta separating 7th and 8th Lake valley into two parts. The State Campsite is located on this delta.

Reconnaissance mapping of drift deposits was done on the Big Moose, Old Forge, West Canada Lakes, Blue Mountain and Rawuette Lake quadrangles. A marble saprolith buried beneath glacial drift was found on Long Point, Raquette Lake quadrangle. This is the second such deposit found in the Adirondacks.

At the present the stratigraphy of the Raquette Lake region seems to be as follows:

Numerous lakes occupied the valleys of the Adirondacks in pre-glacial time in much the same manner as at the present time. Glaciers moved into these lake depressions, scouring them deeper and incorporating the sandy lake deposits into the base of the ice. The resulting deposits left by the glaciers are very sandy, and relatively free of large material, deposited on top of well sorted lacustrine sands from the pre-glacial lakes. Deglaciation of the area occurred in the minor valleys first. The minor valleys then became proglacial lake drainage channels. As valleys with lower outlets deglaciated the drainage changed from higher to lower elevation. During this period of proglacial lake drainage all water flowed southward. Finally the ice melted out of the region to the north and the present northward drainage was established.

Plans are now moving ahead for next summer's work. Cirque-like depressions in the "High Mountains" will be visited to determine their origin.

Anyone interested in palynology studies in the Adirondacks?

Parker E. Calkin 2/4/66

This seems to be an appropriate means of announcing the forthcoming New York State Geological Association field meetings; these to be held at the Treadway Inn (Niagra Falls) on April 30 and May 1. There will be a full day field trip on Saturday which will cover the most interesting and important Geomorphic and Pleistocene features of the Buffalo-Niagra Falls area. Such features as the prominent beach ridges (Whittlesey to Iroquois), Lockport channels, and Niagara Falls (on Canadian side) will be covered. For those of you who cannot attend I will try to keep some extra copies of the roadlog and "Late Pleistocene History of Northwestern New York" to send out on request. The latter is my excuse for not contributing anything new on the New York Pleistocene at this time; however, I am somewhat of an expert Ha, Ha, on what everyone else has done in this area. I have seen enough of the area, however, to get together a number of questions to ask you when you visit. I am planning to start a detailed study of Erie County and northwest Niagara County this coming summer.

Chuck Cazeau is working on the mechanical composition of till and of beaches (particularly Warren levels) in Erie Co., but like myself has nothing original to offer at this time.

Victor E. Schmidt 2/11/66

Three bits of information, a request, and a question.....

First; In August, with Eugene Sensel, who teaches at Odessa High School, as assistant, I spent ten days in the field trying further to unravel the tills and proglacial lake and stream deposits of the Sixmile Valley near Ithaca. There are at least two tills: the lower is thoroughly leached of carbonate, and crystalline erratics in it show weathering rinds; the upper is fresh and calcareous. Above the lower till are varves which are without doubt advancal, having been deposited in a lake which rose to inundate the site. Three stream gravels, alternating with three more series of varves, lie above the lowest varve series. Wood, leaves, and beetle elytra occur at several horizons. Above these lake and stream deposits is the upper till, and above this is more lake clay. There is no till immediately above the lowest series of varves where these are overlain by the lowest gravel, but I suspect there was such a till, eroded prior to the deposition of the gravel.

Second: Since I published on boulders of "interglacial" conglomerate found in the Cortland area (Am. J. Sci., v. 245) students and I have gradually and erratically (!) extended the range of these rounded pebbles and boulders of carbonate-cemented gravel containing erratics, until it now reaches from Norwich to Wayland. They occur in kames, kame terraces, and outwash. We have not found them north of the Valley Heads border. Can it be that they are peculiar to the Valley Heads drift? (Chauncey Holmes, who noted these before I did, may have some further observations.)

Third: This summer, with a class of 28 captive N.S.F.'ers in glacial geology at Cornell I tried something I have long wanted to do: measuring till fabric in the drumlin sectioned by the N.Y.S. Thruway near Port Byron. We did this at 14 stations spaced fairly uniformly at three levels on the terraced slope. Only afterward did I discover that the students were not uniformly expert on reading directions! Consequently, the data are not wholly reliable, but the technique might be repeated by someone with an equally enthusiastic

group, all of whom can read a compass. Incidentally, my biggest concern at the time was the possibility of pile-ups on the Thruway by distracted drivers; nothing of the sort happened, and I doubt if one driver in a hundred even noticed the diggers.

Now, will someone please tell me where and when the Friends of the Pleistocene (Eastern) meet, and to whom I should write to get on the "list"? I have not been able to attend for several years, and would like to start once again. A postcard for getting this information to me is enclosed. Thanks!

Finally, isn't it high time that we initiate steps to preserve some of our outstanding Pleistocene features, especially eskers and other meltwater deposits, so they aren't all ruined and so future students as well as interested lay persons can see them? We need many more areas in the State like Green Lakes State Park and Mendon Ponds Park. These can serve the public, as well as future geologists and high school students. Incidentally, how do we inform the laymen who visit Green Lakes and the Clark Reservation of their origin? (Mendon Ponds Park is doing a good job in this respect). Any suggestions?

Arthur L. Bloom 4/23/66

Sorry to have tied up this noble (but never Nobel) newsletter for six weeks. It was buried in John Hail's mail when he returned from an extended lecture tour, and he turned it over to me as he dashed for the plane home. In the future, he will receive mail at 7 Shrublands Close, Chelmsford, Essex, England.

My contribution is to report a finite date of about 42,000 B.P. from a piece of spruce wood in the lake beds in 6-mile creek valley, Ithaca. I intentionally avoid giving you casual readers the exact date, the sample number, and the setting because the information is Minze Stuiver's, and he is reluctant to let it out until it is verified by running some more samples, which I am after. The merest trace of modern contaminant in an infinite-age sample would give that date. If it is a real age, it gives us the time of an ice wall across the north end of the Cauga trough. Now grab Alex Dreimanis' correlation table and have fun. Anyone can play "Pre-classical Wisconsin"!

Regardless of the exact date, we know from previous dating attempts that Vic Schmidt's 6-mile creek lake beds are more than 35,000 yrs. old. If the Valley Heads ice, as well as the classical Wisconsin ice (or is that redundant?) followed pre-existing topography without scooping out those weak lake beds, when were our enormous troughs cut, and under what conditions of erosion? Don Coates will like that question, as he is now loading a large charge of (sour?) grape shot to fire at the British invader.

If interested, see Cline, M. G., and Bloom, A. L., 1965, Soil Survey of Cornell University Property and Adjacent Areas; New York State College of Agriculture, Cornell Miscell. Bulletin 68, 31p. (25¢). Mostly Cline's excellent soil maps on an air photo base, with twice the usual mapping scale, plus a bit of geologic interpretation by me. I'll send you a reprint if you are saving your quarters.

Donald R. Coates

Received Newsletter 3/24/66
Dispatched my addition 3/25/66

This is an excellent idea. I think some definite system needs to be inaugerated in order to see contributions of those people below your name.

I am not sure whether I am Friend of Foe of the Pleistocene, but am happy to be included. Recent publications with punch lines as follows:

1. Implications of the discovery of much thicker drift in southern N.Y. -- GSA Spec Paper 88, p. 33-34. Average till thickness in Broome Co. is more than 50 feet.

2. Water well records: a neglected tool in geomorphology studies of central N.Y. AGU Trans. v. 47 (1), p. 89. Self explanitory..viz. earlier investigators wrong on importance of erosion, type of hills, and till thickness in areas south of Ithaca, Tioga and Broome Co.

3. Base flow characteristics of streams in the glaciated Appalachian Plateau - AUG Trans v. 47 (1) p. 87. Low flow of streams can be closely correlated in many parts of the Plateau with the direction of flow of the master stream. The nature of the valley fill (largely glacially influenced) is of importance in quantifying the low flow parameters.

4. Deglaciation of the Great Bend region of Pennsylvania and New York (with John Harrison) AGU Trans v. 47 (1) p. 90. The latest glacier largely wasted in place rather than by a series of frontal retreats. New evidence on periglacial activity, quantification of "semi"-tors and quarrying, with block movement. Glacial erosion incidental to pro-glacial meltwaters.

The following are in press:

5. Geology of Broome County, to be published as a chapter in the new Soil Survey of Broome County by the U.S.D.A.

6. Till shadows on hills in the glaciated Appalachian Plateau. Should appear in several weeks in SCIENCE. Description with some quantitative data on the shape of hills and depth of rock. Average rock depth is 12' on north slopes and 92' on south slopes for well sample of 400.

Major works in the mill:

7. Geohydrology of streams in drainage basins 300 sq. mi. in southern New York. This work is for the USGS. It has been a 5-yr effort. I have finished two computer programs written for the study and have completed a multivariate analysis using 30 variables.

8. Evaluation of water wells in southern New York. This work is sponsored by Research Foundation SUNY. To date I have personally collected about 2,000 well records...largely in Broome and Tioga Counties, but several hundred are adjacent counties in N. Y. and Pennsylvania. I have written a computer study to analyse this data.

Smaller projects:

9. New thoughts on the concept of Drainage Density.

10. I have run about 50 new samples of till in southern N. Y. for sand-silt-clay ratios, rock counts, and heavy mineral identification.

Questionable concepts and programs: (maybe even just pipe dreams, eh! Bloom?)

I am planning to respond to Clayton's Zeitschrift article on the Finger Lakes. Whether to do it as a short note or a major opus is undecided. If any of you have ammunition with which to help repel the British invasion, I would be most appreciative. Zeitschrift gave me the green light on a short note.

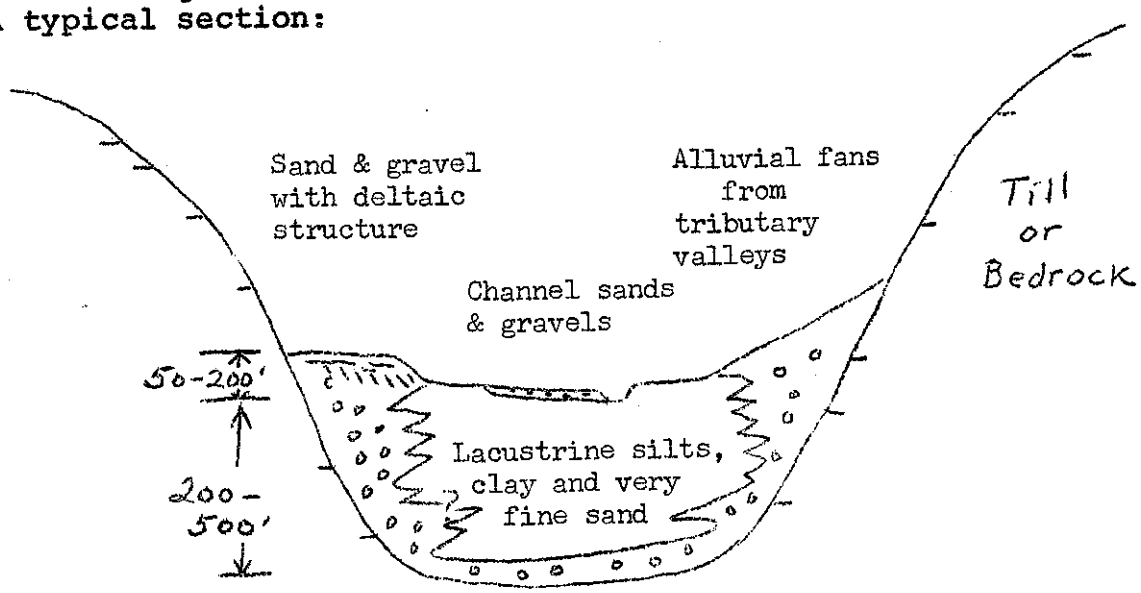
I have two Masters candidates working on glacial problems between Binghamton and Walton.

Robert D. MacNish, U. S. Geological Survey 10/5/66

Geological findings in the Susquehanna.

Most of the major valleys of the eastern portion of the Susquehanna River basin in New York are very deep bedrock valleys which have been filled with up to 500 feet of glacial deposits - mainly of lacustrine origin.

A typical section:



I have found little or no sand and gravel deposits in any upland area in this region. This suggests that the last ice sheet did not stagnate, but remained active until most of the upland areas were free of ice.

Numerous examples of lake sediments are found in small tributary valleys, as much as 150' above the floors of the main valleys, suggesting ice tongues or blocks in the main valleys were the last elements of continental glaciation. The presence of these lacustrine sediments in gorges cut by melt water (as in the Tioughnioga Channel at Chenango Forks) suggests active ice in the valleys during deglaciation rather than stagnant block type.

I have found no evidence of multiple glaciation in the Susquehanna drainage above Windsor.

Walter S. Newman, Queens College 10/10/66

HOLOCENE HISTORY OF THE LOWER HUDSON RIVER ESTUARY

Archeological investigations of the Croton Point shell middens by Salwen (1965), Brennan, Olafson, and others, reveal that the midden was already being accumulated some 5800 years ago (5,840±200 years, Y-1315). Thus, the lower Hudson Valley was already estuarine some 5800 years B.P. when salinities were at least as high as they are today. During the past year, I have been investigating Ring Meadow, on the west shore of the Hudson River adjacent to Iona Island about 1 mile south of the Bear Mountain Bridge, near the south edge of the Hudson Highlands. The marsh is covered by Typha angustifolia while the marsh level is very near mean high water. Peat is encountered to depths of at least 27 feet below mean high water. Basal peats from three levels of Ring Meadow have been C-14 dated.

Lab #	Date (Years B.P.)	Depth (below mean high water)
L-1038B	2500±250	9.0
L-1038C	4080±220	21.0
L-1038D	4630±470	27.0

Pollen analyses of the deepest boring so far (27 feet) indicate the boring terminated in the C-1 (Quercus-Tsuga) pollen zone while the presence of the foraminifer Trochammina inflata throughout the entire length of the bore suggests salinity has remained relatively constant in the area during the past 4600 years. The latter suggestion seems inconsistent with a sea level some 27 feet below its present level. Was Hudson River runoff appreciably less at that time because of greater evapotranspiration? Paleontological investigation of bores from the extreme western end of Long Island Sound find the pelecypods Pandora trilineata and Mercenaria campechiensis associated with the upper B (Pinus) and C-1 (Quercus-Tsuga) or C-2 (Quercus-Carya) pollen zones. Since these mollusks do not live in the area today, but are extant further south along the Atlantic Coast, it appears that the hypsithermal in southern New York State was a real interval and, perhaps, explains the paradoxical salinity data for the lower Hudson River estuary.

Work is continuing at Ring Meadow where we will attempt to bore to still deeper levels. I will complete the western Long Island work this winter.

I am still looking for the "Montauk Till" of Fuller (1914). I have not yet been able to find it. Les Sirkin has had similar luck. If the Montauk Till isn't real, Cliff Kaye faces some difficulty in his Marthas Vineyard correlations.

Charles S. Denny, U.S. Geological Survey 10/19/66

I spent about three months in the Plattsburgh area this past summer. John Goodlett, Department of Geography at Johns Hopkins, was near by for about two months and continued his mapping of some of the tree species in the four quads that I am mapping: Dannemora, Plattsburgh, Rouses Point, and Mooers. I have completed the surficial map of the Dannemora and the New York part of the Plattsburgh quadrangles, and they will be published in the Geologic Quadrangle Map Series (GQ-635), hopefully next spring. The Mooers quad is about four-fifths completed and the Rouses Point about two-fifths. I hope to complete the mapping next summer.

The beaches in the Mooers quad are spectacular. They are ridges composed either of angular boulders, of flagstones, or of pebble gravel depending upon the nature of the material available to the waves. The total absence of any rounding of some of the beach "gravel" makes me wonder if the beach ridge could have been formed in one storm. Or, might ice jams on the shore have piled up some of them? I had the pleasure of visiting beaches and deltas on the Vermont side of the basin with Paul MacClintock and Perry Stewart. The deltas are similar to those on west side, but many of the beaches are insignificant by comparison with those on the west shore. I suppose this again reflects the abundance of weak, soft, fine grained, and schistose rocks on the east side of the lake. I still have no C-14 dates except for a loner on Champlain sea shells. Pud and I investigated some "blow-down" mounds and pits on a Champlain Sea beach that at first I took to be patterned ground -- frost polygons several feet in diameter -- obviously indicative of periglacial

conditions on shore of the Champlain Sea. Further thought convinces us that the patterns are related to tree throw and that no patterns could persist in the surface soil for 10,000 years because of the activity of Shaler's "subsoil plow." I have also done considerable calculating on the subject of Champlain Sea deltas and present and past rates of sedimentation, but I don't as yet know whether or not my calculations mean much, so I'll postpone telling you anymore about them.

Donald M. Lewis, New York State Museum 10/20/66

Late-glacial Pollen Evidence From Southeastern New York

Pollen from sediment samples taken near Mohonk Lake, Ulster County in the Shawangunk Mountains near New Paltz show two definite lateglacial climatic oscillations. The site is not ideal in a palynological sense due to the possibility of strong topographical influences on plant ecology. Corroborative pollen data should be obtained from nearby sites.

The sediment is 5.26 meters deep. The older oscillation is the classical spruce, pine, and non-arboreal pollen sequence, but without specific habitat indicators except for a single pollen grain of Rubus chamaemorus, an arctic-alpine species and the only one I have seen in New York State pollen samples.

The younger oscillation is especially well-marked. Spruce drops to rather low, constant values until rising to a final maximum; pine shows a steady increase until dropping just before the final spruce rise; oak rises to low, constant values before dropping at the end of this zone. There are other pollen indicators substantiating this cold-warmer-cooler trend, but the most striking is the easily recognized Myriophyllum alterniflorum which is found throughout the "warmer" zone, but nowhere else in the sediment column. This plant is now found in Scandinavia, Iceland, Greenland, Newfoundland, New England, northern parts of New York (rare), Michigan, and Minnesota, and Alaska. The pollen zone in which it is found (3.81 to 3.05 meter-levels) is taken to represent Two Creeks warming, correlating with published pollen diagrams from central and southern New England.

There are several things technically wrong with other parts of this profile, but, overall, this site has renewed my faith in the pollen analysis method. The Myriophyllum and Rubus finds emphasize the value of specific identifications of plants of limited present distribution and restricted habitat. More of these should be identified and publicized.

Leslie A. Sirkin, Adelphi University 10/25/66

I have been working on the reconstruction of late-glacial environments along the terminal moraines from Staten Island, N.Y., to Block Island, R. I., and I have cored a number of bogs in between (on Long Island, that is). Although the pollen diagrams have proven informative, one of the problems has been a lack of basal radiocarbon dates for bog sections and finite dates for the drift in this region. The reason is simply that the drift and lacustrine sediments contain too little carbon or even wood fragments for radiocarbon determination.

However, a more basic problem is the lack of radiocarbon dates and pollen stratigraphy between Staten Island and western Pennsylvani

and New York, along the terminal moraines, and elsewhere in the state in association with recessional drift. This lack of information became more obvious to me this past summer while compiling data for a paper on correlation of late-glacial environments in the east. While there is considerable late-glacial and postglacial stratigraphy for New England, intraglacial, full glacial and late-glacial data is almost totally lacking in New York, and precious few radiocarbon ages exist for the late-Wisconsin drift sheets.

I would like to suggest a solution to the problem. Short of volunteering to core and process every untrammeled bog in New York, perhaps we (the FNYQ) can give more attention to recording and (at least) staking out, (hopefully) probing, and (if convenient or at all warranted) collecting continuous cores, including bottom samples for radiocarbon dating, from likely-looking lakes and bogs or continuous samples from exposed till sections. The data concerning each site could then be recorded on a file card, and along with any samples collected might be deposited in some centrally located storeroom or core library providing that the collector had first crack at the samples. These sites could then be kept in mind for future work, with the reference material available to any interested colleague. For most of us this would mean merely locating and recording the prospective site and forwarding the information to the core library-card file for future reference. For those planning projects or grant proposals, it would mean consideration of additional funds for radiocarbon dates, palynological services, or laboratory assistants.

If this proposal seems at all interesting, I would appreciate hearing some other ideas on the subject, since I have been involved in sometimes futile hunts for bogs and intramorainal peats in my own area. Perhaps, those interested could discuss the matter at the next Quaternary meeting, as for example at the N.A.G.T. in Port Washington, or in the next newsletter.

Ernest H. Muller, Syracuse University 10/26/66

Since the original round-robin, I have contributed little to the advancement of New York Quaternary Geology beyond an abortive abstract with Gordon Connally on the Binghamton-Kent problem read by title at the Northeastern Section, Geol. Soc. America meetings in Philadelphia in March. A field trip guidebook in the Cortland area, prepared for Eastern Section, Nat. Assoc. Geology Teachers in April includes local geomorphology and a field trip comparing diverse aspects of Valley Heads moraine deposition in troughs between Cortland and Syracuse.

During June and July, I taught for 6 weeks at a Geology Summer Science Institute for College Geology Teachers, sponsored jointly by India's University Grants Commission and the Agency for International Development, at Sagar University in central India. This experience sharpened my awareness of exhumed topography of the Precambrian Vindhyan uplands as resurrected from beneath the Tertiary Deccan trap, my awareness of the necessity of Continental Drift, and my sensitivity to problems of adjustment which Indian students encounter upon entering graduate departments in this country.

Field conferences with Bill Shilts, Perry Stewart, and Paul MacClintock in Vermont, with Barry MacDonald and the "little friends" in Quebec, and with Bill Newman on Cape Breton Island, Nova Scotia afforded opportunity to catch up with recent developments in these field areas.

At present I am working with Louis Lliboutry's massive two-volume "Traite de Glaciologie", which though differing in objective and content, is only a bit less exhaustive and considerably more sharply stamped by the author's original genius than is Charlesworth's two-volume work on the Quaternary.

The Utica Daily Press, Sept. 8, shows Don Fisher, State Paleontologist announcing recent receipt of a skull of an "ice age horse" collected from lake sediments 40 ft. below the surface in downtown Albany.

Bill Savage, a student at Syracuse University has commenced a study of the Syracuse drumlin swarm, with intent to stress particularly the relationship of drumlins to bedrock topography in this area on the plateau margin.

Graduate thesis investigations completed at Syracuse University in 1966 include James S. Street's Ph.D. study of the "Glacial geology of the eastern and southern portions of the Tug Hill Plateau," Joseph A. Caggiano's M.S. study of the "Glacial drainage history and drift petrography of the Vernon, N.Y., Quadrangle" and Donald B. Krall's "Fluvioglacial drainage between Skaneateles and Syracuse, N. Y."

Jan Murray and W. Scott Baldridge, students working under Don Potter at Hamilton College have completed a study reporting relationships of glacial flow in the Mohawk lobe to the Valley Heads moraine system in the Clinton-Oriskany Falls area.

Chauncey D. Holmes, Tully, N.Y. 10/28/66

This note is chiefly to confirm my presence in our area and my continuing interest in The Quaternary. I am still mostly sidetracked on my house-building project, but I have begun a study of an upland swamp between Norwich and Cincinnatus.

In 1937-38 I studied the central New York region as a part of my Yale dissertation, and some of the results have never been published. Of course, they are somewhat outdated now, but I shall be glad to offer unofficial aid to anyone working on the glacial geology hereabouts, along with both orthodox and unorthodox ideas on almost any topic relevant thereto.

Allan Randall, U.S.G.S. 10/28/66

The Susquehanna water-resources team spent much of its time this past summer measuring and sampling streams and setting up observation wells and gaging stations. However, we have by now collected much of the available records of major wells and test borings along the major valleys. Some geologic data collection will continue this winter and next summer, with exmphasis on the smaller valleys and alluvial fans of tributary streams.

Surface and subsurface data available thus far indicate that in a great many places along the major through valleys of the Susquehanna basin, deltaic and fluvial-terrace sands and gravels present at the surface are underlain by lacustrine fine sand to clay, underlain in turn by sand and gravel atop rock. The upper and lower units are variable in thickness, generally 10-50 ft. but locally more; the lake beds tend to increase in thickness as depth to bedrock increases. At intervals of one to several miles along the valleys, including localities where outwash sequences head in

"valley-choker moaraines", coarse-grained deposits appear to make up most or all of the section. This pattern can be interpreted as one of stagnation-zone retreat. Maximum depth to bedrock below valley bottoms is much greater (200-500 ft) in the NE-trending valleys of the upper Susquehanna, also near the Valley Heads moraine farther west, than in the Southern Tier from Binghamton to Corning (100-200 ft). Base level in most places was controlled by older stratified drift downriver; only between the Cohocton and Canisteo Rivers, also near Cortland, is there extensive upland stratified drift graded to bedrock spillways. There is some evidence for a late-glacial channel cut in lake beds, etc., and filled with coarse outwash near (and south of?) Binghamton.

Parker Calkin, S.U.N.Y. Buffalo 10/28/66

LATE-PLEISTOCENE GLACIAL RECESSION IN NORTHWESTERN NEW YORK

Fieldwork was begun in late July in the southwestern portion of Erie County (Silver Creek 15') in the Erie Lowland and North Collins/ Gowanda Moraine area. Study of the lake plain area has not been the most exciting work I have ever done but I felt that a careful look should be made again now that I had air photos and detailed maps to use. At the moment, two general remarks seem appropriate:

1. Fairchild's work as well as Leverett's work in this area is surprisingly accurate (or similar to my work, Ha! Ha!) as regards to positioning of beaches and bars. I have particularly searched for features which might relate to sub Warren - pre Dana lake levels but evidence is very sparse.

2. Large tracts of the lake plain have been mapped in the distant past as tills by the soil scientists; however, careful examination (sometimes very difficult in the dry silts) seems to indicate that these are stony lake silts since they show stratification. (I am sure that I may get Gordon Connally out here with this remark). I am attemtping to do some laboratory work that will throw light on the situation.

Some work on the beaches has been very interesting as I have found Warren beach ridges underlain by thick silts and clays in several places but particularly in Hamburg area; hence suggesting important stand in Whittlesey time. Along this same line; Ronald Symecko has confirmed the presence of a Good Whittlesey beach ridge/ strand* in the Orchard Park area (Transit Road) where we stopped last Spring (N.Y.S.G.A. trip).

Till stratigraphy (in the vertical) is sparse in the area but at the west margin of Buffalo (near the Airport) I have found two distinct tills over striated bedrock and at least three Wisconsin tills in Clear Creek (a few miles upstream from Muller's Gowanda Hospital site) and at 18 mile creek (Hamburg) which are separated by outwash or lake silts. No new datable material found as yet. The lowest till at Clear Creek contains large percentages of clay and crystalline rocks while the upper tills contain locally derived materials (mostly shale).

*870-880'

Peter Weyl, S.U.N.Y. Stony Brook 10/28/66

During the 1965 INQUA congress in Boulder, I proposed a new theory of the Pleistocene climatic oscillations. The detailed paper will be published in METEOROLOGICAL MONOGRAPHS in a forthcoming issue on climatic change. Since the time constants of the atmosphere are short, we must look to the world ocean for climatic stability and climatic change. An examination of the climatic differences between the North Pacific and North Atlantic, as well as an examination of recent documented changes leads to the following: The North Atlantic is warmer and its ice limit is further north than that of the Pacific due to the greater North Atlantic surface salinity. The existence of a shallow halocline in the North Pacific and the Arctic oceans, makes these appear as shallow seas to the atmosphere, while the isohaline North Atlantic acts as a deep ocean. A reduction in the surface salinity of the North Atlantic would lead to a southward advance of the sea ice limit to 60° N, a change in the Atlantic circulation, and a glacial climate. The required salinity change could be brought about by a reduction of the water vapor flux from the Atlantic to the Pacific across the Isthmus of Panama. Work on how the ocean interacts with the atmosphere to control the climate is continuing in the department of earth and space sciences at SUNY Stony Brook.

G. Gordon Connally, State University College, New Paltz 10/31/66

There is little new in Orange-Ulster Counties as I have been occupied elsewhere during the summer. Last spring I did discover that some of my ice marginal positions mentioned in my Philadelphia paper do not exist. What I had mapped in reconnaissance as moraines turned out to be a system of crevasse fillings and "inwash eskers". I now feel that there are only two well documented positions north of the Culvers Gap moraine. I also think that the mid-Hudson glaciation was tri-lobate, at least in its latter stages. One lobe went west of the Shawangunks, one went down the Wallkill valley axis, and the third spilled over from the Hudson River. I hope to suggest an interlobate moraine between the latter two at N.Y.S.G.A. this spring.

In the meanwhile I have started a two-year project for the Office of Planning Coordination, through the State Geological Survey. I am to come up with a surficial map of Washington, Warran, Essex and Clinton Counties (all of Lake Champlain-Lake George). I started in late August in the Ticonderoga quadrangle and got tied up doing a detailed map in the Crown Point 7½' quad in order to help locate a suitable site for a well for the Crown Point Fish Hatchery. The site will be chosen by the U.S.G.S. so I'm off the hook on that.

I was able to determine that the Quaker Springs level exists in the form of flat-topped, pitted outwash with feeder "inwash eskers" containing shells. I also located Coveville, Fort Ann and Champlain Sea features, the latter containing shells as far as Crown Point village. I believe that a C.S. erosional scarp can be traced further south than the Ticonderoga quad, but confirmation must await next summer. I also located the same three till lithologies that I found last year in Vermont: the most ticklish of which is a yellow-brown, silt to silty-clay till that suggests overriding of lake sediments.

Donald R. Coates, SUNY Binghamton 10/31/66

My earlier contribution to the now defunct "non-round robin" itemized several activities that have kept me in trouble. This time it might be more appropriate to provide more specific information on some other projects.

1. In case you didn't catch it in SCIENCE, v. 152, n. 3729 for June 17, 1966, or receive one of my almost out-of-print reprints, I published on "Glaciated Appalachian Plateau: Till Shadows on Hill". My data show that north hill slopes are twice as steep as their southern counterparts and can largely be attributed to till thickness...12' vs.92'. Furthermore, in a 1500 square mile area the thickness of till above valley bottoms averages more than 50'.

2. During the summer I prepared a report for the U.S. Army Corps of Engineers titled "Geomorphology of the Cowanesque Basin, Pennsylvania". Part of the basin is in New York. New discoveries include such features as many different levels of elevated lake beds throughout the basin; landslides and dimpled topography develop as a result of the lake clays; depths to bedrock in the valley at Osceola exceed 240' yet are rarely more than 140' in the downstream part of the valley, suggesting anomalous bedrock levels in the pre-glacial channel.

3. I have provided a discussion of Clayton's Finger Lakes article in ZEITSCHRIFT FÜR GEOMORPHOLOGIE which will appear in issue number 4 for 1966. I believe the original article had some factual errors, inconsistencies, and was over-generalized. I will be happy to send reprints when they become available.

4. I am starting to collect my thoughts on slopes in southern New York and with the discovery of tors, patterned ground, and "block fields" the preliminary evidence favors relict cryogenic slopes for several elements of the landscape.

5. John E. Harrison completed his masters thesis titled "Proglacial Drainage Evolution and Deglaciation of the Great Bend Region, Pennsylvania and New York". I am directing two other glacial master's theses; one involves a quantitative terrain analysis in southern New York and northern Pennsylvania using analog methods, and the other is a description and study of some unusual topographic features in the Geneganslet and adjoining basins.

6. I had hoped to present a paper on the statistics of valleys in central New York at the northeastern section GSA meeting, but my maps and materials were unavailable for use during the critical two-week period when my office was moved to another building. Perhaps I will try for the AGU Washington meeting in April.

Calvin Heusser, American Geographical Society 10/31/66

I do not have much for you at this time, but will certainly have more to offer by 1 May. The main thing that I think would be newsworthy for at least some of your readers is that I have a student doing a Ph.D. thesis on late Pleistocene palynology of five or six lakes situated between the Sterling Forest area at Tuxedo, New York and the terminal moraine in the vicinity of Dover, New Jersey, some 40 miles distant. His name is John Nicholas, and he is at present teaching in the Geology Department at CCNY. John has three cores so far and plans to collect the remainder when the lakes become frozen this winter. His objective is to learn something about the climate and vegetation as well as the chronological setting for late-glacial and postglacial time in this sector. He hopes to be able to

obtain C^{14} dates that will give us an idea as to the age of the moraine in this part of New Jersey. By May I should have more definitive information to offer you.

I should perhaps clarify my position since this letterhead may seem confusing. I have an Adjunct Associate Professorship in Geology at NYU where I teach a graduate course in palynology and handle students in thesis work. Several graduate students plan to do theses in palynology but whether they will work in the Pleistocene or not is uncertain. There are a dozen students this year in palynology, and it is likely that a few of them will do theses in the area of our mutual interest. As I say, I will have more for you in May. In the meantime, my best wishes for launching a good newsletter.

Arthur L. Bloom, Cornell University 11/3/66

FERNBANK: A REDISCOVERED PLEISTOCENE INTERGLACIAL DEPOSITS NEAR ITHACA, NEW YORK

In 1908, Maury published a brief description in the Journal of Geology (v. 16, p. 565-567) of a molluscan fauna collected from Pleistocene deltaic sediment near Ithaca, New York. Subsequent workers ignored or doubted Maury's conclusion that the deposit, which is informally labeled "Fernbank" in the fossil collection at Cornell University, is interglacial and correlative with the Don beds at Toronto, of Sangamon Age. The location of the deposit was forgotten.

In May, 1966, I relocated "Fernbank" or an equivalent, following Maury's vague description of the site. Lacustrine deltaic beds extend to at least 60 feet above present Cayuga Lake. The beds apparently fill an interglacial bedrock valley in the glacially oversteepened wall of the Cayuga trough. Sediments are tough and compact; wood and shells are compressed in the horizontal plane. The deposit seems to have been overridden by a glacier, but no overlying drift has been identified. Wood from 28 and 47 feet above present lake level gave radiocarbon ages of >54,000 years (Y-1403) and >52,000 years (Y-1404). A pinch of peaty, shelly silt was analyzed for pollen by A. A. Berti, University of Western Ontario. He reported 230 identifiable arboreal pollen grains, of which about 30 per cent were oak, 17 per cent hickory, 16 per cent beech, and 12 per cent elm. The pollen count is very similar to that of the lower and middle Don beds at Toronto. It resembles the Hysithermal pollen count in central New York more closely than it resembles the modern pollen rain.

The molluscan fauna, the pollen, the infinite radiocarbon dates, and the compacted sediments all suggest that "Fernbank" is an interglacial deposit, probably of Sangamon Age. It is the only such deposit reported from New York State exclusive of Long Island.

Jesse L. Craft, University of Western Ontario 11/4/66

Just a short note to show that the Pleistocene of the Adirondacks is far more complex than any of us ever believed.

This summer was spent walking the trails (and blow-down) in the High Peaks Region (Mount Marcy, Whiteface). Thanks to two mountain climbing field assistants (Shirley Petlac, Plattsburgh and Dave Cuyler, Brockport) all the peaks above 4,000 feet were climbed and observations on the distribution of glacial erratics were made. I worked mainly in the valleys looking for evidence of mountain

glaciation. Some of the interesting observations are as follows:

1. No erratics (Potsdam sandstone or meta-sedimentary) were observed on any peak standing above 4200 feet. The highest occurrence of Potsdam sandstone was on Algonquin (5114') at the elevation of 4600 feet.
2. Continental ice tongues formed lateral moraines in the major north-south valleys.
3. Ice flow direction was mainly north to south in the high peaks but positive evidence has been found to indicate a west to east flow through the Newcome area and a south to north flow over the National Lead Co. mine at Tahawas.
4. There was east to west flow of ice in Roaring Brook (west side of Gaint Mountain) that truncates the Continental lateral moraine.
5. There are 3 till sheets in the Tahawas pit, each capped by a glacio-fluvial sequence.
6. The small lake on the south side of Mount Redfield (Marcy quad is a tarn with a moraine blocking the outlet. (If you see Gordon Connally ask him about it.)

P. Walker (Plattsburgh) and C. Gehris (Brockport) are starting work on the palynology of Adirondack bogs.

I am writing my dissertation this winter.

Next summer I hope to study the distribution and age relationships of the Continental Lateral Moraines and frozen ground features of the High Peaks region.

Headquarters will be at the Atmospheric Sciences Research Center Whiteface Mountain. If anyone is in the area, drop by.

QUATERNARY NEWSLETTER

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