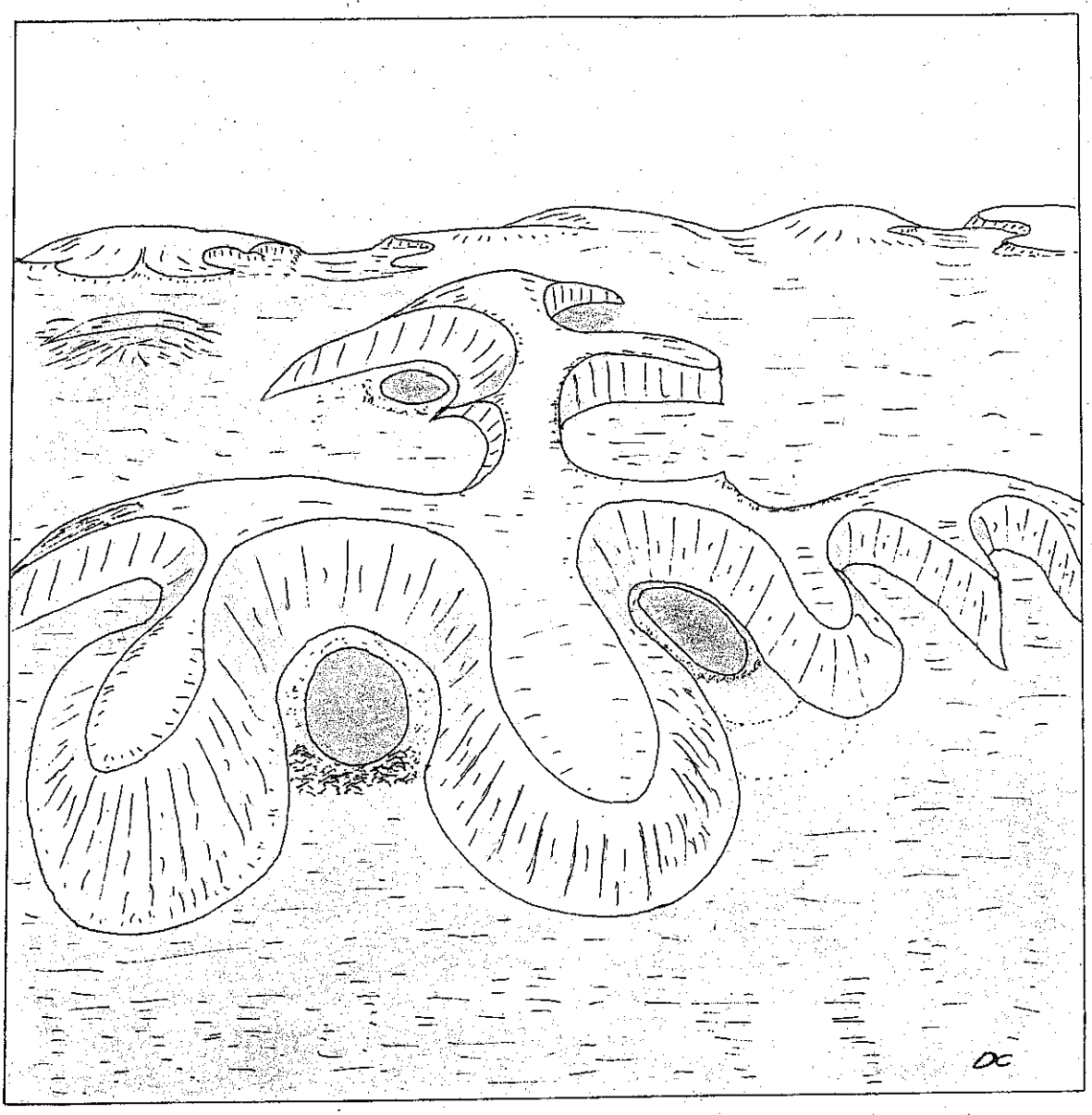
NEW YORK GLACIOGRAM



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EDITOR'S PAGE

In the last issue of Glaciogram a request for suggestions to improve this service met with monumental silence. Therefore, I have decided to make no radical departures except to widen the line spacings to provide for easier reading. My daughter, Lark, has been the cover artist until this issue, which I did. If any of you wish to try your hand at line diagrams or other types of illustrations that lend themselves to easy printing I encourage you to submit them for future issues. The only topical restriction I would place concerns their relevancy to glaciation.

The mailing list continues to grow and is now over 100. It is indeed heartening to note the scientific stature of many of the new names who wish to receive this information. Actually, more than 150 copies are disseminated with each issue and at some point I suppose a limit will be reached.

Those of you who missed the Annual Meeting of the New York State Geological Association, were certainly the losers in not participating in the field trips conducted by Walt Newman to Montauk Point and Les Sirkin to western Long Island. The only way to capture part of the fun is to order the very first class guidebook. Discussions during the field trip reinforced my previous decision to broaden the base of New York Glaciogram to include all nearby states and provinces. (Perhaps a new name is in order. What are your opinions?) For example, it became very obvious that certain problems of the tills, moraines, and outwash on Long Island should not be studied in that vacuum but needed the additional insight that can be obtained from Martha's Vineyard, Cape Cod, and Nantucket.

Although it is self-evident, the success of Glaciogram depends on contributions and repartee with contributors and others to reach higher levels of communications. I trust you will all have a lot to report next November.

DRC

WILLIAM A. WHITE

1/11/68

A study made in the north central New York area is suggesting that drumlins are not the original topographic forms in which the glacier deposited the drift that composes them. Rather, they seem to be forms carved from a once continuous drift sheet by erosion.

The drift was deposited in a broad sheet. Then the ice retreated and left it exposed to subaerial denudation which dissected it extensively. This dissection may have been largely the work of ordinary streams in an interglacial time. However, much erosion was wrought by a plexus of outlet channels from proglacial Lake Iroquois which braided through the northern part of the drumlin zone after the retreat of the ice that carved the drumlins. Since the gross features of bedrock topography should have been basically the same during the immediately preceding ice retreat, it may well be that much of the dissection of the drift sheet was done by massive discharges of water from earlier proglacial lakes draining to the Mohawk Valley as the later Lake Iroquois did. At any rate, as the ice made its last advance (to the Union Springs and Waterloo moraines) it seems to have overridden a topography of dissected till which it carved up to make drumlins. In many places the ice flowed across the ridges diagonally and cut them up into tiers of drumlins staggered en echelon.

The length of a drumlin is usually determined by the distance the ice flowed over the ridge from which it was carved. Glacial erosion was greater along certain axial routes of ice flow. There it removed most of the drift, and cut into soft bedrock to make rock drumlins and others that are made partly of bedrock and partly of drift. Many of these are atypically long because they were eroded out of a flat lowland that had suffered little stream dissection before the drumlin-carving ice crossed it. Drumlins grade into glacial grooves with decrease in relief of the predrumlin topography from which they were carved.

Many drumlins are wholly or partly made of water-laid drift. This obviates the possibility that their fusiform shape was built up by lodgment till, and makes it difficult to avoid the assumption that their shape is the result of glacial erosion.

Aside from features of shorelines of proglacial lakes, water-laid sands and gravels are associated with drumlins in three different

ways. (1) As part of the drift sheet from which the drumlins were carved. (2) As bars of lag gravel where drumlins were eroded by a plexus of outlet channels that drained proglacial lakes. (3) As glacio-fluvial tails down-glacier from drumlins. The origin of these last is obscure. Possibly they are subaqueous deltas built where proglacial lakes invaded narrow reentrants in the ice front or in water-filled voids below floating ice where the waning ice was thinned as it passed over the crests of drumlins.

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DONALD D. COX 1/29/68

A Late-Glacial Pollen Record From The West Virginia-Maryland Border

Summary

An undated pollen diagram was constructed from a 3.5 meter sediment column taken at Cranesville Swamp on the West Virginia-Maryland border. Stratigraphic and pollen data indicate that the swamp began its development as a lake during a major advance of the Wisconsin ice, possibly the glacial maximum. Sand and clay in the bottom layers are suggestive of slope wash resulting from an incomplete vegetative cover. Pollen data from these strata indicate an open boreal woodland consisting of scattered spruce, fir and jack pine, with grasses, sedges and other herbaceous plants on the intervening open ground. Pollen zones 1 and 2 are identified in the lower 1.5 meters of sediments. These zones contain elements of both the A and the pre-A zones of New England pollen profiles.

The transition from boreal woodland to deciduous forest appears to have been a very rapid one. The pollen profile does not show a distinct transitional coniferous forest. Three subdivisions of the deciduous forest zone are recognized as C1, C2 and C3. C1 is characterized by high hemlock, birch and oak. A maximum of chestnut and a minimum of birch identify zone C2. Modes in Fagus and Carya mark the boundary between C2 and C3. Maxima in Quercus, Betula and Picea along with a pronounced rise in herbaceous pollen distinguish zone C3.

Cranesville Swamp probably persisted as a lake until closure or near closure in C2 time. From then until the present it has existed as a shallow lake during moist years and a seasonally flooded marsh during dry years.

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JERRY A. LINEBACK and ALAN M. JACOBS 3/12/68

We have been restudying the Illinoian "ridged drift" of the Kaskaskia Basin in southern Illinois in light of recent work on ice-stagnation features. We expected to find end moraines and till plains, but instead found ridges of ice-contact stratified drift, kames, trenches of silt, and two tills: thought to represent lodgment and ablation deposits of an Illinoian glacier. We would like to compare notes with anyone currently interested in ice-stagnation features. We will present a paper on their results at the May 1968 meeting of the Northcentral Section of G.S.A.

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RHODES W. FAIRBRIDGE 4/3/68

"The Encyclopedia of Geomorphology" edited by me, is now in page proof and should be published by the end of the summer. It contains about 450 articles by over 100 authors. Articles of local interest include such ones as Champlain Sea, Glacial Lake Albany, Finger Lakes, etc."

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ROBERT MAC NISH, ALLAN RANDALL, and HENRY KU 4/5/68

The USGS team investigating the water resources in the Susquehanna River basin plans only limited field work this summer, chiefly measurements of water loss from small upland streams where they cross the stratified drift in major valleys. Most of our effort will be directed to preparing a first draft of our final report. An interim report describing amounts and sources of geohydrologic data available for the basin, and presenting a preliminary picture of aquifer geometry and quantity and quality of water available, is now in review; publication as early as next fall is possible.

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CHAUNCEY D. HOLMES 4/7/68

Basal sediments beneath the two swamps I have studied thus far contain re-deposited (?) pollen which I believe antedates the last glacial episode in this area (central and east-central part of the State). With some additional field equipment made during the winter, I'm hoping to find some of this elusive and hypothetical peat still in situ,--maybe enough for a radiocarbon date.

CHAUNCEY D. HOLMES 4/7/68 diatoms

Is anyone working on the late-glacial-postglacial diatoms and sponges? The local record of diatoms seems quite like that reported by Repo and Tynni in Comptes Rendus de la Societie géologique de Finlande, No. 39 (1967), pp. 133-159.

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WALTER M. TOVEL 4/9/68

The Department of Geology, Royal Ontario Museum, Toronto 5, is engaged in studies of bottom samples and cores of the Great Lakes; work, particularly oriented towards Lake Ontario, will begin this summer. The program is slanted towards biostratigraphic studies based on pollen succession. For control, cores from small lakes of the Ontario upland have been taken. The ultimate aim of the program is to establish with greater accuracy the chronology and pattern of deglaciation, the pollen succession, and the climatic changes.

The palynological work, which is the important component of the problem, is being carried out by Dr. John H. McAndrews, the Associate Curator of the Department of Geology. The materials for the Lake Ontario Basin are being provided through the cooperation of the Burlington Institute of the Department of Energy, Mines and Resources.

Background feasibility studies of Great Lakes cores have been undertaken, and pollen extracted. The cores were obtained from the straits which mark the entrance to Georgian Bay. This program was made possible by using the C.C.G.S. Porte Dauphine, the research vessel of the Great Lakes Institute, University of Toronto. The work will continue, with the aim of establishing the relationship between low-water stages in Lake Huron and Georgian Bay.

This communication is submitted to acquaint our neighbors and unknown colleagues in the southern portion of the Lake Ontario drainage basin with our work, in the hope that they will establish contact with us.

The Royal Ontario Museum (Department of Geology) will sponsor a GEOBOTANY Symposium to be held at the Museum, in Toronto, some time in February, 1969.

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ALEKSIS DREIMANIS 4/15/68

Last winter I was rewriting my paper on a climatic-environmental hypothesis on extinction of mastodons which was presented at the GSA Meeting in New Orleans last November. When the published occurrences of mastodons were plotted on a map, interesting patterns of their distribution developed. Thus, according to J. Drumm, 1963, the New York State occurrences cluster in two major areas; one is south of Lake Ontario, another in the Hudson River Valley - Atlantic region. I could not find any reports on mastodon finds from the intervening mountainous belt between these two areas. Is this separation real, indicating that mastodon disliked mountainous terrain, or it is just lack of information? (Very few have been reported from the mountainous areas farther S.W. outside of New York State and the occasional reports are from valleys).

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JANE L. FORSYTH 4/17/68

I look forward very much to this summer, as I plan to spend the first six weeks at an ecology-geology NSF Institute at Colorado State (in the Rockies) and the rest of the time working on other half-completed northwest-Ohio problems (how much of the Defiance Moraine west of Findlay was covered by Maumee III? how far south of Maumee III (or I) did earliest postglacial waters extend?) and starting the systematic mapping of the glacial geology of Williams County in the far northwest corner of the state.

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NICHOLAS K. COCH 4/23/68

This past year I have been supervising undergraduate projects in the glacial stratigraphy of Suffolk County. Carl Sondergeld and Michael Katuna are studying variations in sediment parameters in the Ronkonkoma Moraine System in the Moriches Quadrangle. William Kagan is studying the Harbor Hill Moraine and shoreline features in the Orient Point Quadrangle. Linda Appleby is doing a study of variation in diagenetic changes in quartz-grain surface features in the sediments of the Ronkonkoma and Harbor Hill Moraines. I continued my research on the post Miocene sediments of Southeastern Virginia last summer. I mapped one and a half 7.5 minute quadrangles

NICHOLAS K. COCH 4/23/68

for the Virginia Division of Mineral Resources. The area studied contains an extensive valley-fill system which was deposited in the James River and its tributaries during Norfolk time (late Pleistocene), when sea-level was approximately 45 to 55 feet above the present relative position. We made 35 deep core borings and got a good picture of the facies changes upstream in these valley fills.

John Goddard, a graduate student at Queens, and I are working on uranium-thorium and protactinium growth dating of coral from the Virginia Pleistocene. Preliminary dates seem to be consistent and most interesting. Jerre Johnson, of the College of William and Mary, and I have been working on a Coquina Facies in the upper part of the Yorktown formation (late Miocene) and its relations to the overlying Tertiary (?) and Pleistocene sediments. We plan several weeks of field study this summer and hope that we can clarify the late Tertiary-early Quaternary Geological History of the area.

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ROGER M. WALLER 4/26/68

I have finished my field work on the Black River basin project and have been busy compiling results this winter. My surficial geology map at 1:125,000 scale is completed. Some 350 wells have been tabulated, but they contain very poor descriptive information on the glacial drift.

The delta complex in the west foothills of the Adirondacks was built westward onto and against a kame complex of the retreating Black River lobe of ice. The Hogsback Road between Woodgate and Hawkinsville is not an erosional remnant (as stated in the INQUA guide book) in my estimation. The adjacent closed depressions and the gradation from the plain to the east, give support that the feature is an inwash into a crevasse at the glacier front. Similar features are probably present elsewhere because of the interfingering of the eastward-built kame complex and the westward-built delta.

The Beaver River headwaters appear to occupy a rather broad pre-glacial valley system, but was it a major outwash for the melting ice on the north? Field evidence is needed for this "remote" area. All of the drumlin-like knolls on Tug Hill that were observed

ROGER M. WALLER 4/26/68

had poorly-to well-sorted shaly sediments, thus I conclude that they are kames from the stagnating ice.

In reply to Parker Calkin's query in the last issue of Glaciogram, could the circular patterns be relict frost patterns, or more likely pingoes (a large depressed one would be unusual, but seems possible after ground ice had melted) representing post-glacial permafrost conditions? Check the numerous publications on such modern-day features in the Arctic.

My summer will be spent writing up the report on the geohydrology of the basin.

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PARKER E. CALKIN 4/28/68

Pleistocene work presently being undertaken in north westernmost New York includes textural and petrographic studies of the Niagara Falls and Buffalo Moraines by graduate students Bartolamucci and Kirchgessner respectively. Among other data collected, there is a clear predominance of purple over red garnets in the tills and an increase in the sand fraction toward the interlobate area near Batavia. Bob Seiler, who is initiating a stratigraphic study of the surficial deposits of the Niagara Falls and Gorge area, hopes to gather some of the shell collections taken from the area by previous surveys. Would anyone knowing the wherabouts of shells taken from old Niagara River bars, please drop me a note?

Niagara Falls

This coming summer I will leave New York to work on the Pleistocene of western Maine with Hal Borns. We will be mapping surficial deposits of the Little Bigelow Mountain and Stratton quadrangles of western Maine.

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G. GORDON CONNALLY 4/28/68

One of the last defenders of informality is going to take this opportunity to become formal (just this once). I am going to paraphrase a section on Lake Phases from the appendix of my recent report to the State on the Champlain Basin project.

G. GORDON CONNALLY 4/28/68

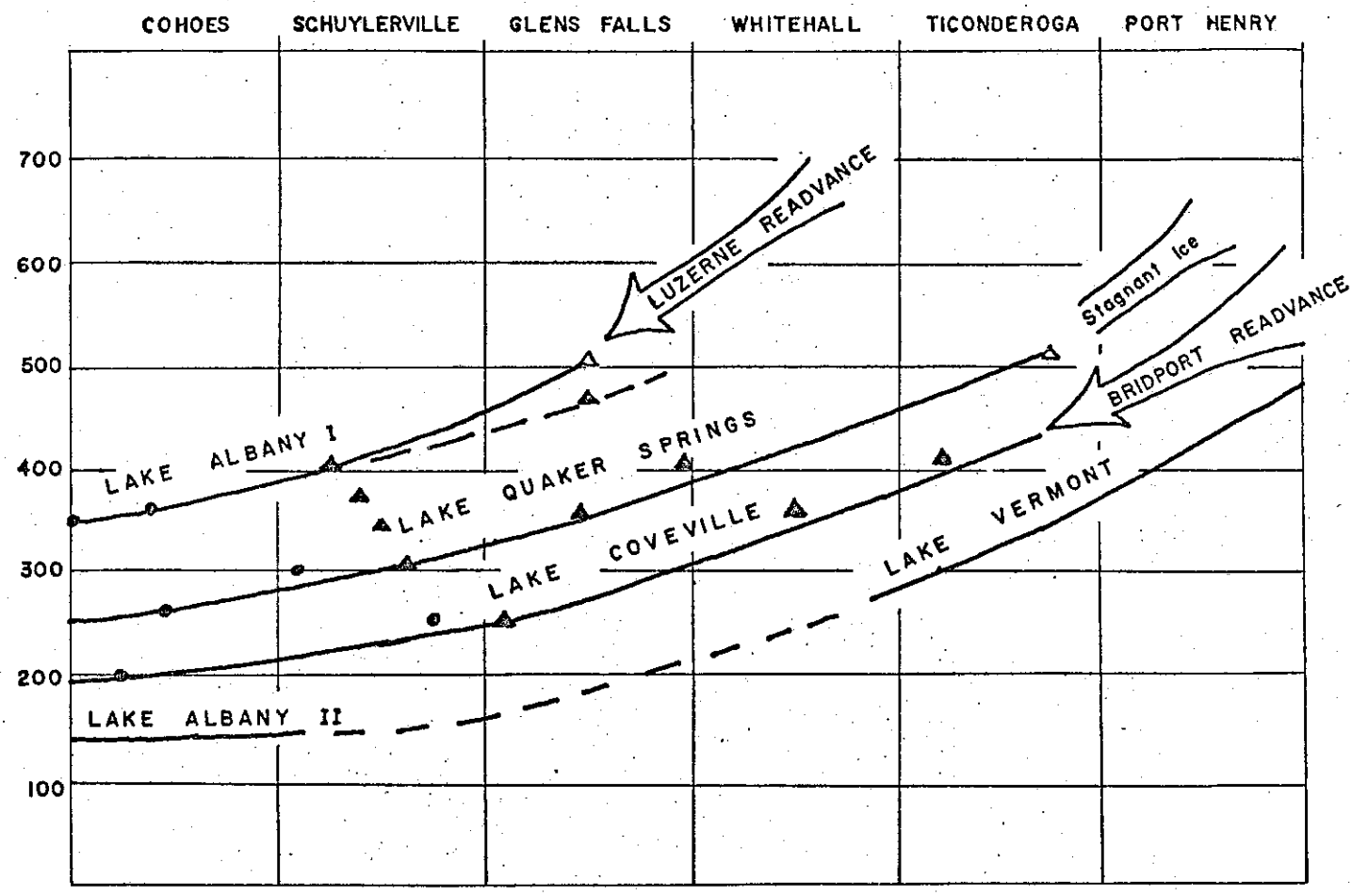
LaFleur (1961 and 1965) has described the history of Lake Albany near Troy and Chapman (1942) the history of Lake Vermont in the Champlain Valley. On the basis of the Hudson Valley work LaFleur suggests that the Quaker Springs, Coveville, and Fort Ann phases of Lake Vermont were continuous with, and therefore controlled by, Lake Albany water levels. I found ample evidence to support this contention for both Quaker Springs and Coveville levels but not for Fort Ann.

As the ice from the Luzerne Readvance dissipated southerly drainage was initiated within stagnant ice (Glen Lake esker system). When most of the ice had melted an outwash delta covered the ice-channel fillings to a present elevation of 500 feet. The outwash delta marks the beginning of Lake Albany in the Glens Falls region. The outwash delta is cliffed and an extensive sandy deltaic plain is developed at 460 feet. This probably represents the same water body after the land had rebounded following the recession of the ice margin into the Lake George basin.

An ice marginal position at Miller Mountain, north of Ticonderoga is at the proper elevation for the Quaker Springs phase confirming my previous suggestion (Connally, 1965) that stagnant ice was present near Middlebury, Vermont (Brandon quadrangle) during the Quaker Springs phase. The Mettawee River delta at 400 feet at North Granville (Cambridge quadrangle) falls right on LaFleur's projection. Similarly, the sandy deltaic plain south of Trout Brook (Ticonderoga quadrangle) at 480 feet and the sand plain on which Glens Falls is built, at 360 feet, also fall on LaFleur's Quaker Springs projection.

The sandy, Poultney River delta at Fair Haven, Vermont (Whitehall quadrangle) at 360 feet and the Hudson Falls deltaic plain at 260 feet both fall on LaFleur's Coveville projection. Thus, I support LaFleur's concept of continuous water plains between the Quaker Springs and Coveville phases in the Champlain Valley and water levels in the Hudson Valley. I suggest that these water bodies be referred to as Lake Quaker Springs and Lake Coveville.

Except for a rather small sandy deposit at Culvers Falls Dam north of Fair Haven, there is no suggestion of a low energy Fort



Rebounded water planes of Lakes Albany and Vermont, after LaFleur, 1965. Open triangles represent outwash deltas, solid triangles represent stream deltas, and solid circles represent beaches shown by LaFleur. Quadrangle locations at the top indicate latitude, and elevations at left are feet above present sea level.

G. GORDON CONNALLY 4/28/68

Ann level between the Hudson and Champlain Valleys. Thus, I follow Chapman in suggesting that Lake Albany and the Fort Ann phase of Lake Vermont were separate entities connected by a high energy stream in the East Bay-Wood Creek valley. I further suggest that the name Lake Vermont be restricted to this level in the Champlain Valley.

LaFleur suggests that the name Lake Albany be restricted to the uppermost of the four levels in the Hudson Valley. I would modify that suggestion so that the uppermost level is referred to as Lake Albany I, while the lowest level, contemporaneous with Lake Vermont, is referred to as Lake Albany II. These suggestions are summarized below.

Hudson Valley	Champlain Valley
Lake Albany I	Ice
L a k e Q u a k e r S p r i n g s	
L a k e C o v e v i l l e	
Lake Albany II	Lake Vermont

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DAVID FULLERTON 4/29/68

The following sequence of glacial and deglacial events (in chronologic order) is inferred from stratigraphic and morphologic relationships in the upper Mohawk Valley region in New York State.

1) At least three Wisconsin glaciations, separated by nonglacial intervals, are recorded in the upper Mohawk Valley region, and two glaciations are recorded in the lower Mohawk Valley. Ice movement southwestward from the Adirondack Mountains, into the upper Mohawk Valley, and onto the Appalachian Plateau occurred only during the earliest glaciation, possibly Early Wisconsin in age.

2) Following a nonglacial interval represented by widespread deposition of lacustrine deposits and later fluvial sediments, the Mohawk Valley was glaciated by ice moving southeast from the St. Lawrence Lowland through the Black River Valley, east and northeast from the Ontario Basin through the Oneida Lowland, and west and

northwest from the Champlain-Hudson Lowlands through the lower Mohawk Valley. The westward and northwestward movement of the "Mohawk lobe" of earlier literature was dominant along the southwest margin of the Adirondacks and at least as far west as Utica in the Mohawk Valley and on the northern margin of the Appalachian Plateau. There is no stratigraphic evidence of movement of ice southwestward from the Adirondacks into the upper Mohawk Valley during this glaciation. If the continental ice sheet covered the Adirondacks, the thickness of ice in the southwest Adirondacks was not great enough to alter the topographically-controlled movement in the Black River and Mohawk Valleys correlation of this glaciation (Late Wisconsin) with that responsible for deposition of the Olean drift on the Appalachian Plateau is not supported by any existing stratigraphic data in the Mohawk Valley. An hypothesis that the Late Wisconsin terminal "moraine" may lie on the Appalachian Plateau between the Catskill Mountains and Cazenovia, New York is compatible with the glacial history of the Mohawk Valley as interpreted from stratigraphic sequence and ice movement directions. A drift boundary or "moraine" in this position has not been delineated, but its existence has been hypothesized by Chamberlin, Fairchild, Flint, MacClintock, Denny, and others.

3) A nonglacial interval followed dissipation of the ice in the Mohawk Valley. Glacial lakes were present in the larger valleys, and fluvial gravel was deposited in the Mohawk Valley subsequent to their extinction.

4) The "Valley Heads" morainal complex in the upper Mohawk Valley region represents a readvance of at least 30 miles by ice from the Ontario Basin. Glacial lakes were not present east of Little Falls at the time of the "Valley Heads" advance. The lacustrine sediments east of Little Falls overlie pre-"Valley Heads" till and were deposited in deglacial lakes during the previous deglaciation.

5) Glacial Lakes "Herkimer", "Schoharie", and "Amsterdam" of Fairchild (1912) were not present in the upper Mohawk Valley region during the "Valley Heads" deglaciation. The surface morphology and sediments attributed to these hypothetical lakes are not lacustrine in origin.

ERNEST H. MULLER 4/30/68

With the spring term coming to an end, I am looking forward now to departure July 1, with my family, for field work in Iceland. Before that, however, I expect to lead a ten-day circuit of the Erie, Huron and Michigan Basins for Syracuse University graduate students. If all goes well, I hope also to leave with the State Geologist a draft of the Niagara, 1:250,000 sheet, covering the surficial geology of New York west of the Genesee River.

Bill Savage, a graduate student at Syracuse University, has completed his M.S. thesis, reporting ice-flow patterns as represented by till fabric in the East Syracuse drumlin field and at the terminus of Ptarmigan Glacier, Alaska. These studies seem to bear out predictions based on plastic flow theory, showing marked divergence at the stoss end and convergence in the lee of drumlins. They suggest also that drumlin growth takes place in concentric shells with dominant accretion at the nose.

Joseph Morley, a senior at Wooster College, working under Gray Multer, has studied the constitution of red till exposed over pro-glacial gravels at Wampsville and Fayetteville, east of Syracuse. Fabric analyses and stratigraphic studies made by graduate students in the Glacial Geology class at Syracuse University support extension of this drift sheet into the Jamesville trough where the ice advance which it represents affected the development of the Syracuse Channels.

Stephen Forster, a graduate student at Syracuse University plans to commence glacial studies in the Carthage Quadrangle with a view to resolving problems of correlation between the St. Lawrence Lowlands and central New York.

L. Iroquois

Chauncey Holmes's call for resolution of the Hough-Bretz controversy (Glaciogram, Nov., 1967, p. 1) was welcome because of the bearing which Michigan-Huron correlations have on the interpretation of relationships in New York. All evidence seems to point to a pre-Two Creeks age for Lake Iroquois, but until the Valders border can be traced continuously eastward across Ontario, one can afford to retain an open mind as to the relationships of the Valders moraine to Lake Iroquois and the Ft. Covington moraine.

As pointed out by Charlie Denny in conversations at G.S.A. in Washington, the Churubusco and Ellenburg Depot, 1:24,000 topographic sheets, published in 1964 by the U.S.G.S. show a well-defined moraine ridge around the nose of Covey Hill, roughly corresponding to MacClintock and Stewart's Ft. Covington moraine. The narrow, distinct ridge, with a minimum of stagnation features on its proximal border, suggests a fairly sharp, though perhaps minor readvance such as might indeed have closed the outlet at Covey Hill to re-establish Lake Iroquois with outflow through the Rome Outlet.

Such re-establishment of Lake Iroquois, if it took place, should be reflected in varved sediments of Lake Iroquois, such as those exposed near Trenton, Ontario. Perhaps Jaan Terasmae will be releasing pollen and radiocarbon data from bordering pond basins that will pin down the demise of Lake Iroquois. In any case, ultimately, the resolution of the Hough-Bretz controversy must come from Michigan and Wisconsin and it will be welcome to hear the opinions of relatively unprejudiced observers.

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GERALD H. JOHNSON 5/1/68

*"A Coquina Facies in the Yorktown Formation near Chuckatuck, Virginia and Its Geological Implications", by Gerald H. Johnson and Nicholas K. Coch

A coquina facies of the Yorktown Formation is exposed in pits of the Lone Star Cement Company near Chuckatuck, Virginia. The coquina facies is about 1.5 miles wide and more than 4 miles long, thins from an axial thickness of 65 feet to less than 10 feet on the edges and trends N. 20° to 25° W. The coquina, consisting mostly of medium to coarse biofragmental sands, conformably overlies and is overlain by glauconitic silty sand and grades laterally into quartzose and glauconitic sands and clays. East of th Suffolk Scarp the upper part of the coquina has been removed by post-Yorktown erosion and is unconformably overlain by the Sand Bridge Formation (Pleistocene).

Thick, steeply dipping cross-beds characterize the central and western parts of the facies. The foreset beds dip toward the northwest at angles up to 35°. Crossbeds along the eastern margin dip gently toward the northeast. Beds along the eastern margin generally exhibit greater textural variation and are thinner. Symmetrical ripple marks occur in the sands of the topset beds.

The fauna comprised mostly of epineritic to littoral species of pelecypods, gastropods, bryozoans, corals, barnacles, disarticulated crabs, foraminifera, and ostracods, is diverse. Decapod burrows are common in the gently dipping beds. Polynicid snail beds with imbricated immature pectins, oriented fusiform snails, and transported tubular decapod burrows indicate deposition under turbulent, shallow water conditions.

The stratigraphic relationship, sedimentary features, and fauna of the coquina facies in the Chuckatuck area indicate that the deposit is an offshore or barrier bar complex. The bar prograded landward and grew northward under the influence of northward flowing currents and wave action in response to a rising sea level during late Tertiary time.

*Presented April 5, 1968 at the Southeastern section meetings of the Geological Society of America in Durham, North Carolina.

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DONALD R. COATES 5/6/68

I am the happy recipient of a $20,000 grant (co-workers include Drs. Joseph Butler and Nicolay Timofeeff of the SUNY Binghamton Department of Geography). Our group will initiate a study of the Appalachian region in an attempt to develop a new systems approach and simulation model for the ultimate purpose of watershed planning. Each investigator and his research assistants will study a certain range of variables in addition to interacting with other members of the team. Butler will focus attention on flood planning and econometrics; Timofeeff on soils and climatology; and Coates on hydrogeology. Specifically, I have in mind studying contrasts in the water-budget system and will compare such properties as streamflow regimes in glaciated vs. non-glaciated terrains, and plateau structures vs. folded structures. Our investigation will concentrate on the New York-Pennsylvania region. Field work will start during the 1968 summer and continue through 1969. Extensive computer-based programming of data is planned.

I envy those of you who are able to spend an unrestricted summer in the noble name of research. For a while I was doing a good job in staying away from administrative matters, but I have been tagged to be the director of an NSF-sponsored earth science institute that SUNY Binghamton will hold for several weeks during the 1968 summer.

With the urging of Kern Davis, on April 16 I hosted a small conference of 14 geologists and engineers. We met for the purpose of studying glacial valley-fill materials and their relation to dam site locations. Attending this meeting on the Binghamton campus were representatives of the U.S. Army Corps of Engineers (Baltimore District), Soil Conservation Service, U.S. Geological Survey, New York State Water Resources Division, and professional staff from SUNY Binghamton and Oneonta. It was the consensus of this meeting that liaison among such groups and the sharing of information and data along such lines was very important.

Jean-Jacques Flint has completed his masters thesis entitled "Hydrogeologic and geomorphic properties of small basins between Endicott and Elimra, New York". We are all proud of this work because he paved some new ground in using computer-based programming, factor analysis and other multivariate systems, to study glacial and hydrogeology data sets. Groups of variables were differentiated,

DONALD R. COATES 5/6/68

the degree of autocorrelation within these groups was determined, and the rate of change of variables were calculated and related to correlation coefficients. Flood plain characteristics, a direct inheritance from glaciation, were the most important criteria in determining streamflow rate changes in the flow duration curve. The roundness index of erratics in till was greater in the seven basins that drained north into the Susquehanna than for the six south-draining basins. This is interpreted to mean that the ice incorporated fluvial materials from the Susquehanna valley as it moved southward.

I continue to evaluate certain hydrogeology and glacial properties of drainage basins ($\leq$300 square miles) from the Catskill Mountains westward to Hornell, New York. In those basins that are tributary to the Susquehanna at least three important basin subsets can be described that differ primarily in the types of valley-fill sediments they contain. I find these differences are important in explaining streamflow characteristics. Thus, south-flowing streams have better-sorted glaciofluviatile sediments than north-flowing streams, whereas east or west flowing streams flow in valleys with higher-till ratios. These differences are explainable in terms of the nature of the glacial advances, retreats, and stagnation. Most streamflow characteristics in the Catskill Mountains can be explained by precipitation and geomorphic considerations.

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ROBERT J. LAFLEUR 5/9/68

I am returning to the Mohawk Basin for the U.S.G.S. this summer to complete the surficial mapping and water resource study of the Schoharie drainage. The State Museum is also supporting the mapping phase. Rich in his "Glacial Geology of the Catskills" mapped only as far north as Gilboa so this should complete an interesting area north to the Mohawk, at a scale of at least an inch to the mile.

Many water wells in the Esperance area reflect two glaciations, the most recent producing the E-W drumlins. Search is being made for outcrops of the older drift. A series of sills for Lake Schoharie (post-Delanson Channel phase) are found just north of

ROBERT J. LAFLEUR 5/9/68

Esperance and suggest the endurance of lake waters for a time after the recession of ice from the lower Schoharie Valley. The preglacial Schoharie drainage appears to lie east of the present course from Esperance north. More well data are required to establish its exact whereabouts.

The Schoharie mapping joins the Gloversville area presently being completed by Yuri Yatsevitch at R.P.I. for the U.S.G.S.

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WALTER S. NEWMAN 5/11/68

I was elected departmental chairman for a three year term commencing July 1, 1968. The U.S. Geological Survey has employed me for this coming summer to map the surficial geology of the Ashley Falls Quadrangle in southwestern Massachusetts and northwestern Connecticut. And finally, the folks who joined me on the NYSGA Field trip out to the Montauk Peninsula on May 4th have caused me to reconsider my position concerning the antiquity of the Montauk Till. Stratigraphically, I still see only one till but morphologically a case can be made for a marked contrast in maturity of adjacent areas. Have to do a lot more work out there in the next year or two especially in the light of Tom Gustafson's find of 32 mollusk species including a number of warm water forms in a formation near Sag Harbor and at an elevation of about 160 feet above sea level!

Our graduate students, Al Rokash and Lillian Musich, and myself, have been working on the Hudson River thalweg and the "incised meanders" in the Highlands Gorge. Published and unpublished boring data plotted on profiles disclose a deep bedrock thalweg usually more than 300 feet below sea level extending from Kingston south to opposite the Battery. However, Tom Fluhr's work discloses no such feature in the Upper New York Bay Water Tunnel. Many of the bedrock cross-sections appear to simulate a fiord profile. I also have a vague feeling that much of the Hudson River Valley is in some measure a morphological coulee. And, I suspect, that those incised meanders in the highlands may well be part of the coulee system. We'll spend time in the field both early in June and later in the fall on this one.

JOSEPH H. HARTSHORN 5/13/68

Now that I have barely survived my first full year of academic life after plunging headfirst out of the U.S. Geological Survey I am ready for two things. First, some field work to get the dust of books out of my nose, and second, an effort to get a good program for graduate students in glacial geology here at the University of Massachusetts. This year my assistant, Kerry Campbell (U. Mass Senior), and I will try to work out the history of glacial Lake Hitchcock in more detail. Our field work will be in the Northfield quadrangle on the Mass.-N.H.-Vermont border, but we will range the length of the valley looking for clues that have evaded me in the past. As those who were with us on the October NEIGC trip will remember, debate continues on how to identify beaches or other shoreline features in Lake Hitchcock. Fred Larsen, a Professor of Geology incognito from Norwich University who is on academic leave to finish up his Ph.D., will work for the U.S. Geological Survey this summer in the Mt. Tom and Easthampton quads, Mass., with John Mullen (U. Mass Senior) as field assistant.

Joe Caggiano, most recently of Syracuse and Temple, will be at U. Mass this fall for his Ph.D., and I hope to get him working on glacial lake problems in western and central Massachusetts. Gail Ashley will work on problems of varved clays this summer, chiefly near Amherst. A.J. LaFleur (U. Mass Senior) will do glacial work somewhere in western Massachusetts, locality undetermined as yet. And Tony Stewart, recent U. Mass graduate, will work with Carl Koteff of the U.S. Geological Survey in yet another glacial-lake problem in the Nashua Valley of New Hampshire.

Finally, I'm sure Roger Colton of the Denver office of the Geological Survey, my colleague on Lake Hitchcock studies, will be back in this area shortly, probably in the Hampden and Ellington quadrangles near the Mass.-Conn. State line.

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