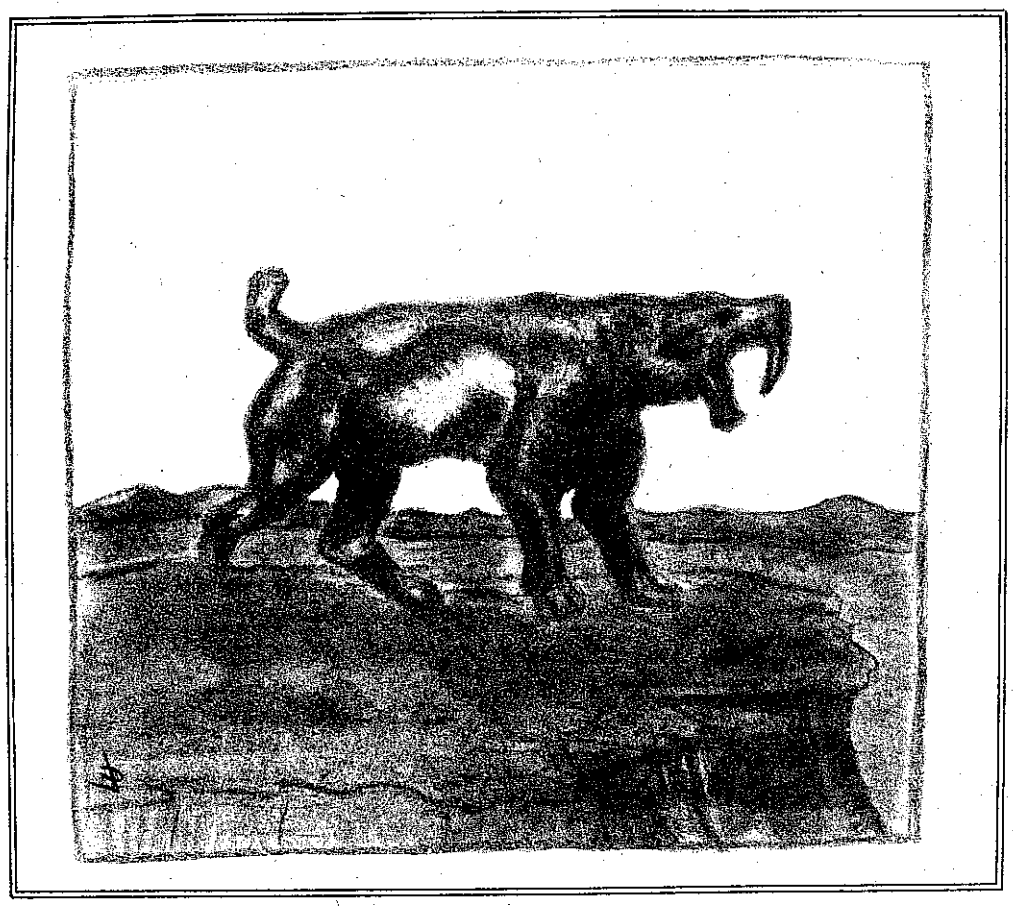
RKFahnestock

NEW YORK GLACIOGRAM



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Nicholas K. Coch 11/8/67

My research in Pleistocene Geology on Long Island is just beginning, so I have little to report other than what I hope to do. I will be studying and comparing the Harbor Hill and Ronkonkoma moraines from a sedimentologic viewpoint. I hope to be able to establish the depositional systems and sedimentary facies associated with these two moraines through a study of pebble lithology, texture and morphology. A later phase of the program will involve the identification and coring of morainal remnants on the Continental Shelf off the South Shore of Long Island.

In the summers, I have been continuing my research on Pleistocene sealevels and morphology in southeastern Virginia. This summer I will be looking at the inner edge of the coastal plain in an attempt to study and differentiate the gravel complexes (Lafayette, Brandywine, etc.) that crop out there, with the aim of fixing the age of these units.

Robert E. Funk 11/28/66

The earliest known human occupants of New York State were Indian hunters of the Paleo-Indian stage who manufactured a characteristic fluted projectile point, and who are generally assumed to have spent most of their time chasing big game animals such as mastodon, elk and deer. On the basis of radiocarbon dates for similar groups in the Southwest, in Massachusetts and in Nova Scotia these early hunters probably lived between 7000 and 9000 B.C. Such a placement is supported by current geological estimates for the age of the Champlain Sea. (Ritchie, 1957; 1965, pp. 1-30.)

Despite scattered finds of fluted points throughout the state, no actual Paleo-Indian habitation sites were discovered within its borders until 1958. Two small, single-component camps have been reported by William A. Ritchie (1965, pp. 19-30). In 1963 a large quarry-workshop site of the period was discovered in Greene County by R.A. Johnson, an amateur archeologist (Funk and Johnson, 1964). Limited test excavations were carried out on this site by the writer between 1963 and 1965. In July 1966 a N. Y. State Museum expedition under the writer's direction worked for 3 weeks at the site (called West Athens Hill). At the end of this period more than 18 fluted points and hundreds of other flint tools, typical of Paleo-Indian assemblages, had been collected. The hill bore extensive outcrops of high quality Normanskill flint, a prime attraction for the Indians. It also commanded excellent views of the valleys on two sides. Unfortunately, no charcoal was available for C-14 analysis. Hopefully, palynological studies now in process will yield useful data on forest associations. It is believed that expert geological examination of artifact-bearing deposits would help resolve certain problems (part of the site remains unexcavated).

Shortly after the close of the field season, another and smaller Paleo-Indian site was discovered by Thomas Weinman, also an amateur archeologist. This small camp is located on a slight rise in the clay flats south of Coxsackie. It seems to be exclusively a surface site, disturbed by the plow.

Also relevant to the problem of early man is a cave near Goshen, N. Y. recently discovered and excavated by amateur archeologists in Orange County. Upper levels of the sparsely inhabited cave yielded artifacts of familiar types ranging in age from about 3000 B.C. to A.D. 1000. In the lowest cultural levels a single fluted point was imbedded in white cave earth. Identification of refuse bones by John Guilday, of the Carnegie Museum, indicates that caribou, a sub-Arctic animal, may have been hunted by the Paleo-Indian occupants. The point is the first of its kind to be found in a cave east of the Mississippi valley.

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1965. The Archaeology of New York State. Natural History Press, Garden City, N. Y.

George W. White 12/6/66

During the field seasons of 1964, 1965, and 1966, Dr. Stanley M. Totten of Hanover College and I studied the stratigraphy of Pleistocene deposits in northwestern Pennsylvania with the support of an NSF grant. Graduate students Stephen Moran and David Gross were the research assistants. This is a stratigraphic elaboration of the work which White and his associates--Shepps, Droste, and Sitler--did earlier and reported in Pennsylvania Survey Bulletin G-32. Large new strip mines and two intersecting interstate highways provided very extensive exposures of the drift and unusual opportunities for detailed examination of the stratigraphic units.

The bulk of the drift was determined to be about 38,000 years old (the lower part is somewhat older) and is named the "Titusville Till." It is early Wisconsinan, ("Altonian" in the Mississippi Valley terminology). The Titusville Till may be divided into at least three units. Kent till overlying the Titusville is generally thin, in many places less than ten feet. Below the Titusville in some places is till (Illinoian?) with a very thick paleosol (Sangamonian?) and at a few places beneath this is a still lower, very deeply weathered unit which may be pre-Illinoian.

Unfortunately the strip mines and quarries are all south of Meadville, Pennsylvania, and although extensive exposures near the New York state line are not totally absent, they are not common. The Titusville Till can be traced below the Kent till to the New York state line, presenting interesting possibilities for correlation with the Otto section. Clymer Till, two to ten feet thick, overlies the Kent Till in the most northern part of Pennsylvania and has been traced from south of Corry to the New York state line. We suggest that this till is related to a readvance near Clymer Center, New York, described by Muller in New York State Bulletin 392, p. 43, and that the readvance was at least 15 or 20 miles

Charles S. Denny 3/30/67

My plans for the summer call for going to Plattsburgh about the first of June. I hope to complete field work in the Plattsburgh area this summer. I have had to spend considerable time this winter on subjects other than New York glacial geology. I expect to be on Cumberland Head in cottage just north of ferry slip; name on mail box. It is a convenient stopping place on the way to Expo' 67. Visitors welcome.

Dave Fullerton 3/26/67

The problem of multiple Wisconsin glaciation in New York State has been revived by Art Bloom's finite radiocarbon age from the Sixmile Creek section, near Ithaca (Glaciogram, v. 1, no. 1, p. 8). The Port Talbot-Plum Point Interstade in southern Ontario and the Gahanna (Brush Creek) Interstade in Ohio are firmly established, and there is stratigraphic evidence of nonglacial conditions in the Southeastern Townships of Quebec during the Middle Wisconsin, but what is the record in New York?

From time to time there has been mention of a buried soil along Auries Creek, south of Johnstown and south of the Mohawk River, in Montgomery County. In correspondence I managed to corner Dick Arnold, who studied the section in some detail, and his observations indicate to me that the soil should receive further attention. The story is Dick's, but the general run-down is as follows.

The section was discovered by Dick Arnold and Al Southard, in 1957, and it was mentioned in publication by Muller in 1957 and by Dreimanis in 1960. Two unoxidized and unleached tills are separated by a non-calcareous, oxidized, gleyed soil, thought to be the remnant of a B horizon. The soil is interpreted to indicate ice-free conditions, but no assumptions regarding temperature, precipitation, or duration of non-glacial conditions are warranted.

Nonglacial conditions in the central Mohawk Valley east of Little Falls are indicated by the presence of imbricated gravel deposited by eastward fluvial transport across the fault block at Little Falls. The gravel is overlain by Late Wisconsin (Main Wisconsin) till deposited by westward-moving ice, and an older till appears to be present beneath the gravel. Well logs from Montgomery County also indicate the presence of two tills separated by a thick unit of gravel in the axis of the Mohawk Valley.

Interglacial conditions are not indicated and ice-dammed lakes were not present either at the time of soil formation along Auries Creek or at the time of gravel deposition east of Little Falls. The stratigraphy indicates the existence of a nonglacial interstadial interval between Wisconsin glaciations in the Mohawk Valley region. Unfortunately, no datable organic material has been found to verify the age of the respective deposits.

The presence of nonglacial sediments between tills of assumed Wisconsin age along Auries Creek, in the Mohawk Valley, and near Ithaca should give impetus to a re-evaluation of the chronology of Wisconsin glaciation in New York. The Great Gully and Gowanda sections should be studied in detail and the organic zones should be re-dated, now that radiocarbon can be pushed back to the 50,000 years range. As was the case with Art Bloom's "Fernbank", the literature contains numerous references to long-forgotten stratigraphic sections exposing multiple tills with intervening nonglacial sediments. An

effort to "rediscover" these sections is long overdue.

Parker E. Calkin 4/7/67

During the coming summer graduate students Jim Lehmann and John Sweeney will work on surficial geology problems in the Eden and Springville areas respectively. Jim will concentrate on the glacial lake-bottom sediments and beach ridges while John will examine the problem of buried stream valleys, outwash plains and Valley Heads Moraine of the Springville area near Cattaraugus Creek.

Ronald Symecko has finished examination of beaches of the Orchard Park Quadrangle where he has defined possible Wayne and Grassmere strandlines in addition to Warren and Whittlesey beaches.

Because of some doubt expressed as to the correlative of the Port Huron Moraine in western New York, I hope to study a belt stretching from the Valley Heads through Gowanda, Hamburg, Marilla, and Alden Moraines this coming summer. Last summer's work indicates that the Gowanda and Buffalo Moraines were overridden by the ice front following the stand that allowed their formation. This readvance may have consumed only a few miles but adds to the great ice marginal activity that appears to have taken place in 1,000 years or less following the Port Huron advance and preceding retreat to the Ontario Basin.

William D. Sevon 4/11/67

Pleistocene Geology in Northeastern Pennsylvania

A cooperative program between the Pennsylvania Geological Survey and the U. S. Geological Survey has resulted in the mapping of five 7½-minute quadrangles (Lehighton, Palmerton, Kunkletown, Wind Gap and Saylorsburg) in Carbon and Monroe Counties, northeastern Pennsylvania. Although the emphasis in the mapping program has been on the bedrock geology, the surficial deposits have also been mapped and much information has been gained about the pre-Wisconsin (Illinoian (?)) glacial deposits in the western part of the area and the Wisconsin glacial deposits in the eastern part of the area. The report on the geology of the Lehighton and Palmerton quadrangles will be published within the next year by the Pennsylvania Geological Survey and will include a separate map and a part of the text will be devoted to surficial deposits. The reports on the other three quadrangles will be published by the U. S. Geological Survey. I plan to continue investigation of the pre-Wisconsin glacial deposits during the mapping of the bedrock geology of three 7½-minute quadrangles (Christmans, Pohopoco Mountain and Brodheadsville) immediately north of the quadrangles already completed.

Other unpublished work about the surficial deposits of this area are:

Epstein, J., Report on the surficial geology of the East Stroudsburg 7½-minute quadrangle, in progress with the U. S. Geological Survey.

Gardner, L. R., 1966, The Pleistocene geology of the Brodheadsville and Pohopoco Mountain (7.5') quadrangles, Pennsylvania: The Pennsylvania State University, unpublished Master of Science thesis, 99 p.

Sevon, W. D., 1966, Bowmanstown boulder field, Carbon County, Pennsylvania: presented at 42nd Annual Meeting of Pennsylvania Academy of Science, publication in progress.

Walter S. Newman 4/13/67

Late Pleistocene History of the Lower Hudson River Estuary

My collaborators, David Thurber, Lloyd Burckle (Lamont Geological Observatory), Harvey Zeiss (an outstanding undergraduate), and myself are continuing our investigation of the Quaternary sediments in two marshes at the southern end of the Hudson Highland Gorge adjacent to Iona Island. Thanks to the cooperation of the New York State Department of Public Works, who last fall completed a boring program on and around the island, we now have excellent sections. We are completing a micropaleontological analysis of one of the borings in Salisbury Meadow which occupies a "meander-scar"-like bedrock channel (Thompson, 1936) whose thalweg is about 98 feet below mean high water. This boring commences about one foot below mean high water, penetrates 93 feet of organic silt, then 4 feet of sand and terminates 10 feet into bedrock. Bits of wood in the sand at and just below the organic silt-sand interface have been dated by David Thurber at the Lamont Geological Observatory at 12,500±600 years B.P. (L-1141). (Note: This is a revision of the date I discussed at the recent meeting of the Northest Section of the Geological Society of America which I gave as 13,600±600).

Investigation of the core samples for Foraminifera disclosed Trochammina sp. to a depth of about 45 feet, the remainder of the core being devoid of forams. Lloyd Burckle's diatom analysis found brackish water forms throughout the length of the organic silt, with some marine diatoms encountered at the 40,45,50 and 90 foot levels, suggesting that this sector of the Hudson River has been an estuary during the past 12,500 years. The culmination of foraminiferal numbers (5) at the 40 foot-level coupled with the incursion of marine diatoms indicate somewhat higher salinities than those today. Harvey Zeiss and myself have been working up the pollen and spores. The top 10 samples to a depth of 50 feet seem clear-cut and are clearly divisable into Deevey's C-3, C-2, and C-1 subzones. The sample from the 55 foot level is quite sandy. We are troubled by the samples from the lower portion of the organic silt. Starting from the bottom at about 95 feet up to the 65 foot level, the pollen runs about 75% pine and 15% oak. Spruce and fir are minor constituents as are alder and birch. If these levels represent the B Zone, then the C-14 date should be about 2000 years younger (which, it seems to me, would be a more reasonable date from a sea level point of view). However, the 60 and 65 foot levels are running about 40% Compositae (heliophiles!) that are incompatible with forests. Then, do the pine and oak pollen of the lower levels represent exotic forms blown in through a long distance transport mechanism?

If the date is valid, it suggests that the Lake Albany episode terminated prior to about 12,000 years B.P. Furthermore, if both our Throgs Neck date (L-606A, 11,950±200 years B.P.) and the Salisbury Meadow dates are valid sea level indicators (they are 35 miles apart), then about 75% of postglacial isostatic rebound (about 2.2 feet/mile as measured by Reeds (1933) had already occurred by 12,500 years B.P.

A Crassostrea virginica valve from the lower midden at Montrose

Point (a stratified shell midden divided by a soil horizon some 44 miles up the estuary from the Narrows) is being dated by Thurber as about 5100 years B.P. The site, located by Louis Brennan and Sigfus Olafson of the New York State Archeological Association, records a time when the salinity of the estuary was higher than today and appears to confirm the reality of the thermal maximum (I'm down on hypsithermal!).

I will spend 5 weeks this coming summer mapping the Montauk Peninsula of Long Island and will continue my search for Fuller's (1914) Montauk Till.

Charles Cazeau 4/14/67

My grad students and I have been doing some heavy mineral work here at Buffalo in both modern and Iroquois-Warren strand lines. We have also been looking at heavy minerals in boulder clay and some of the outwash deposits. Much of this has been "reconnaissance", and two thesis topics have emerged, one of which is completed. We are at least getting to know the kinds of minerals to expect. Abdillahi Gahnoog has in progress a comparison of heavy minerals in Iroquois and Warren sands. His sampling of the Iroquois extends halfway to Rochester. The most striking character of the moment is the garnet distribution. It is very uncommon in the Iroquois sands, but rather abundant--in fact, the leading mineral, in Warren sands. The same relationship holds when modern Ontario and Lake Erie sands are compared.

Diana Ho studied the size characteristics of the heavies across the modern Erie beach, and cranked out a very interesting piece of work. The most common minerals are garnet, hornblende, hypersthene, and diopside. There is a wide variety of minerals in lesser amounts including zircon, tourmaline, epidote, sillimanite, kyanite.

We hope to bring a lot of these data together into a cohesive summary for the next GLACIOGRAM.

Forrest Durham 4/18/67

Some Sporadic Minor Buckling of Strata in South Central New York

Stresses residual from an uneven regional warping following glaciation are believed to have formed several surficial anticlinal folds in south-central New York. Although in no case is a whole fold exposed, evidence seems to indicate that horizontal and vertical extents are limited. Curving axes of nearly symmetrical folding suggest shallow vertical stresses being relieved.

In a few isolated areas in south-central New York some small anticlinal folds occur which have been but briefly mentioned in the geological literature(Kindle 1909). It is difficult to predict where such folds may be found, and their true significance is not readily understood. The term Sporadic Minor Buckling is suggested because of the widely and irregularly scattered occurrence of the folds, and their small size. Fifty feet wide was the maximum found, and twelve feet was the maximum vertical disturbance of the strata. Dips on the flanks of the scattered folds range from 3 to more than 30 degrees, averaging approximately 10 degrees. The extreme dips were restricted to one specific locality where a small stream was observed to be cutting down through the crests of the folds.

All the bucklings occur in thin sandstones and shales of Upper

Devonian strata of central New York. After a careful search, the writer was able to find but a few instances of these bucklings and they are scattered over the area in a confusing manner. It is quite obvious, then, that this type of folding represents extremely localized relief of concentrated stresses. The bucklings are associated with gorge development, interglacial or post glacial, with only two exceptions. In nearly every case the axes of folding are closely associated with jointing. In no case can the axis of a buckling be shown to be in association with axes of regional folding, further suggesting that the bucklings are localized. Nearly every axis that can be traced any distance is found to curve greatly, thus strongly suggesting vertical stresses.

The region of south-central New York has been described by several writers as being tilted following the melting of the Pleistocene Ice Sheet. This uplift, beginning with the melting of the ice, is believed to be still going on at a diminishing rate.

Fairchild (1916) has described the New York uplifting not as a rigid mass, but as a wave movement in a slowly bending crust. His mapping depicts a 200 foot rise running through the Finger Lakes with a regional tilting of a little in excess of 2 feet per mile to the northeast. Rodgers (1937) suggests that a discontinuous tilting with per saltum shifts of pattern is the usual condition. Chisnell (1951) has demonstrated two upwarpings: N52W at 0.75 feet to the mile for lower strand lines of former pro-glacial lakes in the Cayuga drainage basin, and N18W at 1.34 feet to the mile for higher strand lines.

It would seem quite possible that the variable which makes the sporadic minor bucklings so infrequent must arise from localization of stresses residual from an uneven regional warping following glaciation. It is thought that this is the primary cause of the bucklings, which are further localized by valley erosion and jointing. Once formed, the buckles may be accentuated by frost heaving.

The sporadic minor bucklings of strata are truly "skin wrinkles" extending but a few feet vertically in upper Devonian sandstones and shales. They are believed in no way connected in their origin with numerous slump features in the Syracuse, New York Region, believed by many (Phillips 1955) the result of dissolved Salina Salt.

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Rodgers, John (1937) Tilting of Proglacial Lakes - American Journal of Science IV Series, vol. 20, p. 308

John E. Harrison 4/19/67

I have spent the past year at the University of Grenoble and will continue graduate studies this fall at Syracuse University. The following is an abstract of my M. A. thesis, on deposit at SUNY-Binghamton.

Sharp reversals in flow direction of the Susquehanna River throughout the Great Bend Region of New York and Pennsylvania pose several important geomorphic problems. The strange orientation of this valley, first south, then, west, north, and finally west again, and its influence on deglaciation of the area provide the major focus of this thesis. This region was studied in an attempt to decipher the type and chronology of deglaciation events and processes during Wisconsin time.

Field data support the idea that deglaciation in the uplands occurred by down-wasting rather than back-wasting. Lowering of the ice surface exposed hilltops to intense periglacial activity, aiding in the development of tors, dismembered blocks, cryoplanation surfaces, and patterned ground. Extra-thick, morainic deposits have caused drainage diversions throughout the region. Good examples of this type of channel derangement occur east of Great Bend, where the Susquehanna River is diverted, and southeast of New Milford, where several south-flowing streams have been beheaded.

A scale model was constructed to illustrate and analyze deglaciation in the uplands. Field work, coupled with the model, made it possible to reconstruct deglaciation events and processes. A sequential series of photographs traces the development of such features as wind gaps, cols, through-valleys, and the eight mile long, 300 foot deep, glacial channel which I have named the "New Milford sluiceway."

Sedimentary deposits in the Susquehanna valley were mapped on the basis of fabric and topographic form. Such materials as clay and silt, where they formed the valley bottom, were differentiated from the outwash on the basis of fabric, while distribution of sediments and topographic form were used to identify ice contact features such as kames, kame complexes, and eskers. Data gathered on the size, arrangement, orientation, and composition of these sedimentary deposits suggest that deglaciation of the area was a complex process consisting of many phases. The discovery of morainic barriers across the Susquehanna River valley indicates that while ice was down-wasting in the uplands, it remained active in the valley. Following deposition of the barriers, ice in the lowlands stagnated and down-wasted. Deposition, associated with this down-wasting led to the formation of the kame complexes and associated stagnant ice features. The position of the kames, kame complexes, eskers and other ice contact features has led to the theory that these materials were often deposited at, or near, the junction of tributary valleys. Following ice stagnation in the valley, waters flowing down tributary valleys or over the divide, onto the ice, removed the protective mantle of debris and incised the stagnant mass. The resulting topographic lows, in the vicinity of cols and tributaries, aided in the concentration of the kames and eskers.

With the wasting of the ice in the valley, meltwaters from residual ice in the north, deposited first, coarse outwash, and later, silt and clay. Removal of the obstruction past Binghamton resulted in the re-establishment of the westerly drainage of the Susquehanna River. Finally, deglaciation of the entire Susquehanna drainage basin, caused a change of regimen in the river and initiated

a period of degradation that has persisted at different rates to the present.

Donald R. Coates 4/26/67

I have had many non-glacial activities during the past six months, so the only relevant manuscript that has emerged is entitled "Drainage Density in a Glaciated Terrain". The U.S. Geological Survey is reviewing the manuscript and a paper by the same title was presented April 20th at the annual meeting of the American Geophysical Union. The abstract occurs in American Geophysical Union Transaction March 1967, v. 48 (1) p. 97. The theme developed is that many geomorphologists have studied drainage density in a variety of regions, but no one has provided a comprehensive analysis of drainage density in glacial regions. I measured drainage density in 25 basins of the Glaciated Appalachian Plateau that range in size from 14 to 282 square miles. Morphology, hydrology, and geology quantitative indices were determined for each basin, and are compared with drainage density in both single and multiple regression analyses. The following conclusions seem warranted:

1. There are both similarities and differences in the control of drainage density when glaciated terrain is compared with nonglaciated regions.
2. Terrain ruggedness factors as measured by topographic slope, stream gradients, and relief show negative regressions with drainage density.
3. Geology variables are not consistently important, but rock massiveness properties are more closely associated with drainage density than lithology, and the areal extent of valley fill indicates a positive regression in the Susquehanna region.
4. Scale of mapping, which affects the size of drainage density figures, greatly influences hydrology-drainage density correlation coefficients. Thus, correlations are significantly higher for precipitation and storm runoff when 1:24,000 maps are used than on 1:62,500 scale maps. Apparently hydrology influence of topography is more subtle than other variables, and small scale maps are too insensitive to depict the changes.
5. Morphometry variables produce higher multiple correlation coefficients than geology or hydrology variables, but the actual control of drainage density can be explained reasonably well by using a multiple regression of precipitation, massiveness, and relief.
6. Drainage density analysis when augmented by field mapping studies indicate the majority of slopes can be considered of direct descendence from the ice ages and are, therefore, cryogenic.
7. Drainage density is not uniform in the glaciated Appalachian Plateau, nor within the various subset basin groupings, and multiple factors control these disparities.

I am currently directing three M.A. theses: (1) Robert Sager is working with analog model theory as applied to glacial terrain. (2) Jack Conners is studying unusual land forms in the Genegantslet region. (3) Jean Jacques Flint will evaluate terrain, lithology, and valley fill controls of stream regimen in selected basins of New York and Pennsylvania. In addition, Douglas Cherkauer, will probably receive the award of Distinguished Honors in Science for his senior thesis on the hydrology of small watersheds in Broome County. He is analyzing streamflow and glacial sediment properties of 50 third-order basins with special emphasis on the flow regime caused by basin orientation.

Recently, I have become involved in a joint project with three members of our Department of Geography; Joseph Butler, Jane Lancaster, and Nicolay Timofeeff. We have a common background all Ph.D.'s from Columbia, and a general interest in terrain analysis. For contractual arrangements we call ourselves PERG (Physical Environmental Research Group) and will start a team study of northern Appalachia. We plan to conduct a series of quantitative and comparative analyses of physical factors and pertinent institutional influences in both the glaciated and non-glaciated sections and to explore the implications of these findings for watershed development, resource management and conservation, floodplain occupance, and other aspects of land use planning. Special use will be made of computer simulation methods and remote sensing techniques to aid in unusual approaches to geologic, geomorphic, and soils mapping. It is hoped that this type of project using a coordinated research approach can constitute a prototype for similar efforts elsewhere.

In a personal communication, Dave Fullerton states that he would like some new information on dating and correlation of the Olean Till. It is such a beautiful problem that I have been waiting for the properly-motivated graduate student to undertake its solution. Of course, this is fair game and all are welcome that can beat us to the punch.

Leslie A. Sirkin 4/27/67

As a bi-product of my last letter in the Glaciogram probing for interest in a centralized core or core site library, I have been pleased to learn of several recently completed pollen stratigraphic studies. Stingelin and Groth at Penn. State have presented theses on pollen studies in central Pennsylvania, an area near the Wisconsin terminus which was previously overlooked. Nicholas, at N.Y.U., is working on the pollen stratigraphy of lakes and bogs in the Hudson Highlands and along the terminal moraine in New Jersey, and Cal Heusser has mentioned that other students of his are working their way westward along the bogs of the moraine. I would appreciate learning of other areas in which pollen studies are either being initiated or should be started.

In the pollen study I prepared for the 1967 N.Y.S.G.A., in conjunction with Gordon Connally's study of the glacial geology of the Wallkill Valley, the pollen record begins within the Herb Pollen Zone (T zones), with what might be termed a park-tundra. The main problem with this interpretation of the record is the low percentage of NAP in the record, generally less than 20%, and the dominance of pine, spruce, fir, birch, willow, and alder.

The NAP, which consists of grass, sedge, and Plygonaceae (Rumen-type) pollen is similar in content to the NAP spectra of the bogs studied on the coastal plain and in southern New England where the Herb Pollen Zone is more adequately represented by the pollen of herbaceous plants, even to the presence of high arctic tundra indicator pollen (see the works of Deevey, Leopold, Ogden, Davis and myself). The pollen record in the Wallkill Valley is consistent with the trees, shrubs, and herbs which are known to colonize the morainal and glaciated surfaces and the vegetation may be more appropriately termed a park-tundra rather than a tundra, taiga, or taiga-tundra.

The absence or low representation of the herb pollen, and therefore the absence of tundra to the north and northwest of the coastal plain (as pointed out by Whitehead), appears to be more a factor of the transgressive overlap of the late-glacial vegetational zones and the dilution of the herb pollen by larger quantities of conifer pollen. This may be partly the result of long distance pollen transport (The shadow zone suggested by Davis) and/or the influx of trees from the coastal plain on the east and south and from the Appalachian forests on the west and south into an area of sparse ground cover. It should be remembered in this context that the Spruce Pollen Zone commences on Long Island while glaciation is still in progress in south-central New England, the central-Hudson region, and central New York.

I offer this brief analysis of the existing pollen record as a tentative explanation of the interpretation of the existence of tundra or tundra-like vegetation in the late-glacial as represented in the late-glacial pollen record.

Aleksis Dreimanis 4/27/67

" The Port Talbot Interstade of the Wisconsin Glaciation"
Abstract from Canadian Journal of Earth Sciences, v. 3, p. 305-325, (1966)

The Port Talbot interstade is a cool, long, nonglacial interval separating the Early from the Late or Main Wisconsin in the Lake Erie region. Recent test borings at its type locality, lithologic and palynologic investigations of the cores, and new radiocarbon dates suggest that this interval was considerably longer than previously assumed. It began more than 48,000 years before present (B.P.) and ended, if the Plum Point interval is included, 24,000 years B.P.

The entire nonglacial interval comprises two relatively warm episodes, with boreal climate (Port Talbot I and II), separated by a brief glacial readvance that reached Lake Erie from the north; 100 varves were deposited during this readvance. Another similar readvance separates the Port Talbot II beds from the Plum Point (?) sands and silts. Pine (Pinus) and spruce (Picea) pollen predominate throughout the section, with relative abundance of oak (Quercus) in the Port Talbot I green clay. The pollen assemblages are dissimilar from those of the Sangamon interglacial or postglacial in southern Ontario.

" Lake Arkona-Whittlesey and Post-Warren Radiocarbon Dates From "Ridgetown Island" in Southwestern Ontario"

Abstract from The Ohio Journal of Science, v. 66 (6), p. 582-586, (1966)

Three radiocarbon dates from raised beaches along the "Ridgetown Island" support the age assignment of 13,000 years B. P. for the beginning of Lake Whittlesey in Ohio, and the termination of Lake Warren before 12,000 years B.P., as concluded from post-Warren data in Ontario.

"The Susaca - Interstadial and the Subdivision of the Late Glacial - A Discussion"
Summary from Geologie en Mijnbouw, v. 45, p. 445-448, (1966)

Late-Glacial interstadials, contemporaneous with the recently introduced Susaca-Interstadial, have been recognized for some time in the Great Lakes Region of North America (the Cary-Port Huron, or Cary-Mankato, or Bowmanville, or Arkona, ending approximately 13,000 B.P.), and in Northern Europe (the Raunis Interstadial, 13,390 ± 500 B.P., and the correlative Plyusna Interstadial). It is suggested that the name Raunis Interstadial be used for the region affected by the North European continental glaciation.

George W. White 4/28/67

Northwest Pennsylvania

My associates and I are concluding work on the glacial deposits of northwest Pennsylvania, adjacent to New York. White and Dr. Stanley M. Totten of Hanover College, completed collection of samples from measured sections (except for a very small area) in the 1966 field season. A report is now in progress on the stratigraphy.

Part of the report will include the detailed studies of graduate student David L. Gross, who is now completing his master's thesis entitled Mineralogical Gradations Within Titusville Till and Associated Tills of Northwestern Pennsylvania. 237 till samples from 152 localities were collected and analyzed, with particular emphasis on Titusville Till. Textural, light mineral, heavy mineral, and carbonate analyses were run. Significant differences were found between the mean texture and mineralogy of each till unit. Grading from oldest to youngest there is a net decrease in percent sand, an increase in percent silt, a slight increase in percent clay, and increase in carbonate content, and a substantial increase in percent feldspar. The most interesting results of this study were the discovery of both areal and vertical gradations within individual till units. Within Titusville and Kent Tills there is an increase in percent sand and a substantial decrease in percent feldspar as the outer limit of the till sheet is approached. The areal gradations are believed to be directly related to the direction and distance of ice flow. Within stratigraphic sections, a net upward increase in percent feldspar was found in Titusville Till. A number of hypotheses are discussed and dilution by local bedrock is favored as an explanation of all the gradations.

Another part of the study is by Stephen Moran who is also completing a master's thesis on Titusville Till, Stratigraphy of Titusville Till near Youngstown, Ohio. His study involves seventeen sections in four closely situated quarries, which were described and sampled in detail. Numerous beds were recognized in Titusville Till at each section, one section contained 12 such beds of till separated by sands and gravels, maroon bands, stone lines, or a change in gray color. Feldspar content of the .125-.177 mm fraction indicated breaks within all but 4 of the sections.

Correlation of units defined on the basis of feldspar content led to a sequence of five subunits within Titusville Till. Absence of a weathering zone within the sequence and the great similarity among units in texture, potassium feldspar content, total heavy mineral content, and carbonate content support the conclusion that these are subunits of one till sheet.

The youngest unit is exposed only in the northern-most quarry, moving southward successively lower subunits subcrop below Kent Till. The earliest sub-unit occurs only as erosional remnants in low places on the bedrock surface. The subunits are believed to represent the deposits of a pulsating retreating glacier.

Janice M. Whipple 4/30/67

My work during the summer of 1966 was in the major part reconnaissance. The area which I studied is marked at the northwest by the city of Utica, thence east along the Mohawk River, south along the Schoharie Creek, and west through the northern limits of the plateau. I concentrated efforts in an area roughly coincident with the USGS 15' Richfield Springs quadrangle, and I intend to continue in this locale. I wish to reconstruct the Pleistocene history of the central Mohawk Valley and to relate this to events in Susquehanna valleys.

Along the edge of the plateau there is an infrequent distribution of glaciofluvial deposits. The monotony of the till cover is somewhat relieved by drumlin morphology. These forms occur both in groups trending east-west and singly, trending at a slight angle to axes of the northern reaches of the through valley system on the plateau. Karst development in the Helderberg group is observed thoughout the area. It is possible that there may be sedimentary and/or organic remnants in the caves, and that subsurface drains influenced the development of surficial features. The Clinton group crops out within the area and affords a distinctive tracer lithology.

It is hoped that well logs will offer additional data of value. The highly variable bedrock lithology and relief lend both assistance and hindrance to the study.

Ernest H. Muller 5/1/67

This winter has afforded too little opportunity to take stock so I have little news to offer. I am looking forward to a summer schedule that will include 2½ weeks in Colorado Springs at a Danforth Workshop on Liberal Arts Education, a month in field work in New York and several weeks field work in Cape Breton, Nova Scotia.

During the winter excavations for a housing development on the drumlin field in southeast Syracuse have afforded unusually fine opportunities for drumlin investigations which Bill Savage and perhaps in time another graduate student in this department will take advantage of.

John Donohue, a graduate student in the Department of Geography has applied to maps of Erie, Chautauqua and Cattaraugus Counties a drainage density parameter based upon coincidence of random dots with drainage lines. The pattern shows higher density in the northern part of the plateau and the lake plain as compared to the southern part -- a relationship tentatively ascribed to differences in drift permeability.

Wood fragments collected from between two tills at the National Lead Company's Sanford Pit on the McIntyre Development at Tahawus in the central Adirondacks have yielded an age greater than 55,000 years according to informal communication from Minze Stuiver at the Yale C-14 Lab.

On April 8-9, a study conference on Green Lake (Fayetteville, near Syracuse) was convened by Taro Takahashi, William Dient and Wally Broecker on the campus of the University of Rochester. Papers on the glacial geology and geological evolution of the basins of Round and Green Lakes, on ground water relationships, on the physics, chemistry, biology and material balance of the lakes point up the continuing interest these two meltwater plunge pools are generating.

Yours for a good summer and more news to report in the fall.

Roger M. Waller 5/1/67

This brief letter will introduce myself and the project I have been assigned. I am with the Water Resources Division of the U.S. Geological Survey at Albany. I started a ground-water study of the Black River Basin in August of last year. The project includes mapping of the unconsolidated deposits, hence I am very interested in current glacial-geology studies in and adjacent to the area. I had the opportunity to meet some of your New York geologists at the Boston G.S.A. meeting.

I transferred to New York from Alaska. I spent most of my ten years there on reconnaissance studies for ground-water in glacial deposits. The contrasts and similarities of Alaska and New York glaciation are very interesting.

The Black River Project field work will end this fall. We hope to do some auger drilling in the outwash-delta complex along the west slopes of the Adirondacks. Two interesting (to me) items I've found in the relatively few well records I've obtained so far: Bedrock "channel" at Lowville is close to 300 feet below land surface and the delta at Camp Drum covers a bedrock channel lying about 100 feet deeper than the adjacent Black River channel in limestone.

So, I am pleased to be working in this interesting state and I am looking forward to receiving the Glaciogram.

Robert G. LaFleur 5/8/67

Last summer was spent on mapping of valley bottom deposits in the western Susquehanna Basin for the USGS water resources investigation. I expect to return for about a month to the Wayland-Naples area for detailed mapping and also to southern Steuben County and to the Tioughnioga between the Valley Heads at Tully and Cortland this summer. The remainder of this season I expect to spend either in the Mohawk or Allegheny Basins with the USGS in mapping and groundwater investigation.

I have been attempting some correlations in the Susquehanna Basin of recessional deposits south of the Valley Heads, based on the USGS mapping and would like to tie the area in to the Catskills and Mohawk eventually.

Kernan W. Davis 5/9/67

In the New York State Government, nowadays, three Departments have geology staffs. The Department of Education has the Geological Survey; the Department of Public Works has geologists in the Bureau of Soils Mechanics; and the Conservation Department has geologists in the Division of Water Resources. Kernan W. Davis is the Senior Engineering Geologist for Division of Water Resources and Mrs. Judith Ambrosio is his assistant.

The Division of Water Resources provides staff services for the New York State Water Resources Commission. The Commission is charged with the responsibility for the planning development and management of this vital resource. The geologists form a link between the engineers and planners on the one hand, and the scientific community on the other.

The work of Davis and Mrs. Ambrosio is mostly in the planning stage and centers about reconnaissance studies of ground-water resources, erosion and sediment problems and reservoir site studies. Information is gleaned from federal agencies, such as the Soil Conservation Service, the Army Corps of Engineers and the U.S. Geological Survey; from other state agencies and from academic institutions.

In regard to the latter-mentioned source, several university departments have contributed useful information. Each professor may be able to supply only a few outcrop descriptions, well logs, or other bits and scraps of information in response to a data request from Davis. Nevertheless, after a half dozen phone calls and a few inter-agency memoranda, the geologic situation in a particular watershed, or valley, or site can be appraised and judged, if not accurately defined.

The glacial deposits of New York State form the foundation for many of its engineering works and comprise much of the framework for the ground-water resources of the State. Now and in the months and years to come, increasing emphasis on these materials will develop. The academic community is urged to increase its study and understanding of what some people call "overburden".

Soon you, the reader of this news letter, may receive an inquiry from the Division of Water Resources regarding some phase of your research. Your cooperation will be greatly appreciated, and your continued work in the field is certainly encouraged.

G. Gordon Connally 5/10/67

To begin with I want to congratulate Don Coates on the first "volume number" of the glaciogram. I like the format and the numbering and still consider the glaciogram an informal newsletter.

I submitted two papers to the symposium on Quaternary Geology of the Northeast at Boston. Glacial Geology of Mount Mansfield Quadrangle, Vermont was read by title and Glacial Geology of the Brandon-Ticonderoga Region, Vermont was presented orally . I also published the Pleistocene Geology of the Wallkill Valley in the N.Y.S.G.A. Guide Book with co-author Les Sirkin.

I am now on leave from New Paltz and have established field headquarters at Glen Lake north of Glens Falls. I am mapping the Whitehall, Glens Falls, and Fort Ann quadrangles at present and will extend northwestward to my Ticonderoga work and then southward to the old Cambridge and Hoosic sheets as the summer progresses. At this point Chadwick's ice-evacuation stages are not particularly compelling.

In the Wallkill Valley evidence for a readvance may be present. Rising lake levels are suggested for the 230' deltas near New Paltz and till may be present over lake sands north of Rosendale. This in turn suggests readvance to an inferred position near Rosendale and re-damming of the lower Wallkill after a period of recession and free drainage.

HAVE A GOOD SUMMER AND LET ME HEAR FROM YOU IN OCTOBER.

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