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THE MENDON KAME AREA

BY

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ROCHESTER, N. Y.

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MENDON KAMES
View in the eastern range, looking northwest

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By Herman L. Fairchild

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Foreword

The numerous and striking glacial features of western New York have been the subject of many scientific papers, and the remarkable group of gravel hills in the town of Mendon, 10 miles south of Rochester, has not been overlooked. But the hills are deserving of special description, because they have no superior in their display of the peculiar characters of morainal deposits. The pictorial record is made in anticipation of the possible defacement by the growth of population and the march of improvement(!) The destruction of some of the most beautiful portions of the Pinnacle Range is a warning of the danger to other features of our finest scenery.

In the varied and beautiful topography of western New York there is nothing more unusual and attractive than the Mendon kames, with their included phenomena. The area is not appreciated because the features are not really seen from the highways. Few

people today see anything that is invisible from their automobile. The three roads which lie alongside the ranges of hills afford merely a suggestion of their singular characters. But a little climb up

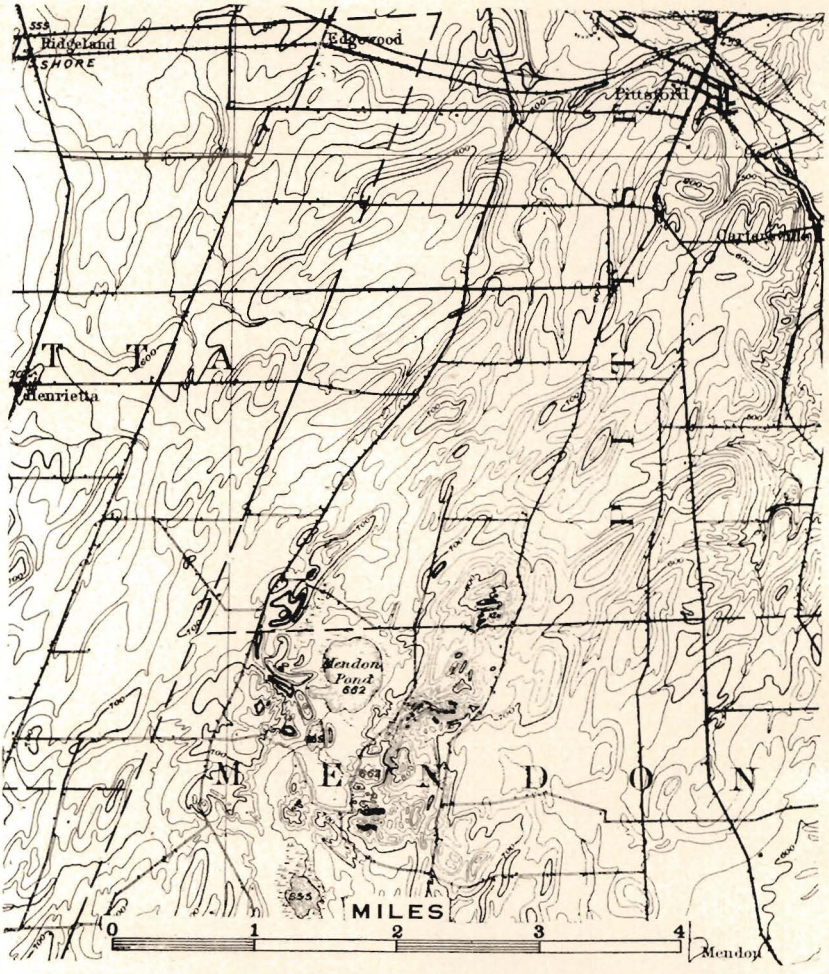


Figure 1. **MENDON KAME AREA AND SURROUNDING TERRITORY**
From the Rochester topographic sheet

almost any of the higher roadside knolls will give a view of hills and hollows with surprising form and relief.

The four most singular and romantic geologic products of the continental ice sheet are found here in excellent display. These are the drumlins, which surround the kame area (figure 1), and

the kames and eskers which constitute the groups of hills, with their included basins, or kettles. A century ago these objects were insoluble puzzles. And even with the rise of the new science of

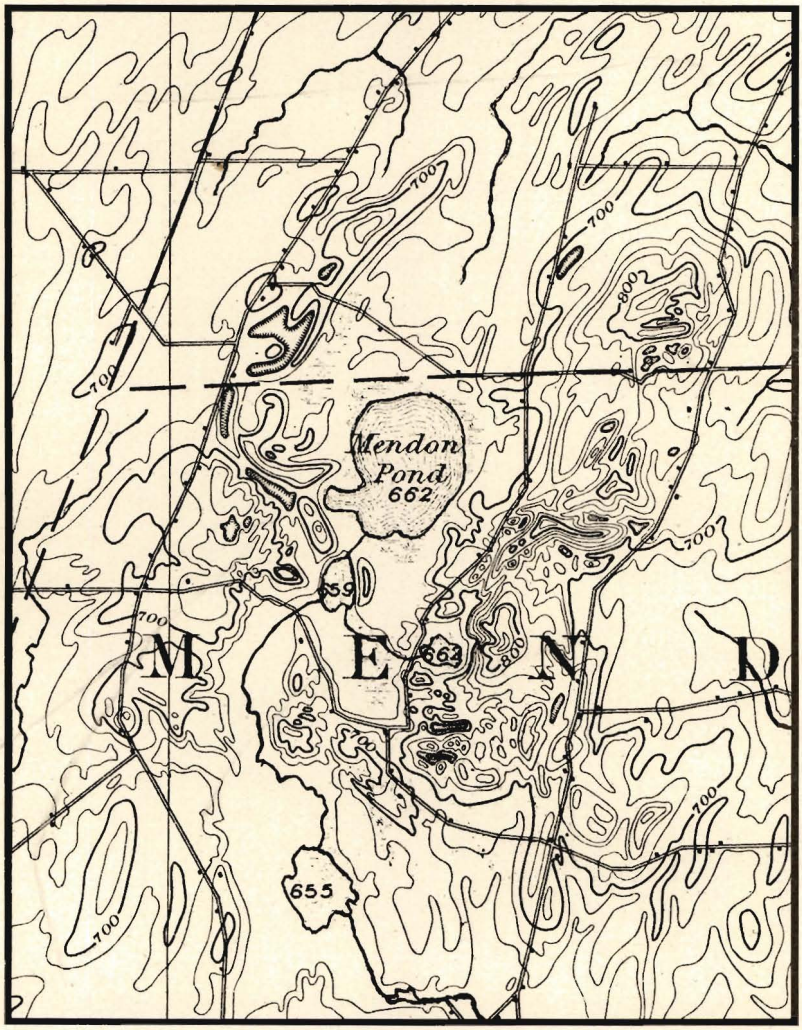


Figure 2. **MENDON KAME AREA**
Enlarged from the Rochester sheet. One and one-half inches equal one mile

glaciology these phenomena were not readily understood, because they are not produced by mountain or stream glaciers, which were the early subject of glacial study. These features are the work

only of extensive ice sheets or continental glaciers, and probably under temperature conditions not found in the ice caps of Greenland and Antarctica.

Concerning the origin of drumlins, kames and kettles [1] there is no longer any doubt. And the only question relating to eskers is whether they were sometimes built in open trenches, ice-walled canyons of the glacier, or were always laid in tunnels beneath the ice sheet, subglacially.

The few published references to or brief descriptions of the Mendon moraine are in the papers listed at the close of this writing.

The Mendon kame area, with its unusual display of glacial topography and phenomena; its group of lakes, so rare in this region; its peculiar botanical interest; its elevation above the surrounding country; its definite and limited area; its Indian trails and camp sites and its high educational value in the study of nature, should be preserved inviolate as either a State or a County park.

Location; Area

This group of mounds and basins, knobs and kettles, piled about two large eskers, lies in the towns of Pittsford and Mendon some ten miles south of the City of Rochester. The area is bounded on the west by the Clover Road and on the east by the Pittsford Road. It covers about two miles east and west by two and one-half miles north and south. The features with high relief, sharp knolls and deep kettles, form two north and south belts with a low and smoother intervening tract. This middle tract holds four lakes, and is traversed along the east side by the Douglas Road. Two roads cross the area, the Canfield Road north of the large (Mendon) lake, and the Pond Road in the southern part of the area. These geographic features are shown in the maps, figures 1 and 2.

These Mendon lakes, locally called "ponds," are the only natural bodies of standing water in Monroe County, excepting three lakelets near Bushnell Basin, in the Irondequoit Valley, and Blue Pond, three miles west of Scottsville.

A fair imitation of the Mendon kames and kettles is seen in the higher ground of Mount Hope Cemetery, with suggestions in other parts of the Pinnacle range of morainic hills (see paper 9 of the

[1] For a glossary of technical terms in glacial science see pages 144–148 of this volume. (Paper number 9 of the appended list of writings.)

appended list of writings). In the axis of the upper Irondequoit Valley is another example of this striking topography. The kame-moraine area having more general resemblance is that of the Junius Ponds, in the town of Junius, midway between Lyons and Geneva. A feeble imitation lies east and northeast of Batavia, traversed by the New York Central Railroad.

As the kames are hills of gravel built by streams pouring out of the melting ice sheet, it would be expected that the drainage would be guided by the valleys or depressions beneath the thinning ice. Such is the case with the Irondequoit area. But the Mendon area, like the Pinnacle moraine, stands high on a plain, with no suggestion of subglacial or topographic control of the drainage. With the bold relief and the deep and steep-walled basins the Mendon kames, and their included eskers, are the choicest example of the peculiar product of glacial ice and water acting in concert.

Origin; Lake History

The kames are a product of the constructional (depositional) work of the marginal ice during the melting phase of the ice sheet. They were built by streams flowing from the ice front, and emerging from beneath the ice (subglacial), and perhaps under hydraulic pressure.

During its long journey from the north the glacier had gathered great quantity of rock-rubbish from the land over which it rubbed. Most of this load of drift was held in the basal portion of the ice sheet. During the waning and disappearance of the ice cap, by marginal melting and recession (northward) of the ice front, the burden of drift was dropped on the land. (See figure 1, page 150 of this volume, paper No. 9.)

Under unusual combination of mechanical conditions the basal, or subglacial, load of drift was piled as drumlins by the overriding action of the ice sheet. In the Rochester-Syracuse region we have the finest display of drumlins in the world. The Mendon kames lie in the southern margin of the heavier drumlin area.

Another large part of the drift load fell within the grasp of water, flowing beneath the ice sheet, and some part of this, the coarser material, was deposited in the beds of the subglacial streams, as eskers. (Plates 80, 81.)

The remainder of the glacier's drift load, which had escaped deposition beneath the ice as drumlin and esker, was bound to be

dropped at the melting ice margin. All the marginal drift falls in the class termed moraine, whether left directly by the mechanical work of the ice itself, as till, or indirectly by the draining water. Hence the knolls or mounds of gravel and sand built at the mouths (debouchures) of the streams are, in the general classification, morainal, but are given the special name of kame. The following table shows the nature and genetic relationship of four forms of glacial deposits.

Forms of Glacial Drift

Place of Deposition	Manner of Deposition	
	Ice-Laid	Water-Laid
Beneath the ice sheet; and extended in direction of the ice movement,	Drumlin	Esker
At the margin of the ice sheet, and transverse to the ice movement; Frontal Moraine,	Till-moraine	Kame

The Mendon kames were not only built at the edge of the ice sheet but were piled in the deep water of a glacial lake which faced and laved the ice front. It appears probable that all kame areas and typical kames were built in standing water. The comparison may be the conical heaping of sand when poured through a funnel. On the open land, with free run-off of the glacial drainage, it is supposed that the detritus in the grasp of the streams would be spread out as plains, instead of being piled as cones or mounds, or else would be distributed down the stream valley as "valley train" drift. Essentially, the kames are incipient deltas, and if the ice front would remain stationery for sufficient time, and the water not too deep, the detritus would build a plain, a true delta. With lowering waters the plain might have a series of terraces. But in western New York the glacier was melting too rapidly, and the depth of the facing water was too deep, for the production of plains. The inconspicuous plains or level tracts which may be seen on the Mendon kames were produced by the leveling action of waves after the kames were built, and while the waters were falling away.

The building of the Mendon kames is closely involved in the glacial lake history of western New York. The remarkable series of ice-dammed waters which occupied the Genesee Valley and the Ontario lowland have been the subject of numerous published arti-

cles, some titles of which are listed in the bibliographies in the papers 8, 10 and 11 of the appended list of writings.

For present purpose it is sufficient to say that the kames were built in one of the later lakes of the glacial succession; in the waters of the great Lake Warren. This water body covered much of the basins of Erie and Huron, and had outlet westward across the state of Michigan into the glacial Lake Chicago. The lake extended as a narrow belt of water in central and western New York between the south front of the ice sheet and the highland on the south, and reached eastward to the meridian of Otisco Lake. Over the Mendon area its surface elevation was about 900 feet above ocean (present upraised elevation), and it overtopped the highest Mendon hill, which is contoured as 840 feet. The kames were built in submergence. As indicated above, if the great mass of drift in the kames had been piled at the surface of the lake it would have formed a wide and splendid delta plain, instead of being heaped into the "eggs-in-a-basket" form which we find today. (Plates 78, 79.)

When the ice front in the Syracuse district weakened so as to open escape for the Warren waters eastward, toward the Mohawk-Hudson, the lake fell away into the long-lived Lake Dana, which had its outlet at Marcellus village. The erosional work of the waves of Lake Dana is found through western New York at about 700 feet elevation. The higher kames at Mendon stood as islands in the Dana waters. From favorable points of view some inconspicuous leveled or smoothed tracts may be seen on the east and the west side of the kame area, where the waves had greater force. Perhaps the best view point is on the Canfield Road about one-fourth mile east of its junction with the Clover Road. This is the high point in the road, and by the topographic map is precisely 700 feet. Looking north the perfectly smooth and horizontal lines, due to the leveling work of waves, are clearly seen; along with the wave-cut cliff curving around a knoll, some 40 feet in height. Looking southward the leveling is evident, as all the summits lie in the same plane. The Dana leveling is also seen, looking eastward, from the knoll west of the Big and Deep ponds. This knoll is the southern end of the path regarded as an Indian trail (see below).

Wave-work of Lake Warren appears as erosional plains on the southern flanks of the Baker Hill, north of Victor, at 920 feet elevation (see plate 2 of this volume of Proceedings, in paper No. 8).

The shore cliffs and gravel spits by Lake Dana appear on many drumlins west and northwest that rise to or above 700 feet.

Apparently the waters of Lake Dana fell away so promptly that they left no evident erosion features below the summit plane of 700 feet, of strength sufficient to survive the atmospheric agencies of many thousands of years.

Relations

An examination of the Rochester sheet of the topographic map will give an idea of the geographic features of the country surrounding the kame area. A portion is reproduced here as figures 1 and 2. It is noted that the kames lie in a drumlin area of high altitude, and a little west of south of the Irondequoit depression. Northward, toward Pittsford the drumlins are strong. Westward the surface is also drumlinal but not so strongly ridged. The twenty-feet contours of the map do not fully indicate the drumlinal character of the surface. Southwestward the drumlins reach to the Corniferous escarpment, but the glacial overwash partially buries the minor inequalities. Drumlins lie immediately south of the kame area at the village of Mendon Center. Eastward and southeastward the country is less hilly for several miles, to the Victor kame area.

The drainage from the lakes and the enclosed valley is immediately southward, forming the source of Irondequoit Creek. After passing Mendon Center the creek swings eastward to Fishers, and then northward to Irondequoit Bay. From the borders of the kame area the drainage is radial in all directions.

In very sharp contrast with the Mendon kame-moraine is the range of the Pinnacle Hills, in the City of Rochester. (9, figure 2, page 151.) The latter is of later origin than the Mendon deposit, and with radically different form, being extended east and west, in linear form, and definitely a part of the frontal moraine extending west to and beyond Albion. But the Mendon kame-moraine is not a portion of an extended, definite belt of frontal moraine. On the contrary it is notable as a detached and isolated area, rising out of a plain, and surrounded by drumlins. It is evident that the mass is frontal moraine deposit, but the character and behavior of the ice front during the phase of the kame construction was very unlike that when the Pinnacle range was built.

KAME-MORAINE TOPOGRAPHY
Views in the east range

However, the Mendon area may be correlated with other morainal deposits on the east and west. In a belt westward heavy drift is found on and among the drumlins north of Rush village and either side of the Rush Reservoir. Eastward, the heavy drift on the southern flank of the Baker Hill, north of Victor, is doubtless contemporary. Farther east the glacial rivers have removed the morainal drift, or prevented its accumulation. Far east, and north of Lyons, the Junius kame area exhibits characters similar to the Mendon area, and may correspond in time of deposition.

Topography

The best available map of the kame area is the Rochester topographic sheet, with its imperfect contouring in 20-feet interval. This is reproduced in black and white in figures 1 and 2. The two remarkable eskers which constitute the core or heart of each series of kames are strikingly shown in plates 80 and 81, reproduced from Giles' paper (12). The figures for altitudes are from the Rochester sheet.

The Mendon kames are the third highest ground in Monroe County. The highest point of the County is the extreme southeast corner, on the west border of the Hopper Hills, one mile northeast of Ionia. The altitude, as shown on the Canandaigua sheet, is 1,020 feet. The second highest ground is the Baker Hill which rises to over 930 feet. The U. S. Lake Survey station, by the Baker residence, is 928 feet; shown on the Macedon sheet. Two of the Mendon kames in the east range rise to 840 feet. This altitude of the kame group is a notable character. The surrounding plain is only 660 to 680 feet, and even the surrounding drumlins are only 700 to 720 feet, except one close east, at 740 feet. It is seen that the crests of the highest kames are 120 feet over the drumlins, and 170 feet above the surrounding surface. In this element of excessive height the Mendon kames resemble the Baker-Turk Hill mass, six miles east; which was doubtless contemporary in time of construction and similar in partial origin.

The form of the kames is shown in plates 78, 79. Of pronounced knob and basin type, it is in strong contrast with the near-by drumlins, which are smooth, oval hills or ridges. The kames are mammillary or conical, enclosing numerous deep basins or kettles. Their billowy aspect has suggested comparison with "eggs in a basket."

The altitude figures for the lakes on the topographic map are questioned. The Mendon Pond is marked 662 feet, and Deep Pond, a short distance south, and connected by a channel with no current, is marked three feet lower.

Unfortunately it is not easy to determine precise elevations in the area. The Rochester sheet is one of the earlier maps of the Geological Survey. No "benches" are given on the map nor any altitudes for road intersections and salient points, as in recent and more perfect mapping. To check the elevations in the district it may be necessary to run lines of accurate level from the Barge Canal benches at Pittsford.

Composition; Structure

Kames and eskers are water-laid material, sand and gravel. The fragments of rock had been held in the grip of the ice sheet, and some of them were scored and planed by rough treatment. Finally, with the waning of the glacier, the streams from the melting ice gained possession of the stones and gave them "water treatment." Rolled and tumbled and shoved for long distances the stones were worn into smoothed and rounded forms, as bowlders, cobble, gravel and sand (figure 3).

A minor part of the esker ridges is till, or unassorted rock-rubbish contributed directly by the ice without water interference. Sometimes the walls of the stream channels, or the roofs of the subglacial tunnels, fell in and carried ice-drift into the stream deposits. And sometimes a little advance of the ice pushed its drift into the gravels, and even mashed and crumpled the layers, destroying the bedding and structure of the water deposits. We can readily imagine how, in various ways, the glacial stuff was left on, or in, the stream-borne deposits.

The hills are partly pasture land, with many cultivated fields. Excavations or exposures are few, but sufficient to show composition (figure 3). The most abundant rock is Medina sandstone, which is estimated at one-half the total mass in observed sections, and also of the piles and fences of cobble and bowlders in the middle valley, where cultivation is prevalent. The explanation is that Medina sandstone is the only very hard near-by terrane on the north. Many bowlders of crystalline rocks occur, which have been brought from the Adirondacks or from Canada. Some blocks of

Lockport (Niagara) limestone are found; two large blocks lying on a summit at 720 feet.

The varied and interesting structures and composition characteristic of kames is excellently displayed in the gravel pit on the farm of J. R. Hopkins, on the east side of the Clover Road.

The tops and slopes of the hills are frequently of material so fine and adhesive as to be clayey. Evidently this was deposited from the lake waters which covered the hills during, and subsequent to, their construction.

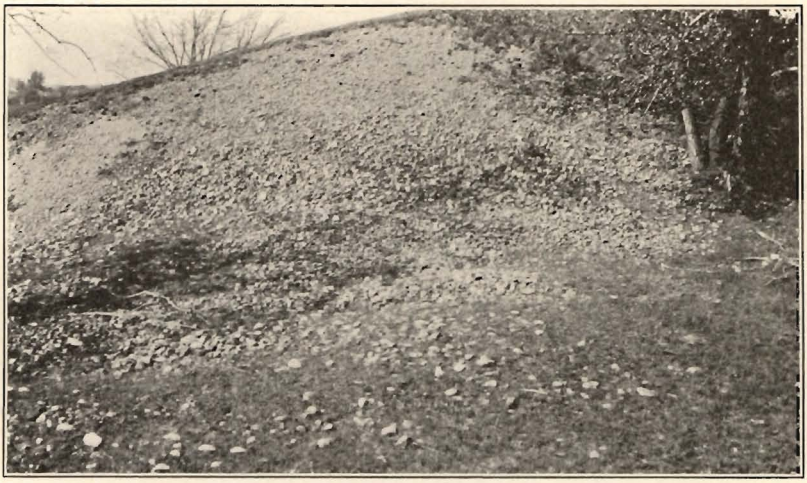


Figure 3. **KAME GRAVEL**
Excavation east side of the Douglas Road

The rock floor of the district is deeply buried under the glacial deposits. The underlying rocks are the Salina shales, and they were deeply eroded before the ice sheet overspread the country. On the Howard farm, on the extreme western edge of the area, it was said that a well starting on the 700 foot contour was driven 130–140 feet without reaching bed-rock. On one of the knolls in the southern part of the east range a well at the 680 contour was said to penetrate 130 feet of clean sand without rock. South of the kames, on the sandplain, farm of Judson F. Sheldon, rock was reported at depth of 69 feet, the altitude of the plain being about 600 feet.

Features

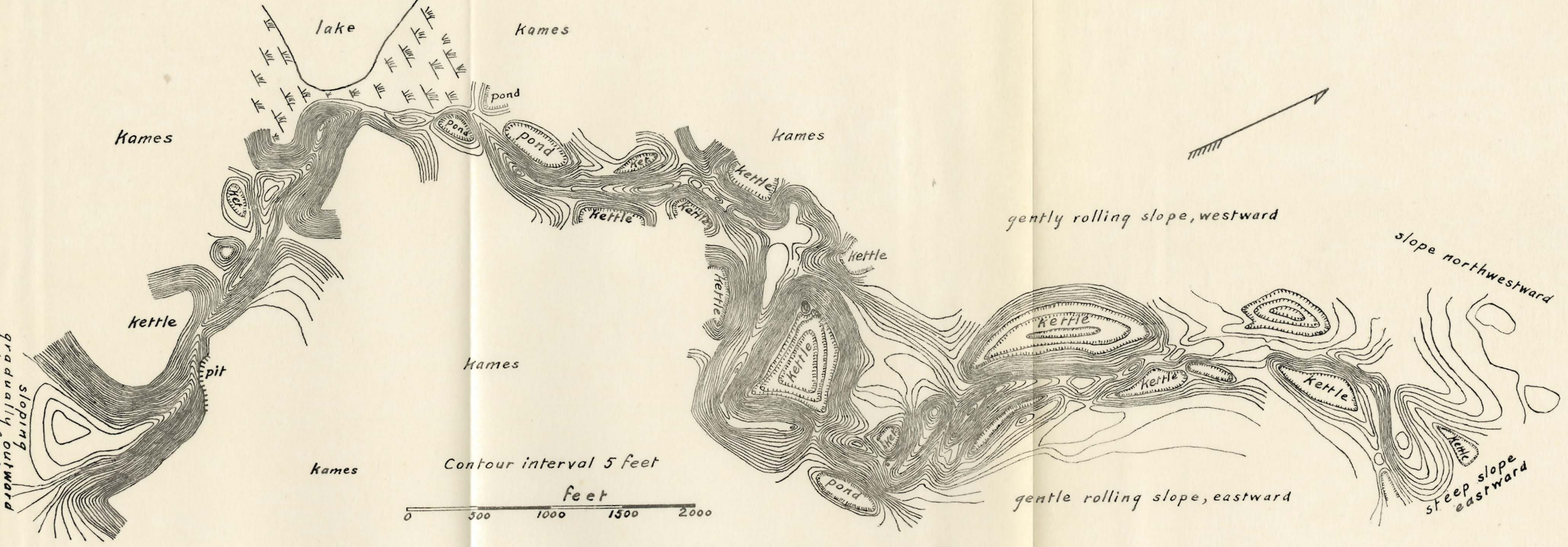
Drumlins. These were built beneath the ice sheet by the piling-on and rubbing-down action of the ice during a phase when it was no longer able to carry all of its load of drift. (The New York drumlins have been described and the mechanics of their building discussed in Bulletin No. 111 of the N. Y. State Museum.) The depth of the ice sheet in which the Mendon drumlins were erected is unknown, but is estimated at perhaps 500 feet. At that time the edge of the ice sheet was miles southward. A diminutive drumlin stands in the valley near Deep Pond.

Figure 4. **EAST RANGE ESKER**
View looking southwest. Cattle-paths on the east slope

The Mendon kames were piled at the ice margin, long subsequent to the building of the neighboring drumlins. It is possible that some drumlins are buried in the kame hills. The massive glacial deposit of the Turk-Baker hills quite certainly has a drumlin base.

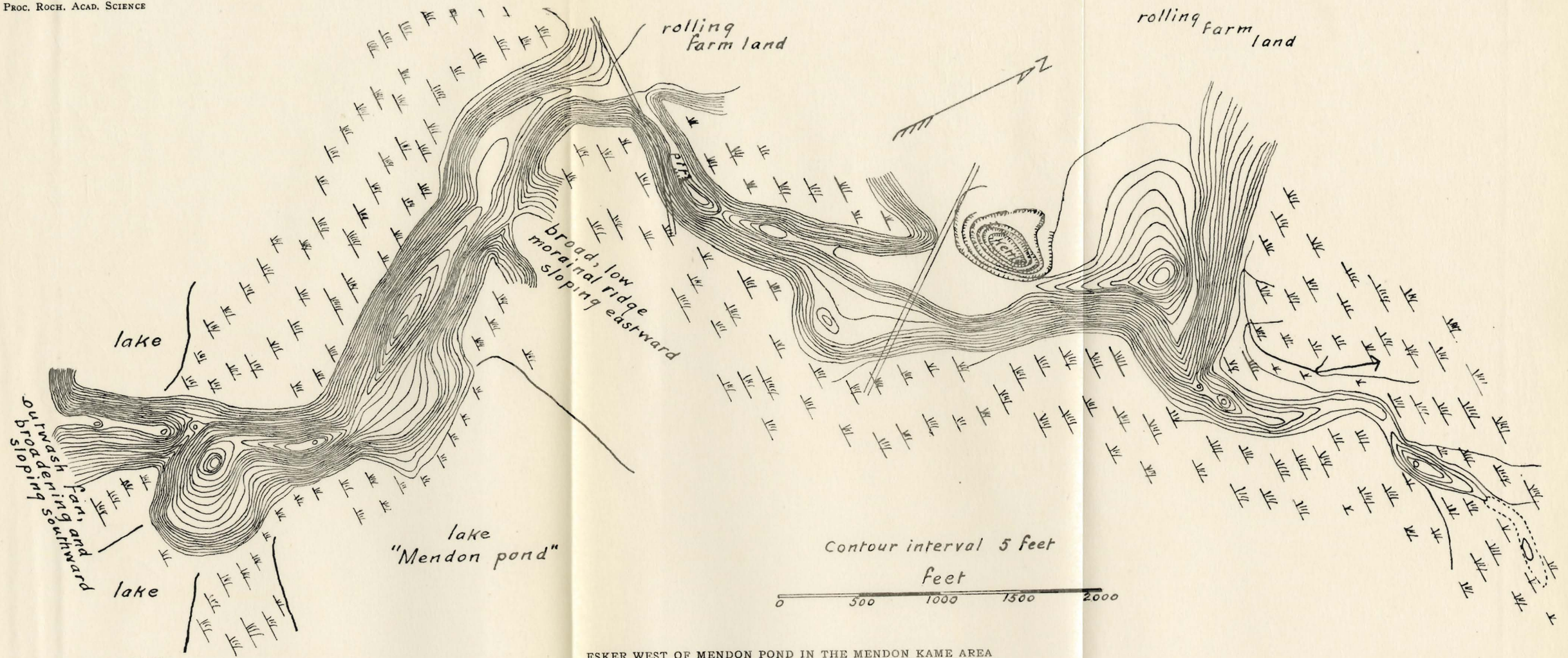
Eskers. The two north and south ranges of kame hills contain two eskers of unusual size and form. They have been described by A. W. Giles in a masterly paper which is part of volume 5 of the Academy Proceedings (12, pages 217–223). Plates 80, 81 are reproductions of his maps.

Eskers are ridges of gravel, often very coarse and poorly assorted, which were accumulated in the beds of overloaded streams. The weight of observation, as well as of theory, favor their subglacial origin, especially of the typical forms, with great length in



Survey and map by A. W. Giles

ESKER EAST OF MENDON POND IN THE MENDON KAME AREA



ESKER WEST OF MENDON POND IN THE MENDON KAME AREA

Survey and map by A. W. Giles

comparison with the cross-section. The streams which drain alpine glaciers, and the Malaspina ice sheet in Alaska, emerge from subglacial tunnels. Water from the melting of the ice surface (ablation) finds its way downward by fissures (crevasse) or by melting its own passage.

The eskers in the two ranges of kames are so irregular in form and so confused with or surrounded by the kames that they are not readily recognized. The one in the east range has greater length, but the other has higher relief and steeper slopes.

There is intimate genetic relation between kame and esker, and both may be product of the same stream. The kame knolls are outwash of detritus piled at the emergence of the glacial stream, at the fluctuating and ragged edge of the ice. The esker is the coarse material dropped by the stream in its bed when the volume and velocity of the flowing water is incompetent to carry all the load. The stream in its course lays the esker and at its terminus piles the kame.

The "feeding esker" may sometimes be found upstream from a kame. During the rescession of the ice front kames are often built on or against the esker, producing an irregular and knobby ridge. The eskers in the Mendon kames have been thus confused or obscured by the subsequent kame construction.

Like drumlins, eskers indicate the general direction of the local ice movement, for the reason that a stream under the ice sheet could not persist with a direction of flow transverse to the ice movement. They could live only in accord with the ice flow, which in western New York was south to southwest.

Eskers should be sought in south-leading valleys, where the subglacial drainage would tend to concentrate. A series of interrupted ridges and knolls lie along the Lehigh Valley railroad, on the west side, between Cedar Swamp station and Rochester Junction, which can be seen from the car window, especially when the trees are bare. These are mapped and described in Giles' paper.

A mile south of the Mendon kames is a conspicuous chain of knolls that is regarded as an imperfect esker, or eskerine. This surmounts a drumlin, close east of the road to Honeoye Falls. The four connected knolls are locally known as the "Dumpling Hills." The altitude, 740 feet, and height above the plain, with a lone tree on the bold north end, makes the little esker very prominent.

Kettles. The basins or bowls, termed kettles in glacial parlance, are singular features. They are not normal products of stream work, and before the rise of glacial geology they, like drumlins and eskers, were mysterious phenomena.

Among the Mendon kames are numerous, large and splendid examples. (Figure 5.) They are not visible from the highways, but may readily be seen by climbing the knolls close to the roads, especially on the east of the Douglas road. They are difficult subjects to photograph with a small camera.

The walls of the basins commonly rise as steeply as the material,

Figure 5. **KETTLE IN THE EAST RANGE**
Looking north

gravel or sand, will rest, or at the "angle of repose." In some cases the height is 100 feet.

Kettles are not erosional; that is, they were not made by removal of materials, or by excavation. They are constructional, in a peculiar way. Some of the more irregular, larger and shallow basins, like those holding the larger lakes, may be due to deficiency of filling at the time of the moraine deposition. But the deeper, symmetrical or subcircular kettles were originally occupied by blocks of ice, detached by the unequal melting of the ragged ice margin. Probably most of the ice blocks were entirely buried in the detrital outwash, and never melted until the lake waters were drained away and the area exposed to the air and the leaching rains. Then the drift cover and walls slumped in, leaving the steep-walled bowls.

Perhaps some larger ice blocks were only surrounded by the ice and stream drift, and were not entirely buried. Such basins stand intermediate in their origin between the typical kettles and the broad basins of unfilled spaces.

The persistence of buried ice until the standing waters were removed was due to the greater density and weight of the colder water. The temperature of the drift about the ice must have been quite 32° F. As any portion of the surrounding water became warmer, up to 39° F. its density increased and it remained in the depths, thus insulating the ice and inhibiting the rapid melting. It

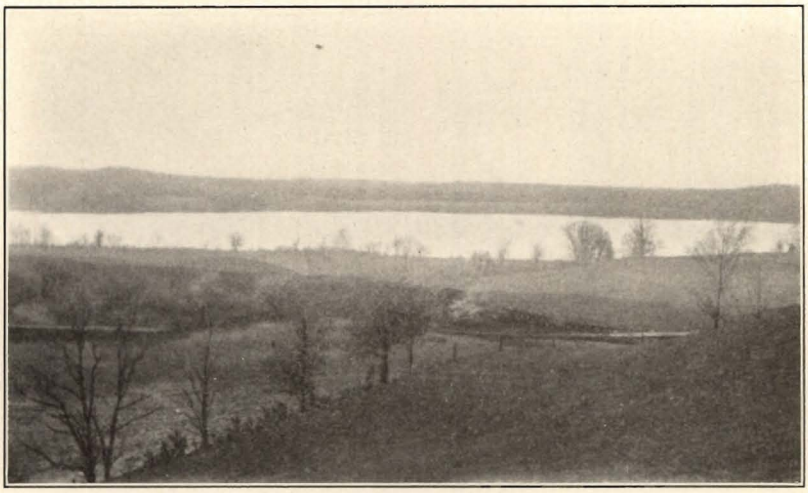


Figure 6. **MENDON POND**
Looking west from the east range esker

may be noted that the bottom waters of very deep lakes, like Ontario and Seneca, are permanently at 39 degrees.

Lakes. In geologic terminology the names pond and pool are used only for artificial bodies of water, while natural water bodies are called lakes, lakelets and tarns.

The location, size and outflow of only four of the lakes in the kame area are shown in the maps, figures 1 and 2. But other lakelets exist, hidden in the deep kettles. One west of the Mendon Pond, in a great well-like kettle, is called Black Pond. Several lakelets lie north of the Harris Pond, at least in wet seasons, and are indicated in Giles esker map, plate 80.

The "Big Pond," the most northerly, and the head of drainage, has an area of about 100 acres, and a depth of about eight feet.

The Harris Pond lies nearly surrounded by the kames on the east side of the valley. It is only a few acres in extent, but is said to have a depth of 24 feet. Deep Pond is mostly shallow but is said to be 34 feet deep in one place. Mud Pond is shallow, as its name implies. The margins of the lakes are mostly swampy.

There are all gradations in size and position of the kettles, from the lowest, with or without lakes or swamps, and those of great depth, to the shallower depressions high in the hills which can never hold any water. Naturally the only basins which can hold lakes are those with impervious bottoms, probably compact, subglacial drift. Below the lake surfaces the surrounding sands and

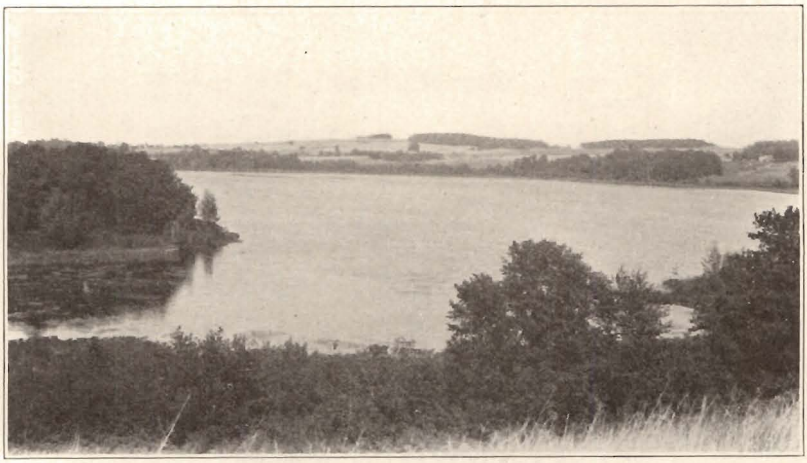


Figure 7. **MENDON POND**
Looking northeast from Knoll at south end of the Indian Trail

gravels must be always saturated with water. Hence the lake levels are not very sensitive to the changing seasons.

Botanical Interest

During many years the Section of Botany of this Society has explored the Mendon district in the intensive study of the flora of Monroe County and surrounding territory. An early collector and student of the Mendon plant life was George T. Fish. Subsequently Milton S. Baxter, Warren A. Mathews, Douglas M. White and Ellsworth P. Killip took up the work, continuing to the present time.

The special botanical feature of the Mendon district is the swamp flora, found in the bogs of the kettle basins and in the

swamps surrounding the several ponds. The flora here is comparable to that of the Bergen swamp, in Genesee County. In the latter area the predominant flora is that which is characteristic of marl bogs, or calcareous waters; while in the Mendon area the sphagnum bog plants predominate.

The Mendon flora is especially rich in orchids and insectivorous plants. The heath family abounds. Several rare species of carex occur, among them *Eleocharis interstincta,* (Vahl) R. & S., not reported elsewhere in New York state. The following two species are found in our botanical district only in Mendon: the Dwarf Mistletoe *Arceuthobium pusillum,* Peck, parasitic upon the Black

Figure 8. **DEEP POND**
Looking southeast from Knoll at south end of the Indian Trail

Spruce, *Picea mariana,* (Mill) BSP., and *Utricularia resupinata,* B. D. Greene.

The plants of the Mendon district are listed in the published Plant List of Monroe County, in these Proceedings, volume 3 (1896), pages 1–150; with particular notice on pages 8, 9. Additional species are recorded in the Supplementary Plant Lists, volume 5, pages 1–38, 59–121.

Aboriginal Occupation

The Mendon Pond Trail

By Arthur C. Parker

When Lewis H. Morgan was preparing the manuscript of his now justly famous "League of the Iroquois" he paid special atten-

tion to the subject of Indian trails. Indeed his "Skenandoah Letters" in the *American Review* contain much of interest about trails, gleaned from this intimate association with the New York Indians.

Many of the most important roads in our State and many more by-paths are built directly upon older Indian routes. This fact is so well known that it has become a tradition. In fact, among a considerable class of our population great pleasure is found in following the routes that the red men once took, and in revisioning ancient conditions. To find an Indian trail, however, that has survived the age of improvements is another thing. A few thoughtful spirits have attempted to hunt out and tread upon the identical pathways that the Indians left behind.

Oddly enough one of the most famous may still be seen in the rocks of the northern end of Manhattan Island,—in the very metropolis. One important survival may be seen near Belvidere in Allegany County, and there is little doubt but that some of the paths around Irondequoit Bay are survivals.

There is yet another trail which both history and tradition unite in proclaiming an Indian path. It was reported to the writer by Professor Fairchild, and it was in his company with Mr. George Selden, a local historian and Mr. Henry Selden, Vice President of the State Archeological Association, that the visit and inspection was made. The path is on the ridge of the long esker running north and south through the J. H. Hopkins farm, on the east side of the Clover Road, just west of the Mendon Pond. The esker rises like a knife edge leaving only a narrow surface for a path. This path is plain enough, and worn about two inches into the soil, though in places it may be deeper. It runs over the ridge to a point overlooking both the Mendon and Deep ponds and then descends the hill and skirts the swamp, coming out on the Clover Road. A by-trail, even more deeply worn in places, diverges to the east and runs to the cove of the big pond. Here are ample evidences of old camp fires. Fishermen at the present time in searching for bait frequently dig down in the earth and find the embers and refuse of ancient fires.

It has been sufficiently established that the Clover Road follows the old Irondequoit-Ganarqua trail. It was this trail that Denonville followed when he invaded the Seneca country in 1687, and indeed his journal mentions the "three ponds."

The question before us, therefore, is whether or not the trail over the esker was a portion of the main trail or not? The fact that

there was a more level area to the west, and one which would avoid the swamp, seems to indicate that the esker trail was not a part of the main trail, but a by-path to the ponds where fish were abundant. It would seem an odd circumstance to find a trunk roadway diverging for the purpose of traversing a narrow ridge; and this was probably not the case.

My conclusion, therefore, is that since we have evidence that the Indians did use the ponds, and that the main trail passed near by, the ridge trail is a survival of the old Indian trail from the Irondequoit trail to the ponds.

That it is a survival seems to be attested by tradition. That it is not a path made by domestic animals appears from the fact that our evidence shows that horses and cattle were never pastured in this particular area. The swamps were too dangerous. That it was not made by hunters and fishermen is indicated by the fact that present day traffic is not sufficient to have worn the path so deeply. The modern hiker who traverses it leaves but an imperceptible impression, as we discovered by experiment in passing and repassing many times.

That it is the survival of an Indian trail, therefore, seems certain. To have reached the pond the Indians would have been compelled by the very terrain to walk the narrow ridge in the precise lines now traversed by the path. We are fully warranted in concluding that the Mendon Pond trail is the best, if not the only, example of a surviving Indian trail in the vicinity of Rochester.

Aboriginal Sites on the Mendon Ponds

Many of the slopes about the Mendon Ponds have traces of aboriginal occupation upon them in the way of fire-broken stones, net sinkers, arrow points and now and then a celt. One considerable site is to be found on the east side of Big Pond and at about its middle point. In general the culture seems to be Algonkian, though there are traces of the Iroquoian. The Algonkian peoples came long before the Iroquoian, and probably fished in the ponds for many centuries until driven out by the Iroquois at some period between 1200 and 1300 of our era.

The later Iroquois explain the gravel hills, such as are seen on both sides of the ponds, as the spew of monster lizards that plowed into the earth and endeavored to devour it. In anger the Thunder god shot them with the gleaming arrows that flew from his eyes

when he caught the culprits, whereupon the monsters disgorged the sand and gravel and then died. The shapes of their bodies may still be seen.

Historical Evidence of Occupation

Mr. J. H. Hopkins, who owns part of the land upon which the esker trail is situated, stated to the writer that his grandfather cleared the farm and found the Indian trail over the ridge leading to the ponds. He stated that originally it was much longer and ran over the ridges to the north. The older settlers, he said, never doubted that the trail had been made by the departed red men.

Just north of his present house, in plowing, he found the ruins of an old cabin and some shards of blue china. Whether this was an Indian hut or one occupied by a settler he cannot tell, but since the Seneca Indians lived in the Genesee valley as late as 1838, and had free access to their old haunts, the chances are about equal as to the nationality of the cabin's occupants. At that time the Indians had European dishes and lived in log cabins. The fact that the Indians left at a relatively late time,—less than a century ago,—strengthens the arguments in favor of the Indian origin of the trail.

List of Writings

The published papers listed below contain references in the present article and some mention or brief description of the Mendon kames and related features. A fuller list of papers on the glacial geology of western New York is given in papers 8, 10 and 11.

1. C. R. Dryer. The glacial geology of the Irondequoit region. *American Geologist,* Vol. 5, 1890, pp. 202–207.
2. H. L. Fairchild. The kame-moraine at Rochester, N. Y. *Amer. Geol.* Vol. 16, 1895, pp. 39–51.
3. ———Kame areas in western New York south of Irondequoit and Sodus bays. *Jour. of Geol.* Vol. 4, 1896, pp. 144–150.
4. ———Kettles in glacial lake deltas. *Jour. of Geology,* Vol. 6, 1898, pp. 589–596.
5. ———Glacial lakes Newberry, Warren and Dana, in central New York. *Amer. Jour. Science,* Vol. 7, 1899, pp. 249–263.
6. ———Drumlins of central and western New York. *N. Y. State Museum Bulletin* 111, 1907.
7. ———Glacial waters in central New York. *N. Y. State Museum Bull.* 127, 1909.

8. ————The Rochester canyon and the Genesee River base levels. *Proc., Roch. Acad. Science,* Vol. 6, 1919, pp. 1–55.

9. ————The Pinnacle Hills, or the Rochester kame-moraine. *Proc., Roch. Acad. Science,* Vol. 6, 1923, pp. 141–194.

10. ————Geologic history of the Genesee Country; in *History of the Genesee Country,* Vol. 1, 1925, pp. 15–110.

11. ————Geology of western New York. Rochester, November 1925. 62 pages, 37 plates.

12. A. W. Giles. Eskers in vicinity of Rochester, N. Y. *Proc., Roch. Acad. Science,* Vol. 5, 1918, pp. 217–223, plates 13, 14.