

## **FRIENDS OF THE PLEISTOCENE 1998: ITINERARY AND FIELD TRIP GUIDE SUPPLEMENT**

**FRIDAY EVENING.** Registration, Check-In, Informal get-together at Ruschmeyer's Inn, Montauk, NY

**SATURDAY, MAY 16.** Breakfast- 7 AM. Please stay for announcements. Saturday field trips- depart at 8 AM. Please car pool. Topographic maps are Montauk Point, Napeague Beach, Gardiners Island East, Gardiners Island West and East Hampton.

0.0 miles. Leave the Inn. Turn right (south) on Second House Rd.

1.0 mi. Turn left (east) on Montauk Highway- Rt 27.

3.0 mi Turn right (south) on Ditch Plains Road. 3.3 mi. Ditch Plains Beach Parking Lot.

**Stop 1. Ditch Plains.** Examination of two drift sheets, Illinoian (?) and Late Wisconsinan in the zone of late Wisconsinan deformation on the proximal side of the late Wisconsinan terminal moraine (the eroded remains of which are postulated as subsea lag deposits south of the Montauk peninsula and south of Block Island. Stop 1 was originally scheduled for Montauk Point where the best exposures of two drift stratigraphy could be seen (Ref. Field Trip 1 in Eastern Long Island Geology-- henceforth ELIG). An evolving erosion control project--mainly encasing the Point in a seawall of rock --has eliminated significant exposures in the bluffs. The exposures at Ditch Plains provide an opportunity to see the deformation of the upper part of the lower drift sheet, mostly in the Montauk Till unit. At Ditch Plains as at Montauk Point, the Montauk Till actually comprises several lithologies of probable glacial and glacial fluvial or lacustrine origin, including sand lenses and lake clays; all are well compacted. The diamict lithology has been characterized as a basal till. Till fabrics and till stone lithologies point to a northeasterly source area associated with the Narragansett Lobe of the earlier glacier. In addition, the strata at Ditch Plains have been indurated and cemented by iron oxides giving the impression of perhaps a greater age. However, this condition of the Montauk Till may be attributed to long term groundwater activity where groundwater rich in iron contributes to diagenesis of the lower drift.

The Montauk Till, named by Fuller (1914), was believed to be the middle member of the Manhasset Formation, a pre-Wisconsin (sic Fuller), glacial formation comprised of a lower outwash gravel, the Herod Gravel, the Montauk Till, and an upper outwash, the Hempstead Gravel. The contact between the Manhasset Fm. and the overlying Ronkonkoma Moraine was placed at the top of the Hempstead or the base of the Ronkonkoma. Fuller believed that the Ronkonkoma Moraine was the terminal moraine of the older of two Wisconsin glaciations, and that this moraine formed the Montauk Peninsula. Similarly, a younger Wisconsin terminal moraine, the Harbor Hill Moraine, was believed to have formed the north shore of Long Island, including the North Fork of eastern Long Island). However, in recent years these interpretations have been substantially revised as explained in the following text.

1. The lower drift/upper drift contact. The upper part of the Montauk Till (all varieties) in nearly all exposures is deformed. It has been broken up into blocks of strata, and masses of this Montauk sediment have been thrust southward and engulfed in sand and gravel of the upper drift. It is concluded that the advancing late Wisconsinan glacier quarried and thrust masses of Montauk southward, depositing them with late Wisconsinan outwash in the end moraine. The outwash of the upper drift is lighter colored sand and gravel that contrasts with the masses of darker colored Montauk which it surrounds. It is also concluded that the top of the Montauk Till, and therefore the lower drift, should be placed at the top of undeformed Montauk Till. The reorganized section should be included in the late Wisconsinan, or upper, drift. It is not, therefore, an upper gravel, the Hempstead Gravel, of the Manhasset Formation of Fuller (1914). This interpretation restricts the Manhasset Formation to the Montauk Till and the lower, Herod Gravel. The late Wisconsinan drift sheet is now defined to include a lower outwash and an upper till. Both the outwash and till vary in thickness, composition and mode of occurrence and deposition in the late Wisconsinan end and recessional moraines. Generally, where the lower drift directly underlies the late Wisconsinan, a zone of deformation can be demonstrated. While there is some topographic relief on the lower drift, the Illinoian terminal moraine was probably south of the Montauk Peninsula.

2. Age of the lower drift. The Montauk Till was placed in the Manhasset Glacial by Fuller (1914). The Manhasset Glacial is the next older glaciation, preceding Fuller's Vineyard Interglacial and the Wisconsin Glacial. Thus, the Manhasset Glacial would equate with the Illinoian Glacial Stage. Later studies suggested that

the lower drift could be early Wisconsinan, based mainly on the cold-warm-cold, mid-Wisconsinan climatic fluctuation. Current research has shown that early Wisconsinan ice did not extend as far south as Long Island and that the next older glacier to have reached the southernmost morainal region was of Illinoian age (see also Sanford, S. and Witt, R.W., 1997, eds. Guidebook, Northeast Friends of the Pleistocene).

3. The Ronkonkoma Moraine. The Ronkonkoma Moraine has been restricted as the terminal moraine of the Connecticut Lobe of the Laurentide Ice Sheet, and as such, it does not form the topography of the South Fork of Long Island. Its eastern counterpart of the terminal moraine, the Amagansett Moraine, does not extend eastward on land, but trends seaward and south of the Peninsula from Amagansett eastward (ELIG, Figures 5 and 33). With the terminal moraine off the present coast, the glacial drifts of the Peninsula are the lower drift, including the Montauk Till, the upper drift, including the zone of deformation, and recessional deposits, including the kamic recessional moraine, the Prospect Hill Moraine, of the late Wisconsinan.

3.6 miles. Return to Montauk Highway. Turn left (west).

4.6 mi Turn right (north) on Edgemere St. Proceed approximately 1.0 mile to kamic exposure on right (east).

5.6 mi Park on shoulder.

**Stop 2. Prospect Hill Moraine.** This exposure of the kamic, upper drift is on the distal margin of the first recessional moraine in the late Wisconsinan recessional sequence, the Prospect Hill Moraine. The drift is generally sandy outwash, capped by thin sandy till with erratics. The moraine, with crests in the 150 ft range, trends southwest-northeast. A narrow area of thin, pitted outwash lies to the south of the moraine and overlies Montauk lithologies. The low permeability of the lower drift forms a surface on which groundwater ponds. Similarly, the upper drift thins to the north of the moraine and forms pitted terrain where the upper drift overlies the lower drift. To the west in Hither Hills, west of Fort Pond Bay, the moraine takes on a washboard appearance with southwest-northeast trending ridges with kames and swales. Many of the kames of the recessional moraine have ice-contact and ice-shoved features.

Age of the Upper Drift. Pollen and radiocarbon data from the southern New York and New England region is consistent and in agreement with the data from bogs and lakes on all of the glacial surfaces on Long Island. All of the records show a cold-warm climatic fluctuation corresponding to postglacial warming, and the consistent vegetational changes from tundra to spruce, pine and then oak forests. The oldest dated strata from the terminal moraines records the glacial maximum at nearly 22,000 years and a very cold climate and tundra vegetation. This conclusion holds for central and eastern Long Island, as well (ELIG, p. 51-57). If the Ronkonkoma Moraine was the terminal moraine of a glaciation older than the late Wisconsinan, its surfaces and related deposits would have experienced an additional cold-warm cycle, that is, an interstadial between the two glaciations, which would have appeared in the respective bog records. No such record exists in this region for terrain between end and recessional moraines in this region. The only interstadial record that has been found, that of the mid-Wisconsinan Portwashingtonian warm interval, separates late Wisconsinan sediments from the lower drift or Illinoian deposits--in the absence of early Wisconsinan glacial drift. If the Prospect Hill Moraine was the Ronkonkoma Moraine, there should also be a thick outwash plain south of the moraine, much like that found south of the Southampton-Amagansett terminal moraine segments to the west in the vicinity of Bridgehampton. Rather, the upper drift thins south of the moraine and directly overlies the lower drift deformed zone--showing that the late Wisconsinan ice crossed that surface toward the terminal position offshore.

6.6 mi. Return to Montauk Highway. Turn left (east). Follow Montauk Highway to Montauk Point.

13.1 mi. Park in Montauk Point Parking Lot (Restroom stop!)

**Stop 3a. Montauk Point.** Assemble across the road at the overlook on the terrace near the pavilion. Discussion of this stop follows the text of Stop 1. Montauk Point in ELIG, pages 126-130.

**Stop 3b. Montauk Lighthouse.** A tour of the Lighthouse will be presented following the excursion around the Point.

**Lunchtime!!** Enjoy your lunch time on the grounds of Montauk State Park.

**Saturday Afternoon Field Trip.** Assemble at the cars at 1 PM. Please follow the road log in Eastern Long Island Geology for the trip westward from Montauk to Amagansett.

0.0 mi. Leave parking lot, proceed 9.2 miles to the Hither Hills Overlook (Stop 2 in ELIG, p. 130-131).

9.2 mi. Overlook

**Stop 4. Hither Hills Overlook.** see ELIG, p. 131

11.4 mi. Napeague Bay

**Stop 5. Hither Hills "Walking Dunes".** (Stop 3 in ELIG, p. 131-133)

18.4 mi. Amagansett.

**Stop 6. Amagansett Moraine.** (Stop 4 in ELIG, p. 134)

Return to Montauk Highway, eastbound.

31.4 mi. Turn left (north) on Second House Rd. to Ruschmeyers Inn.

**Friends of the Pleistocene Annual Banquet.** The banquet will be held at 7 PM at the Inn.

**Sunday, May 17. Breakfast 7 AM.** Please stay for announcements. Sunday's trip departs at 8 AM. Check out before leaving (pay personal charges other than room).

The Sunday field trip log starts in Bridgehampton (Sag Harbor Quad) at the junction of Rt 27 and Sag Harbor Turnpike (not Sagg Rd as in Field Trip 2 in ELIG). The trip follows Field Trip 2 in ELIG, p. 139-144, with two additional stops on Shelter Island and two additional stops from Field Trip 3 in ELIG. The south to north traverse cuts through the outwash plain, the terminal moraine and several recessional ice margins, recessional moraines and associated features. The route also coincides with the Interlobate Zone between two sublobes of the late Wisconsinan glacier in eastern Long Island (nominally, the eastern Connecticut-western Rhode Island sublobe and the Narragansett Lobe). During deglaciation, some of the interlobate zones, like the Sag Harbor Interlobate Zone and the South Huntington Interlobate Zone in west-central Long Island, became focal points for meltwater channels, deposition of fluvial gravels, ponding and deltas, and subaqueous flows. The Sag Harbor channel also exhibits chains of kettle-like lakes that may be the result of ice block decay; the ice blocks may be the result of ice floes in the channel, dead ice, or possibly a surge of ice into the interlobate zone.

0.0 miles. Turn right (north) on Sag Harbor Turnpike in Bridgehampton.

2.4 mi. **Stop 1. Town Transfer Station**, formerly the Town landfill. See descriptions of Stops 1 and 2, ELIG p. 139,140. Lower drift till was observed in the landfill excavation when the pit was active. Borings in the region have revealed one or more buried tills or clays. Those using the Fuller approach claim these sediments as evidence of additional glaciations. It is more likely that the sediments are thrust masses of lower drift or possibly mid-Wisconsinan or Sangamon marine strata. Note the height of the moraine (the Southampton segment of the terminal moraine), up to 280 ft, to the northwest. Two chains of ponds formed in the channels in the Interlobate Zone. The Scuttlehole Ponds (ELIG, p. 136, 137) lie to the west of the trip route, and trend north to south from the moraine to Bridgehampton.

4.5 mi. Junction with Rt 114. Follow the route of Field Trip 2 in ELIG, p. 141, to North Haven (Greenport Quad) and the North Haven ice margin.

4.9 mi. **Stop 2.** Stop 3 in ELIG, p. 141. North Haven terrain.

9.3 mi. **Stop 3.** Stop 4 in ELIG, p. 143. Shelter Island topography, central plain, recessional moraines, Shelter Island ice margin.

10.5 mi. **Optional Side Trip A.** To Upper Beach (ELIG, p. 144). 0.0 mi. Turn right (east) from North Ferry Rd onto Winthrop Rd. Winthrop Rd into Cobbet Lane. 1.0 mi. Intersection with Manhasset Rd. 1.6 mi proceed into Ram Island Rd, turn left (north). 1.8 mi. Upper Beach, park where convenient. Examine exposure of the eastern segment of the Shelter Island Recessional Moraine of sandy drift with a diamict lens-- flow till or subaqueous debris flow? 3.6 mi. Return to North Ferry Road.

10.5 mi. **Optional Side Trip B.** 0.0 mi. Turn left (south) on North Ferry Rd. 0.4 mi.. turn right (west) on West Ferry Rd. 1.4 mi. Shore Rd. turn left (south). 1.5 mi. Park where convenient. Examine exposure of kamic moraine--the western (and higher) segment of the Shelter Island Recessional Moraine in the bluffs. 3.0 mi return to North Ferry Rd.

**Lunch Stop.** Depending on the time of day, lunch may be here or at Rocky Point.

11.0 mi. Continue road log, Field Trip 2 to North Ferry, Greenport and Stirling.

14.5 mi. Stirling. Note description of topography in ELIG, p. 144.

15.0 mi. Rt 48 merges into Rt 25.

18.7 mi East Marion. Turn left (north) on Rocky Point Rd. (Orient Quad).

19.9 mi. **Stop 4. Rocky Point** (Stop 3, Field Trip 3, ELIG, p. 151). The Roanoke Point ice margin. Sea cliff exposure of the Roanoke Point Recessional Moraine, here a fifty foot bluff comprised of ten feet of bouldery till overlying coarse sand and quartz pebble gravel typical of the Roanoke Point Moraine. The bouldery till is nearly identical to the till of the Fishers Island and Charlestown segments of the recessional moraine to the east.

21.1 mi. Return to Rt 25. Turn left (east).

22.4 mi. **Stop 5. Truman Beach.** Glacial meltwater channel. See Field Trip 3, Stop 2, ELIG, p. 149.

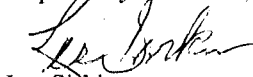
26.1 mi. **Stop 6. Orient Beach State Park.** Remnants of the Roanoke Point Moraine--mostly fine quartz gravel. See Field Trip 3, ELIG, Stop 1, p. 147. Optional scenic 5.0 mi. drive on the barrier beach to Bens Point.

**End of FOP Trip !!** Eastbound travelers-- Orient Point-New London ferry ahead (east)

Westbound travelers--proceed west on Rt 25 to Rt 48, back into Rt 25 at Mattituck into Rt 58 at Riverhead into the Long Island Expressway (I 495) at Calverton.

Pleasant journey!!

Respectfully submitted,



Les Sirkin

PO Box 779

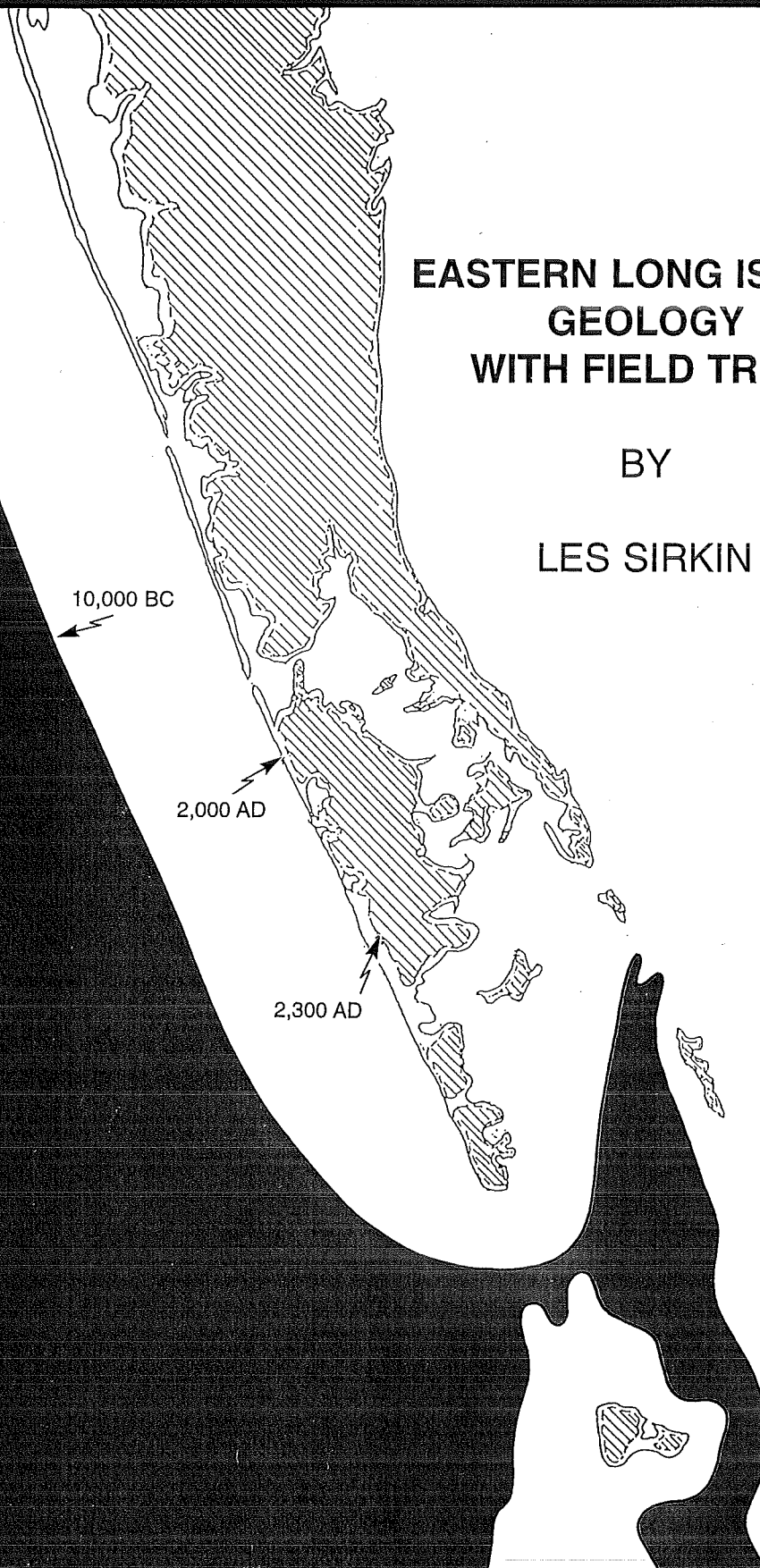
Block Island, RI 02807

PS: The NEIGC, hosted by URI October 10-12, 1998, will run a field trip to Block Island, hosted by myself and Anne Veeger of URI. The trip will be on October 11. See you there!

# **EASTERN LONG ISLAND GEOLOGY WITH FIELD TRIPS**

BY

LES SIRKIN



**EASTERN LONG ISLAND GEOLOGY**

**HISTORY, PROCESSES AND FIELD TRIPS**

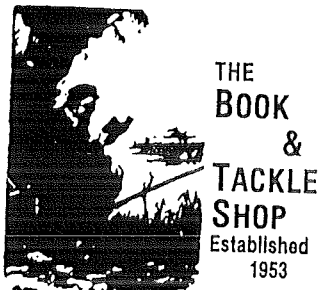
**BY**

**LES SIRKIN**

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## EASTERN LONG ISLAND GEOLOGY: HISTORY, PROCESSES AND FIELD TRIPS

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## GEOLOG

The dynamics of the Long Island coast; their the wind and the sea rise storms have increased the Montauk Point, and be battered and thinned. washed away, and value

In contrast, most ge much less active in the consequence only a few their slopes are deeply tracing their seaward me direct hit, then the sea phenomena.

In the perspective of dramatically since twenty the source region of the Canada and southern New a slab of icing on top of