GLACIATION
and
New York State

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The Last Ice Age

- The Pleistocene Epoch began 1.6 mya.
- During this time, climates grew colder.
- There were numerous ice ages starting 100,000 years ago.
- The last advance of ice was during the Wisconsin Stage of the Laurentide Ice Sheet.

2

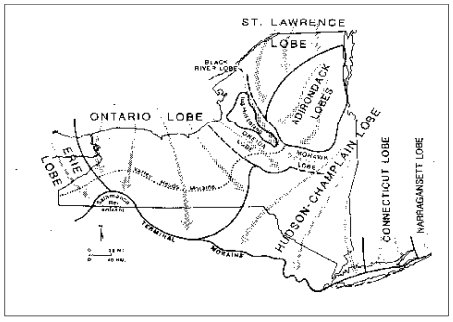
Pleistocene Ice Cap

3

Extent of Ice Sheet over North America 18,000 yrs ago

4

Laurentide Ice Sheet over NYS



5

What did glaciation do for NYS?

- 1. Major shaper of the present day landscape.
- 2. Influenced angle of slope.
- 3. Influenced the location of farms.

6

Glacial Dynamics

- 1. Ice sheets move away from their zones of accumulation and push forward in sections (lobes) under the pressure from their weight (called plastic flow). They also move down slope by slippage (called basil slip) as the weight of the ice melts its lowest levels and acts as a lubricant.
- 2. The forward edge of the ice sheet (ice front) acts as a "bulldozer", scouring the land, plucking loose rocks out of the ground and slicing all vegetation in its way.
- 3. All this material or debris is mixed with the ice as the ice moves forward and down slope.

7

Glacial Dynamics (cont'd)

- 4. Moraines (unsorted glacial debris) are created.
- 5. The furthest advance of the ice front is marked by a ridge of glacial material called the terminal moraine.
- 6. The "retreat" of a glacier is the melting of the ice front, creating the *illusion* that the glacier is moving backward. (It melts in place, not backwards.)
- 7. As the ice melts, the material it picked up is exposed and dropped in place, creating a variety of glacial features.

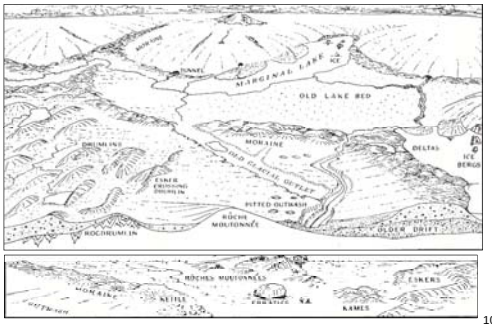
8

Glacial Dynamics (cont'd)

- 8. A recessional moraine is a low ridge of glacial material marking the position of the ice front's advance after a period of retreat.
- 9. Outwash is melt water that flows from the leading edge of the glacier. It carries debris which is sorted by the moving water and deposited in front of the moraines.
- 10. An outwash plain is a landform feature created by outwash. It ranges is thickness from several feet to several hundred feet. Deposits may be found tens of miles from the moraine.

9

Glacial Landforms



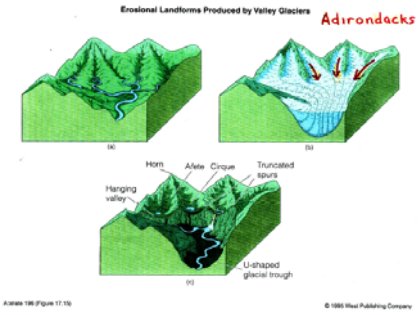
10

Mountain Glaciers

- In a mountainous area, snow and ice collects at the highest elevations.
- The pressure of the mass of ice moves it down a valley under the force of gravity.
- Unique landform features are created.
  - Cirques - Lateral and medial moraines
  - Aretes - U-shaped valleys
  - Horns - Hanging valleys

11

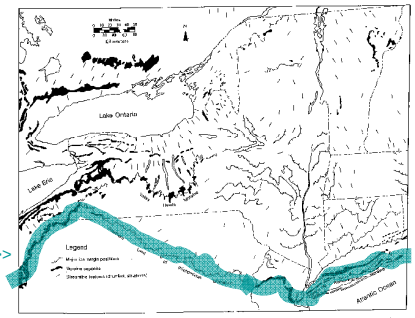
Glacial Features of Mountains



12

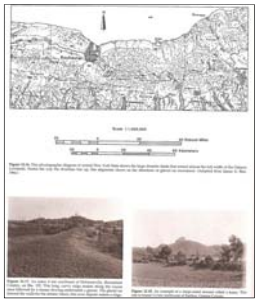
Moraine Deposits

Terminal Moraine>>



13

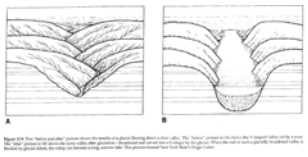
Drumlins



http://docs.unh.edu/NY/plmy02sw.jpg

14

Creation of a U-Shape Valley

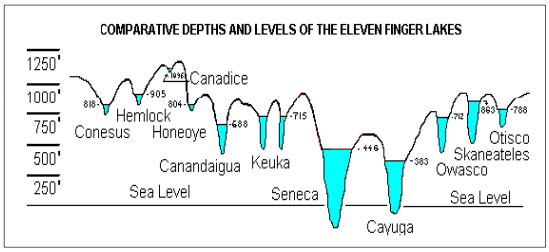


Before glaciation. After glaciation.

http://docs.unh.edu/NY/cort03ne.jpg

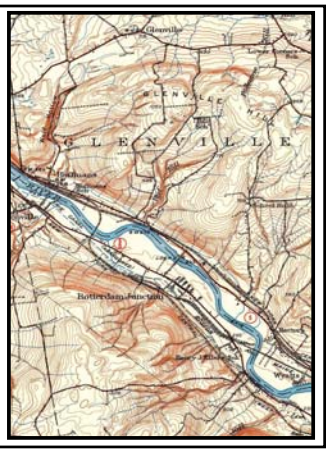
15

Profile of the Finger Lakes



16

Mohawk River: U-shaped glacial valley



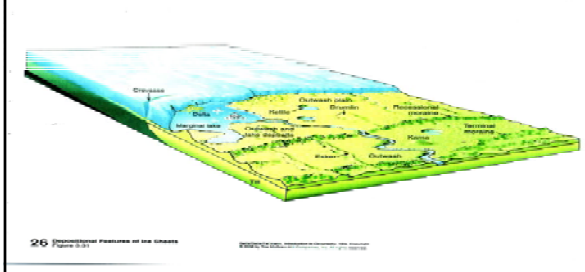
Physiographic Map of NE US

Glacial material was deposited on the (dry) continental shelf. Sea level was much lower.

The moraines mark the southernmost extent of continent-al glaciation.

18

Edge of the Ice Sheet



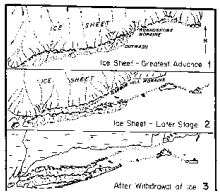
19

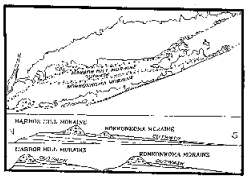
Mendon Ponds Park

Kettle lakes south of Rochester, NY.
Also see Fig. 12.20 in geology book.

20

Creation of Long Island





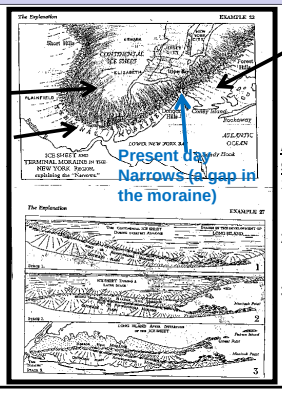
The Ronkonkoma and Harbor Hill moraines run from Staten Island to southern New England creating the base of Long Island and Cape Cod.

Long Island Sound was a glacial lake (a valley filled with fresh water from melting glaciers) with an overflow outlet near Fishers Island. Overtime the glacial lake drained, leaving a river that flowed to the sea.

As climate warmed, sea level rose. Salt water flooded the valley creating an estuary. The highest points of the moraines became islands. Sea level continued to rise, eventually linking LIS with NY Bay, creating Long Island

21

Glacial Features of SE NYS



ICE LOBE

Terminal Moraine

Outwash Plain

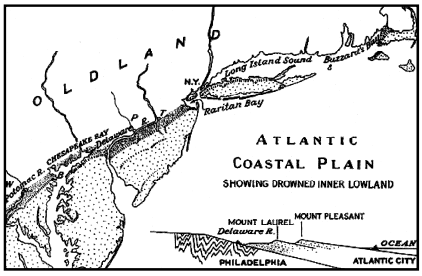
Present day Narrows (a gap in the moraine)

Advances of the ice sheet

1. Furthest extent of the ice creates the terminal moraine
2. Ice recedes leaving behind the South Fork.
3. Ice advances again to create a recessional moraine. When it recedes the North Fork is left behind.

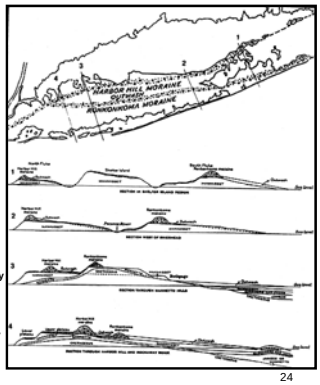
22

Long Island is part of the Atlantic Coastal Plain



23

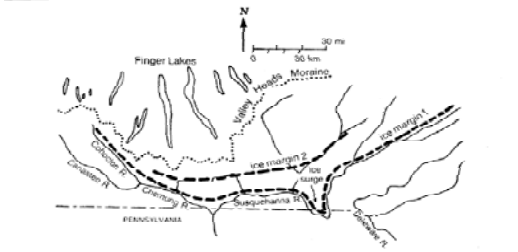
North-South Topographic Profiles across Long Island



1. The twin forks and Shelter Island
2. Central Suffolk County
3. Western Suffolk County
4. Central Nassau County

24

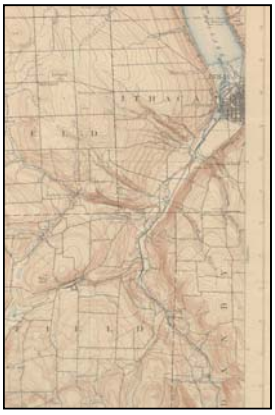
Recessional Moraines of Southern Tier



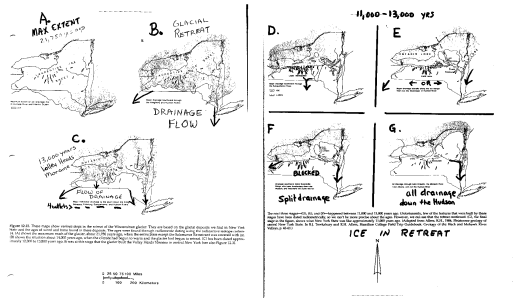
Arcuate trends of the Susquehanna River and its tributaries in relation to probable ice stands during Wisconsin deglaciation, and the similar arcuate pattern of the Valley Heads moraine belt. Adapted from Coates, 1974.

Glacial Dam at Ithaca, NY

Southern outlet of Cayuga Lake is blocked by deposits of the recessional moraine.

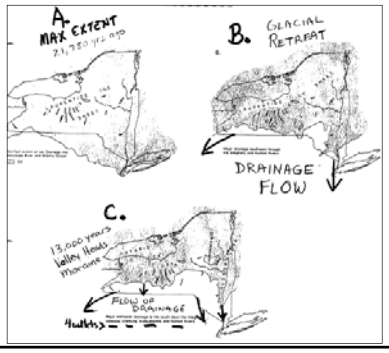


Ice in Retreat -1



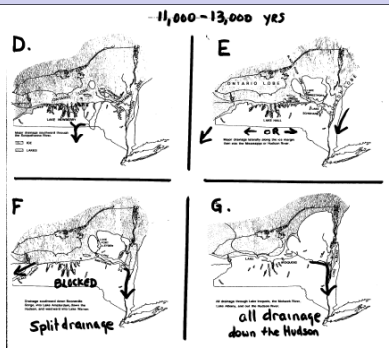
27

Ice in Retreat - 2



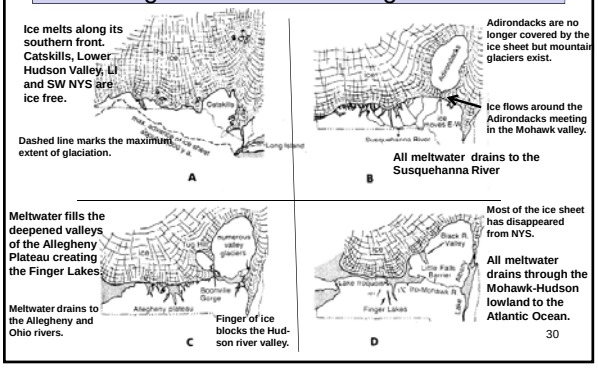
28

Ice in Retreat - 3



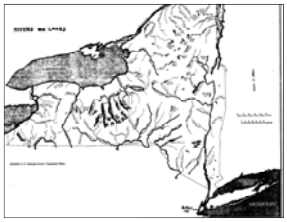
29

Retreat of the Glaciers in NYS: Stages of Wisconsin Deglaciation



30

Rivers and Lakes of NYS:
a result of glaciation



The location of the rivers and lakes of NYS are a result of the physiography created by glacial processes.

Extra Credit for Midterm Exam

Glaciation in Your County. (max of +5 pts.)

1. Describe the glacial features found in <u>one</u> of your assigned counties.
2. Find and print a portion of a topographic map from that county. Circle and identify the glacial features evident on the map and tell how you know the feature is of glacial origin.

32