Glaciers

8.2

I. Continental and Valley Glaciers

a. In some areas of the world it is so cold that snow remains on the ground year-round

b. As snow accumulates the weight of the snow becomes great enough to compress the bottom layers into ice

- The snow will pile so high that the ice on the bottom partially melts and becomes putty-like
- The entire mass begins to slide on this putty-like layer and it will move down hill
  - This moving mass of ice and snow is a glacier

c. As glaciers pass over land they erode it and change its features. It will carry the eroded materials along and deposit it somewhere else

d. There are two types of glaciers: Continental glaciers and valley glaciers

A. Continental Glaciers

a. Continental Glaciers are huge masses of ice and snow that have, in the past, covered up to 28% of Earth

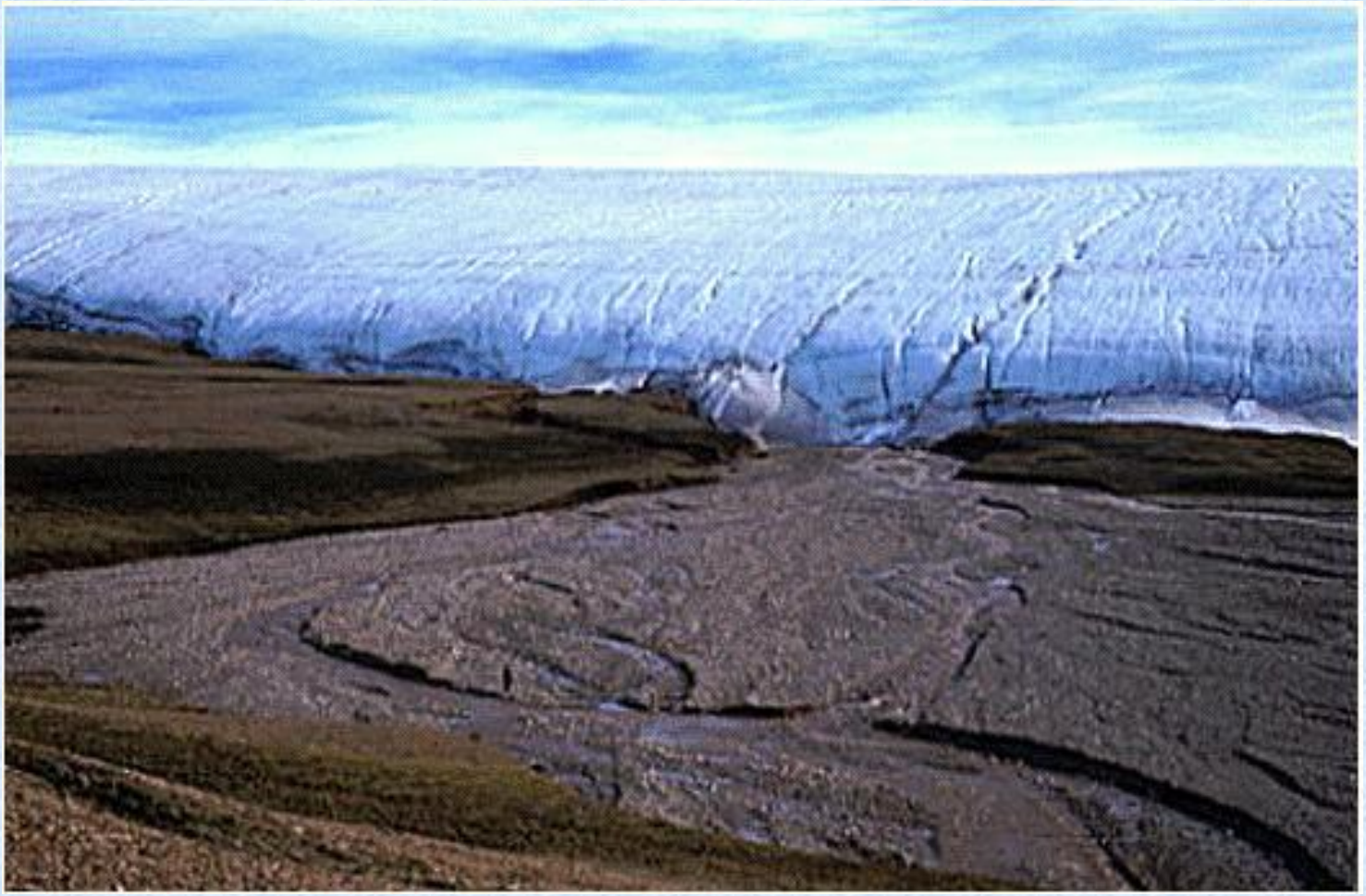
b. Scientists called the periods when glaciers covered much of the land the *ice ages*

- The most recent ice age began over a period of 2 to 3 million years ago and then about 18,000 years ago the ice sheets began to melt

c. Today these continental glaciers only cover 10% of Earth – mostly near the pole in Antarctica and Greenland

- During the time when much of North America was covered by ice and the average air temperature on Earth was about 5°C lower than it is today

Continental Glacier



B. Valley Glaciers

a. Valley glaciers occur even in today's warmer climate in the high mountains where the average temperature is low enough to prevent snow from melting during the summer

- Valley glaciers grow and creep along

b. Valley Glaciers erode bowl-shaped basins , called cirques, into the sides of mountains

Valley Glacier

II. Glacial Erosion

a. As they move over land, glaciers are like bulldozers, pushing loose materials out of their path

b. Glaciers also weather and erode rock and soil that isn't loose

- Glacial ice will melt and flow into cracks of rocks and when the ice refreezes the rocks expand and fracture into pieces

- The rock pieces are then lifted out by the glacial ice sheet in a process called plucking.

- Because rocks are being drug by the glacier gouging and erosion occur
  - These marks, called grooves, are deep striations and indicate the direction the glacier moved

A. Evidence of Valley Glaciers

a. Glacial plucking often occurs near the top of mountains where a glacier is in contact with a wall of rock

b. Valley glaciers flow down mountains slopes and along valleys eroding as they go

c. Valleys that have been eroded by glaciers have a different shape from those eroded by streams

- Stream eroded valleys are normally V-shaped and glacially eroded valleys are U-shaped

III. Glacial Deposition

a. When the glaciers begin to melt they no longer have enough energy to carry much sediment and so the sediment drops or is deposited on the land.

A. Till

a. When the glacier slows down – boulders, sand, clay and silt drops from its base – this mixture of different sized sediments is called <u>till</u>

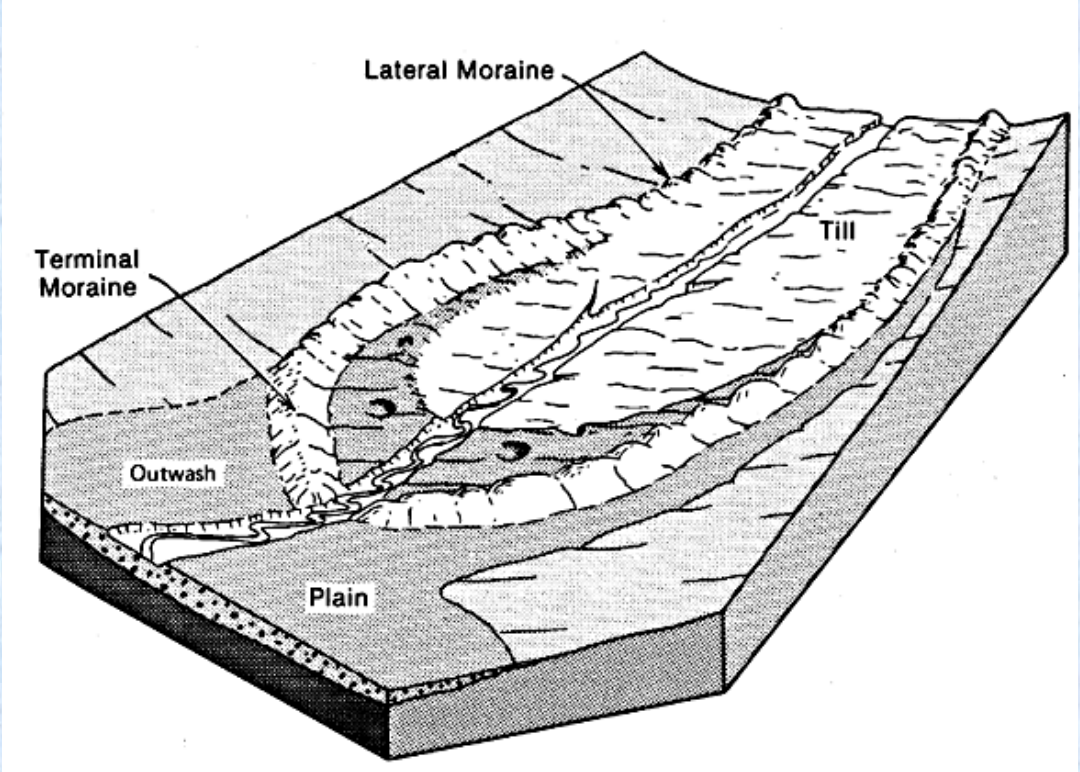
b. Till deposits can cover huge areas of land
   - During the last ice age continental glaciers in the northern United States dropped enough till to completely fill valleys and make these areas appear flat

c. Till is also deposited in front of a glacier when it stops moving forward which forms a ridge of material that is called a moraine

B. Outwash

a. When melting exceeds snow accumulation the glacier retreats or starts to melt

b. Material deposited by the meltwater from a glacier is called *outwash*



c. The meltwater carries sediments and deposits them in layers much as a river does

- Outwash from a glacier can also form into a fan shaped deposit when the stream of meltwater drops sand and gravel in front of the glacier
- Another type of outwash deposit looks like a long winding ridge
- Meltwater also forms *outwash plains* of deposited materials in front of a retreating glacier

d. Glaciers from the last ice age changed the surface of Earth

- Glaciers eroded mountaintops and scoured out valleys