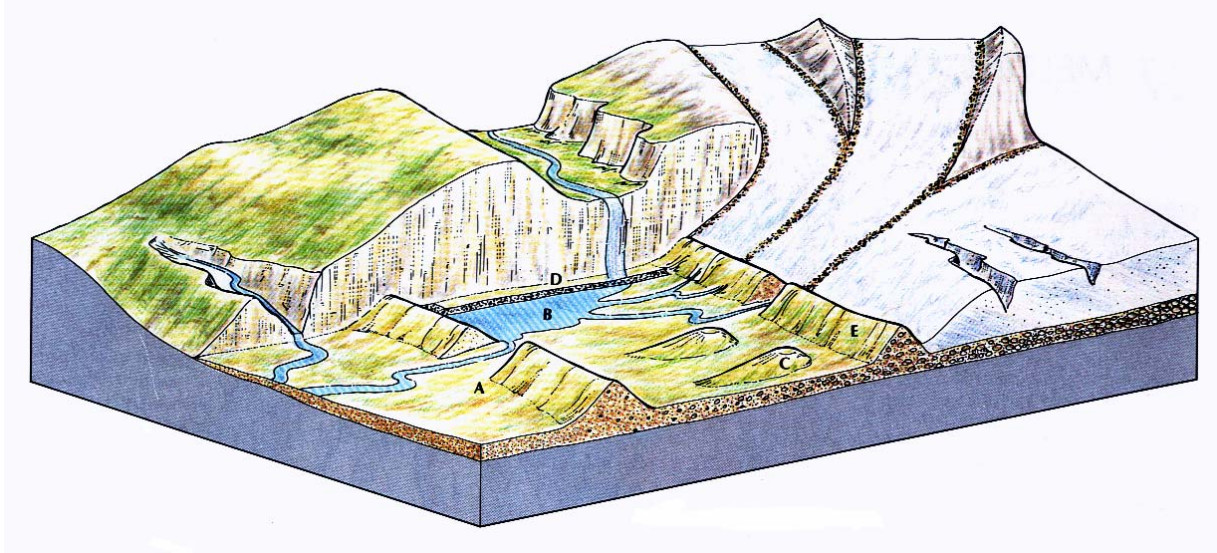


The Range and Variety of Depositional Landforms

You should be able to describe and explain the processes of formation of each landform. Annotated diagrams and sketches should be used as well as examples from one or more located areas.



- A) Ground moraine deposits
- B) Moraine dammed lake
- C) Drumlins
- D) Lateral moraine
- E) Recessional moraine

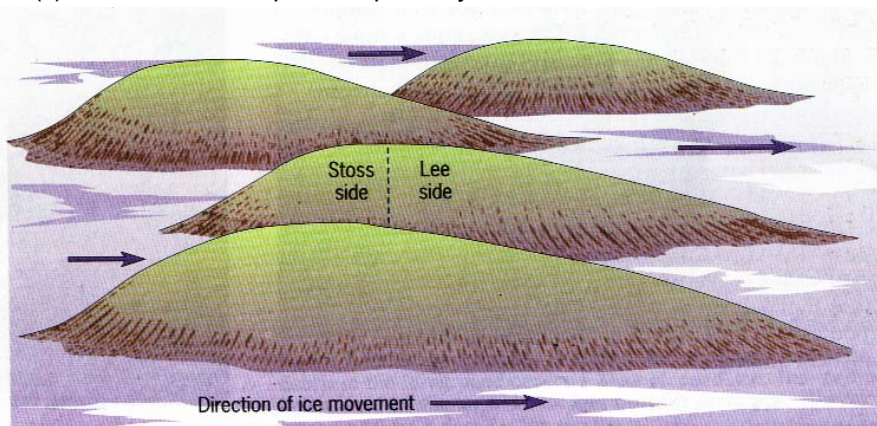
Ablation till: a term used to describe rock debris that has been left as a result of loss of water through ablation. It has been suggested that this term should be abandoned and that the terms *sublimation till* and *melt-out till* should be used instead.

Accretion till: a type of lodgement till that has been added to or that has accumulated over time below a glacier

Basal till: till carried at, or deposited from the under surface of a glacier.

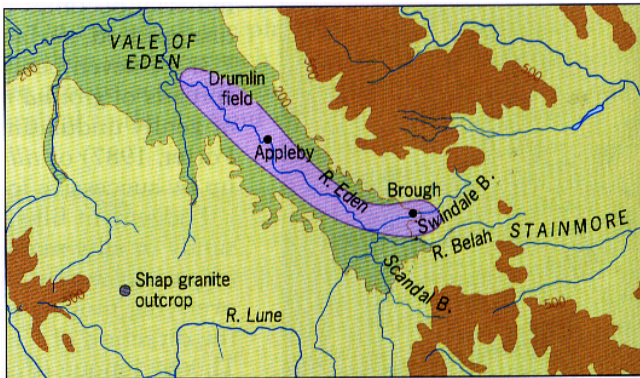
Drumlin: a streamlined, elongated hummock, generally composed of till. The profile is steeper on the “up-stream” side, the long axis of the hillock pointing parallel with the direction of ice flow. Most show no internal structure although some show some stratification. There are two leading theories to their formation:

- (i) the basal ice moulded and eroded pre-existing glacial till (or ground moraine);
- (ii) basal till was deposited, possibly around a nucleus of rock or frozen moraine and the ice moulded it contemporaneously. It is also suggested that till deposition takes place below an ice sheet when it is overloaded with rock debris and the friction with the basal material is greater than the cohesion between the glacier and its basal load.

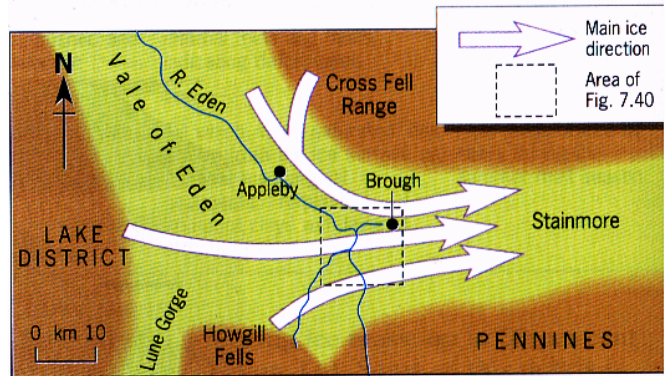


Drumlins usually occur in **drumlin swarms** or **drumlin**

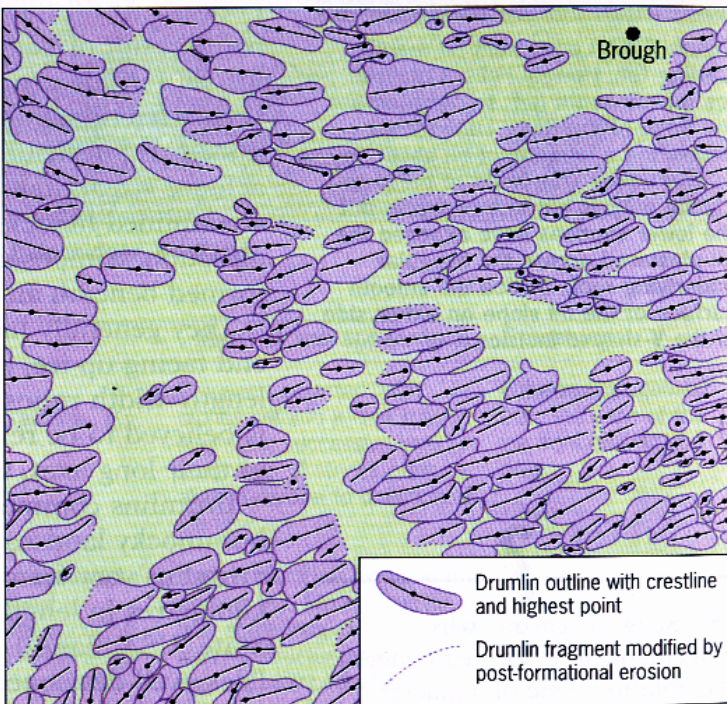
fields, popularly known as “basket-of-eggs” topography.



The Vale of Eden drumlin field, Cumbria



Main ice sources and movements in the southern Vale of Eden during the Devensian Stadial



Drumlin field near Brough, Cumbria. Each drumlin is shown by its planform, along with the crestline and highest point where these can be identified.

Erratic: a large rock fragment or boulder that has been transported by moving ice away from its place of origin and deposited in an area of dissimilar rock types. Some, along shorelines, may have been transported within, and deposited from icebergs.

Felsenmeer, block-fields: a mountaintop spread of angular rock fragments resulting from freeze-thaw on well-jointed rocks.

Ground moraine: a thick sheet of *till*, forming an undulating surface of low relief that has been deposited from the base of a glacier during a phase of melting or glacial retreat.

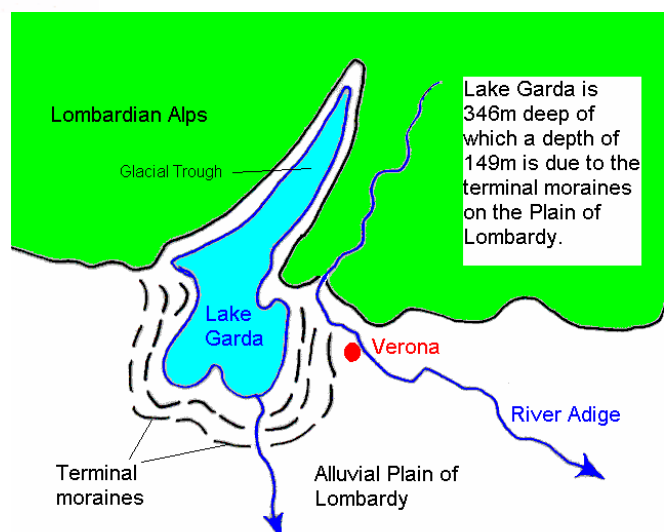
Hummocky moraine: a type of moraine characterised by considerably undulating terrain, owing to the presence of kettle holes and crevasse fillings. It is often thought to be due to an ice-sheet stagnating *in situ*.

Ice-cored moraine: any morainic mound or ridge close to the edge of an ice sheet or glacier that encloses buried ice.

Ice-dammed lake: an ice barrier formed by a glacier or ice-sheet that causes meltwater to pond (see pro-glacial lake).

Lateral moraine: a ridge of glacial debris flanking the glacier side of lying along the side of a valley formerly occupied by a glacier. When the ice is present, the edge of the glacier is likely to be buried by the lateral moraine, thus protecting the ice from the sun's heat. In this way, the moraine may become *ice-cored*.

Lodgement till: rock material that has been deposited by the sole of the glacier in a sub-glacial environment. It is often reworked following the initial deposition and referred to as **deformed lodgement till** or **deformed till**



Medial moraine: a linear accumulation of rock debris extending along the centre of a glacier, often ice-cored. It is created by the merging of two lateral moraines from the point at which two glaciers meet.

Push moraine: a landform produced by the bulldozing effect of a re-advancing glacier or ice sheet on pre-existing ground moraine. Some push moraines display thrust faults, suggesting that the till was in a frozen state when the re-advancing ice affected it.

Recessional moraine, stadial moraine: a moraine marking a period of *stand-still* during a period of glacial recession.

Scree: an accumulation of angular fragments on or at the base of a slope as a result of high levels of mechanical weathering on an exposed rock face.

Sublimation till: rock material laid down in a supraglacial (on top of the glacier) environment.

Terminal moraine: a linear ridge of glacial debris marking the maximum limits of glacial advance. The inner, (proximal) slope, or ice contact slope, is usually steeper than the outer (distal) slope.

Melt-out till: rock material laid down as a result of the top melting of a debris-rich buried ice mass in which structures inherited from the parent ice are preserved after all the ice has melted.

The impact of Depositional Landforms on Human Activity

You must understand both the positive and negative impacts of the landforms on human activity.

Agriculture

Advantages

Ground moraines can enhance agricultural activity. In East Anglia, till deposits up to a depth of 140m overlie the chalk bedrock. A deep, fertile soil has formed in the chalky till. Heavy clay soils are used for pasture and lighter soils are used for arable farming (sugar beet, grain and potatoes)

Disadvantages

In upland areas, till deposits (such as terminal moraines and ground moraines, can create "hummocky ground" which restricts mechanised farming. Where large erratics occur in large numbers, these can also restrict mechanised farming

Settlement and Communication

Advantages

Areas of widespread glacial deposition, such as East Anglia, generally favour settlement location and the construction of transport links. They offer no significant relief restrictions and there are usually many suitable dry sites.

Disadvantages

Glacial sediments are generally unconsolidated and are therefore prone to erosion. Glacial tills on the Holderness coastline of Yorkshire are prone to erosion rates of 2-5m per year; this threatens coastal settlements (such as Hornsea or Withernsea), industrial sites (such as the Easington Gas Terminal) and transport links such as coastal roads.

Recreation and Tourism

Advantages

Terminal moraines can create moraine-dammed lakes. In Northern Italy, terminal moraines have helped to create lakes such as Lake Garda and Lake Como. These lakes are important tourist attractions in the Italian Lake District. The Cromer Ridge in East Anglia, which is thought to be a complex terminal moraine relating to the last Devensian

Glacial, is an important local recreational area for walking, cycling and other outdoor activities.

Disadvantages

Areas of glacial deposition do not have the extremes of relief and landscape attractions that attract visitors to areas of glacial erosion.