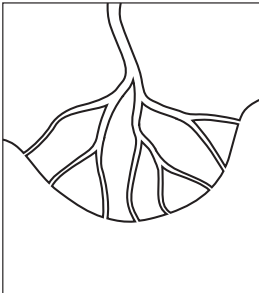


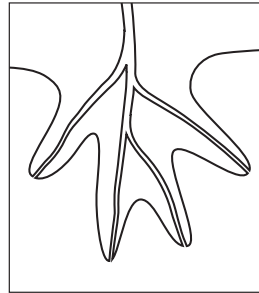
Deltas and estuaries

When rivers finally reach their mouths, the material brought to the ocean or lakes builds up further and further in the still water until it forms a wedge of sand and silt called a delta.

Q1. Deltas are often described as being fan-shaped or like a bird's foot. Write the appropriate word against deltas (a) and (b) below.



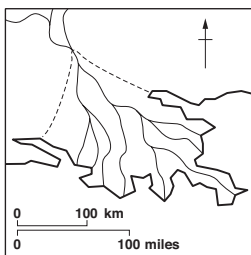
(a)



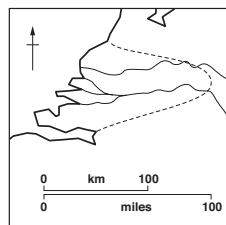
(b)

Q2. Use an atlas to find each of the deltas shown below. The index at the back of the atlas will tell you which pages to look on. Then draw a line from each delta to show its position on the world map. Next to each one write whether it is a fan-shaped or a bird's-foot delta.

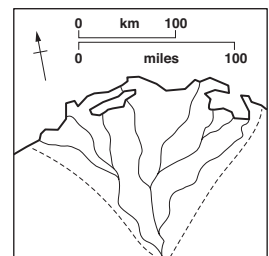
(a) Mississippi



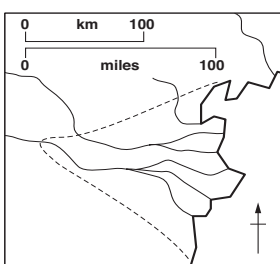
(b) Rhine



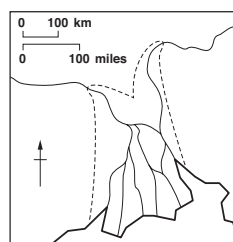
(c) Nile



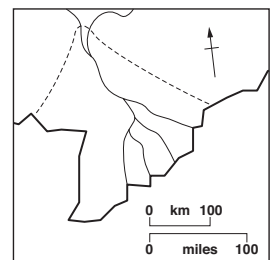
(f) Po



(e) Ganges



(d) Mekong



Answers

**Q1. (a) fan-shaped
(b) bird's-foot**

**Q2. (a) bird's-foot
(b) fan-shaped
(c) fan-shaped
(d) bird's-foot
(e) fan-shaped
(f) fan-shaped**

The Nile and the Rhine have the most obvious fan-shaped deltas. Most of the others are bird's-foot deltas, although some are complex (for example the Ganges/Brahmaputra delta).

Resources

- ▶ A sloping sand tank with the lower part full of water and clear of sand. Watch a river create a delta in it.

Background support

It is common to categorise deltas as fan-shaped or bird's-foot, depending on whether the front of the delta has an even or a crenulate edge. In general, fan-shaped deltas have many distributaries which transfer water and sediment evenly across the delta front, whereas bird's-foot deltas have one main channel that sends all the material in one direction before changing abruptly (often in a flood) and sending all of its water out in a new direction.

All distributaries tend to be contained within natural levees (low broad ridges parallel and close to the channel banks), and bird's-foot deltas can change shape rapidly if there is a breach in a levee wall, allowing the water to spill sideways and therefore make a shorter journey to the sea. At this point a new channel and new direction of buildup occur.

It is worth noticing that deltas can be very fertile because of the deposition of fine sediment. Thus, the Nile delta is heavily populated, as is the Mekong, the Ganges/Brahmaputra (which together comprise the land of Bangladesh), and so on. Others are used less intensively, sometimes for conservation reasons, as is the case with the Mississippi Delta and the Rhone Delta.

There is some confusion as to why not all rivers have deltas. For a delta to form, sea level must remain stable long enough for sufficient sediment

to build up to the surface. The river must also bring considerable quantities of silt and larger material to the sea. Further, the coastal currents must be weak enough for the material to be allowed time to settle.

In places which were under ice sheets during the last Ice Age, recent glacial events have made this combination of requirements impossible. During glacial times, sea levels fell and rivers trenched into their beds. Also, the presence of ice often depressed the land. Subsequently, the sea level has risen and flooded these valleys, forming estuaries, rias, and sounds (fjords). Some estuaries (often called bays) are almost totally filled with sediment, but there has not yet been time for deltas to form beyond the coastline. This is too complex an idea for many students, but it is best to know, so that the difficulty can be addressed if needs be.

Across the curriculum

Using this material you can link:

- ▶ Physical processes, such as sedimentation;
- ▶ Wetland habitats, such as swamps, and also saline wetland habitats;
- ▶ The history of the Ice Age and after;
- ▶ The way that deltas have both helped and hindered people. Many settlements were initially formed on levees (Calcutta, India, New Orleans) and have subsequently spread to more risk-prone land;
- ▶ The way that deltas can provide fertile land but that such land is often hazardous. Over a third of Bangladesh, for example, is made of land that can flood when a typhoon carries storm surges from the Bay of Bengal on to land.