

Geological Work of River

(Part-5)

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4. Braided river- When the sediment load carried by stream increases and stream velocity decreases due to rise in the base level, the stream deposits the sediments in the form of lenticular-shaped bars of sand and gravel along its way. These bars divide the river/ stream channel into numerous small intersecting small channels. The streams then divide and reunite as they flow along these bars and finally flow into the main channel somewhere downstream. This morphology of river channel where the river bed consists of numerous intervening small channels formed as a result of deposition of numerous sand bars along the channel bed that divided the channel into intervening parts is called as braided river. Braided streams tend to occur in rivers with high sediment loads and the coarse grain sizes are deposited towards the central part of the channel followed by deposition of relatively finer sediments.

5. Delta- It is a depositional feature. Delta is formed when the river flows into sea or lake. As a result the stream velocity decreases considerably as it flows into the sea, the stream deposits its sediments at the mouth of the river. The coarser fractions are deposited first towards the river mouth followed by deposition of finer sediments off-shore. Hence the deposits form a triangular-shaped landform that resembles the Greek letter 'delta' (Δ) from where it gets its name.

Factors favourable for delta formation-

- abundant sediment supply;
- absence of powerful waves or current from sea side (if the current are strong then it will remove the sediments deposited at the river mouth and delta cannot form in that condition, here the mouth of the river is open to sea due to which the formation estuary takes place);
- a stable and shallow water off-shore.

Morphology of Delta- Delta consists of three types of beds based on the nature of slope of beds and sediment size-

- Top-set beds- These beds are deposited at the top part of the delta sequence. They are thin, horizontal to gently dipping beds (dips towards the offshore) and composed of fine sized sediments (silt, clay).
- Fore-set beds- These beds are deposited along the sloping bottom close to shore. The beds are thick and composed of coarser sediments. The slope of these beds are high (12° to 32°) depending on the grain size.
- Bottom-set beds- These are thin, horizontal beds composed of finer sediments (silt, clay) that overlies the ocean bottom.

Some Important Terms Related To Drainage Systems-

- Drainage is the term for the movement of water through clearly defined channels.
- Drainage system is a common term for the network of such channels.
- Drainage pattern is the shape that the lakes, rivers and streams make in a specific drainage basin. Over time, the pattern left behind by stream erosion provides information about the types of rocks and geologic structures in a section of the landscape subject to streams.
- Drainage basin- The drainage basin is also called as a catchment, catchment area, catchment basin, drainage area. A drainage basin is the area of land that is drained by a river system (i.e, the river and its tributaries). A

drainage basin may consist of more than one river systems that are separated by drainage divides. In other words, the land surface and the rivers and streams make up the drainage basin. The drainage basin serves as a funnel, gathering all the water in the area it drains and directing it to a single location.

5. Drainage divides- A drainage divide separates adjacent drainage basins from one another. Typically, a drainage divide is a ridge or a high platform.

Different Types of Drainage Patterns -

Type	Description	Geological significance
Dendritic	Irregular branching of streams, haphazardly, resembling a tree	Homogeneous materials and crystalline rocks; horizontal beds; gentle regional slope
Sub-dendritic	Slightly elongated pattern	Minor structural control
Pinnate	High-drainage-density pattern; feather-like	Fine-grained materials such as loess
Rectangular	Streams having right-angled bands	Jointed/faulted rocks, e.g. sandstones, quartzites etc.
Angulate	Streams joining at acute angles	Joints/fractures at acute angles to each other
Parallel	Channels running nearly parallel to each other	Steep slopes; also in areas of parallel elongate landforms
Trellis	Main streams running parallel and minor tributaries joining the main streams nearly at right angles	Dipping or folded sedimentary or low-grade metasedimentary rocks; areas of parallel fractures
Radial	Streams originating from a central point of region	Volcanoes, domes, igneous intrusions; residual erosion features
Centripetal	Streams converging to a central point	Depression, crater or basin, sink holes
Annular	Ring-like pattern	Structural domes

Different Types of Streams

Several drainage patterns depend on the shape and creation of river patterns. It can be broadly divided into two types:

1. Discordant Drainage Pattern- It has no relation to the local topography or geology. Despite topographic changes, the river in the discordant drainage pattern stays on its original course. The discordant drainage pattern is further divided into Antecedent and the Superimposed drainage pattern.

i) Antecedent streams

ii) Superimposed streams

2. Concordant Drainage Pattern- It is related to the local topology and geology. The slope of the river and the topography have a significant role in determining the course of the river in a concordant drainage pattern. These drainage systems are the most prevalent and can be divided into two groups: Consequent drainage rivers and Subsequent drainage rivers.

i) Consequent streams

ii) Subsequent streams

Types of Streams	Description	Examples
Antecedent streams	<p>It is also known as inconsequential drainage.</p> <p>When a piece of a river slope and its surroundings are raised, the river maintains its previous slope while cutting through the uplifted area, creating deep gorges known as vertical erosion or down-cutting.</p>	Rivers like the Indus, Sutlej, Brahmaputra.
Superimposed streams	<p>The harder basal rocks appear unrelated to the tougher rock bed when a river flowing over a softer rock stratum reaches them while following the initial slope. The term “superimposed drainage” refers to this sort of drainage.</p> <p>The hardness and softness of the rock and the patterns of faults or fractures frequently have a significant impact on the drainage patterns (dendritic, trellis, etc.).</p> <p>However, on occasion, the land swiftly rises with the stream’s initial level. Increasing the stream’s gradient increases the erosive force of the stream.</p>	Some excellent examples of superimposed drainage may be seen in the rivers flowing at the Rewa Plateau, including the Damodar, Subarnarekha, Chambal, Banas, and others.

Consequent streams	When the river flows generally in the direction of the slope, there is a consequent drainage system.	Peninsular Indian rivers including the Godavari, Krishna, and Cauvery pour into the Bay of Bengal after descending from the Western Ghats. They are the examples of the consequent Drainage
Subsequent streams	Streams that are formed after the original stream (which is consequent rivers) are considered as the Subsequent River System. Once the primary drainage pattern has been formed, it is a subsidiary stream that erodes along an underlying band of non-resistant rock.	The Yamuna and the Ganga are met at right angles by the drainage rivers Chambal, Sind, Ken, Betwa, Tons, and Son.