**Drainage**

The flow of water through well-defined channels is known as ‘drainage’ and the network of such channels is called a ‘drainage system’.

## Types of Drainage Patterns

**Discordant drainage**

A pattern of drainage that bears no relation to the structure of the underlying rock.

This may be because:

1. The drainage pattern developed on

rock strata that have since been removed

by erosion; a process known as

superimposition. The drainage pattern

thus developed is called **superimposed**

**drainage** (or Epigenetic or Superinduced

Drainage). Examples: The Damodar, the

Subarnarekha, the Chambal, the Banas

and the rivers flowing at the Rewa

Plateau, rivers of eastern USA and

southern France.

2. The drainage pattern was already

present before a period of uplift and

folding that formed the present structure.

As the uplift took place, the rivers were

able to cut down at approximately the

same rate and so maintain their courses.

This process is called antecedence and

the drainage system thus developed is

called **antecedent drainage**.

Many of the Himalayan rivers have

antecedent origin i.e. these rivers existed

even before the Himalayan ranges were

uplifted. These rivers originate in the

Tibetan side beyond the mountain ranges

of Himalayas. The Indus, Satluj,

Alaknanda, Gandak, Kosi, Brahmaputra

all have an antecedent origin. Since

these rivers are antecedent, they run

transverse to the mountain ranges

cutting deep V-shaped, steep-sided

valleys (deep gorges).

**Concordant Drainage (**also called

**accordant drainage)**

The pattern of drainage which arises

from and closely follows the trends of the

underlying strata is called concordant

drainage.

1. **Consequent Streams**: Those

streams whose courses are the

direct consequence of the initial

topography are called consequent

streams.

2. **Subsequent Streams**: These are

developed after the master

consequent.

3. **Obsequent streams**: These flow in

opposite direction to the master

consequent.

4. **Resequent Streams**: A resequent

stream flows in the same direction

as that of the initial consequent

stream, but which develops in

response to a new base level formed

due to inversion of relief.

Concordant Drainage Patterns

**Drainage pattern:**

**Drainage pattern** refers to a design

which a river and its tributaries form

together from its source to its mouth. The

drainage pattern of an area is the

outcome of:

The geological time period,

Nature and structure of rocks,

Topography,

Slope,

Amount of water flowing, and

The periodicity of the flow.

**Some Important Drainage Patterns:**

A combination of several patterns may

be found in the same drainage basin.

**1. Dendritic**: The dendritic pattern

develops where the river channel follows

the slope of the terrain. The drainage

pattern resembling the branches of a tree

is known as “dendritic” the examples of

which are the rivers of northern plain. It is

the most common stream pattern. A

dendritic pattern develops in a terrain

which has uniform lithology, and where

faulting and jointing are insignificant.

Source

**2. Radial**: The radial pattern develops

when streams flow in different directions

from a central peak or a dome-like

structure. E.g. the rivers like the

Narmada, Son and Mahanadi originating

from Maikal Hills flow in different

directions and are good examples of a

radial pattern.

Radial drainage patterns are also

found/in the Girnar Hills (Kathiwar,

Gujarat), and Mikir Hills of Assam.

Source

**3. Trellis**: When the primary tributaries of

rivers flow parallel to each other and

secondary tributaries join them at right

angles, the pattern is known as ‘trellis’. A

trellis drainage pattern develops where

hard and soft rocks lie parallel to each

other. For example, rivers in the upper

part of the Himalayan region and in the

old folded mountains of the Singhbhum

(Chotanagpur Plateau) have drainage of

trellis pattern. The trellis drainage pattern

can also be seen in the Appalachian

region of the U.S.A., where hard and soft

rocks occur in parallel bands.

Source

**4. Centripetal**: When the rivers discharge

their waters from all directions in a lake

or depression, the pattern is known as

‘centripetal’. This drainage pattern is also

called endorheic drainage. For example,

Loktak lake in Manipur.

Source

**5. Rectangular**: In this drainage, both

the main stream and its tributaries show

right-angled bends. A rectangular

drainage pattern develops on a strongly

jointed rocky terrain. It differs from trellis

pattern drainage, since it is more

irregular and its tributary streams are not

as long or as parallel as in trellis

drainage. Example: Colorado river (USA),

streams found is the Vindhyan Mountains

of India.

Source

**6. Barbed:** If you look at the way that

tributaries empty into larger rivers, you

will notice that most of them flow in the

same direction as the rivers they empty

into. But quite a large number flow the

other way. In fact, you will find stretches

of some rivers where every tributary

empties into the river in the “wrong”

direction! Such an occurrence is known

as a barbed drainage pattern.

Most barbed drainage patterns are the

result of river-capture which reverses the

direction of flow. However, the tributary

channels continue to flow in their original

direction.

The Arun River (Nepal), a tributary of the

Kosi is an interesting example of barbed

drainage pattern.

A Barbed Drainage Pattern

**7. Annular:** Annular pattern represents

that part of a drainage pattern in which

the subsequent streams follow the

curving or arcuate courses before joining

the conse quent stream. These results

from a partial adaptation to an

underground circular structure i.e.

batholiths. This is not a very common

drainage pattern in India. Some

examples of this are however found in

Pithoragarh (Uttarakhand), Nilgiri Hills in

Tamil Nadu and Kerala.

Source

**8. Parallel drainage**: The drainage

pattern in which the rivers flow almost

parallel to each other is known as parallel

drainage. The small and swift rivers

originating in the Western Ghats and

discharging their water into the Arabian

Sea provide a good example of parallel

drainage pattern in India.

Source

**9. Deranged pattern**: This is an

uncoordinated pattern of drainage

characteristic of a region recently

vacated by an ice-sheet. The picture is

one of numerous water courses, lakes

and marshes; some inter-connected and

some in local drainage basins of their

own. This type of drainage is found in the

glaciated valleys of Karakoram.