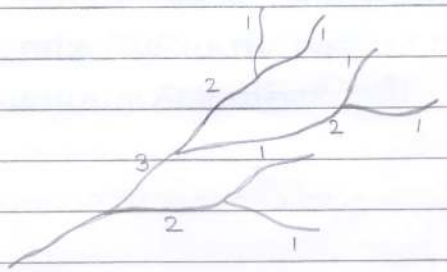
RIVER PROCESSES.

⇒ Sources of water in the river:
→ Rainwater
→ Melted water
→ Groundwater.

River Narmada starts from the groundwater

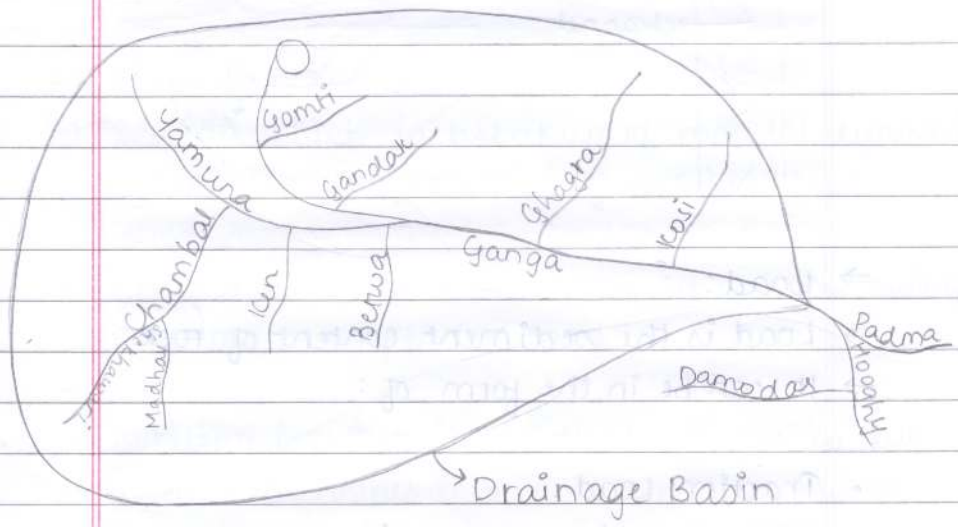
⇒ Rainwater:
→ When the rain falls on the uneven topography of the Earth, it forms rills.
→ A Rill is a path of flow followed by several drops of water.
→ Several rills accumulate to form a channel.
→ Several channels meet to form 1st order stream.
→ The first order streams meet to form the second order streams which again meet to form the third order streams & so on.



→ Tributaries are the small streams that join a river.

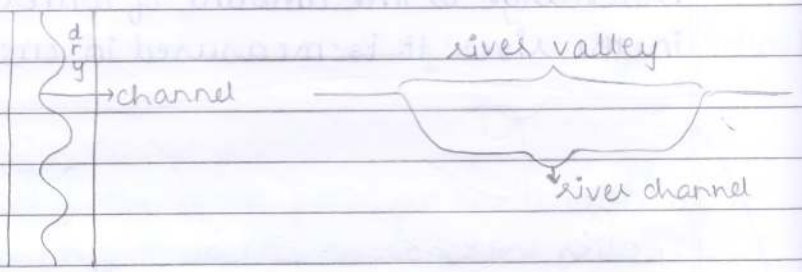
→ Distributaries are formed when river breaks into smaller parts.

→ Discharge is the amount of water presents in the river. It is measured in cusecs.



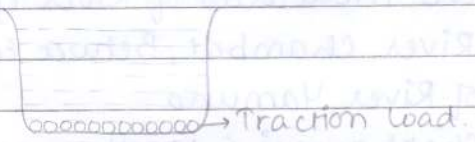
- Gomti, Gandak, Ghagra & Kosi & Yamuna are tributaries of River Ganga.
- River Chambal, Betwa & Ken are tributaries of River Yamuna
- Shekhawari & Madhav are tributaries of River Chambal.
- Damodar is a tributary of River Hooghy.
- River Hooghy & Padma are distributaries of River Ganga.

→ A River Channel is the path of the river during the minimum ~~drainage &~~ discharge.
→ A River Valley is the path of the river during the maximum discharge.

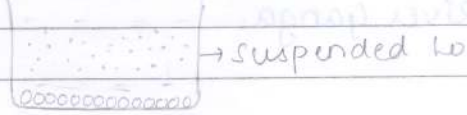


⇒ Load:
→ Load is the sediment content of ~~rock~~ river.
→ It can be in the form of:

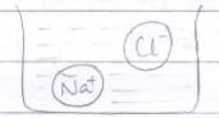
- Traction Load:
  Load formed when debris roll along the river bed due to the flow of the river.



- Suspended Load:
  The sand & clay particles that flow along with water.



- Solution Load:
The dissolved salts which cannot be removed by mechanical process.



⇒ River Processes.

→ Erosion, which is breakup of rock by dynamic agents. The subprocesses of erosion are:

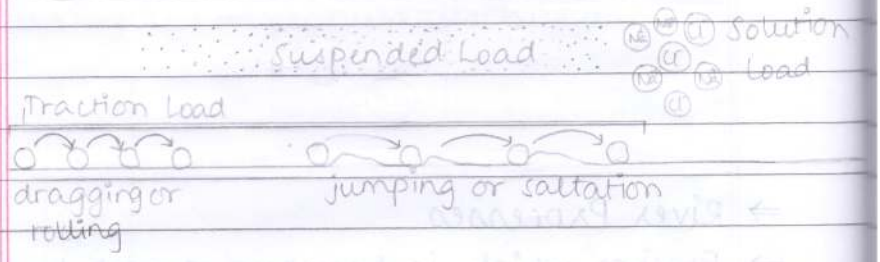
- Corrasion is the wearing away of rocks using traction & suspended load.

- Attrition is when individual rock pieces rub against eachother & become smaller. Due to this, the traction load is converted to suspended load.

- Corrossion is ~~when~~ the granular disintegration of rocks as soluble minerals

- Hydraulic Action is when the ~~wathe~~ water that is going through pressure widens the cracks of the rocks.

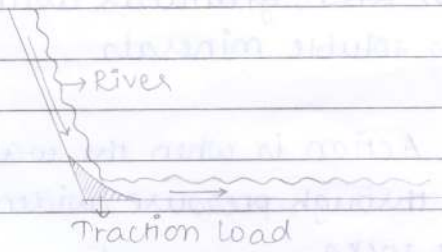
→ Transportation of the load.



- Traction Load is transported rolling (dragging or saltation (jumping motion).
- Suspended & Solution Load flow with the water.

→ Deposition

- Traction load is deposited when there is a sudden drop in the river velocity.



- Suspension load is deposited when the water is still & the velocity is dead slow.

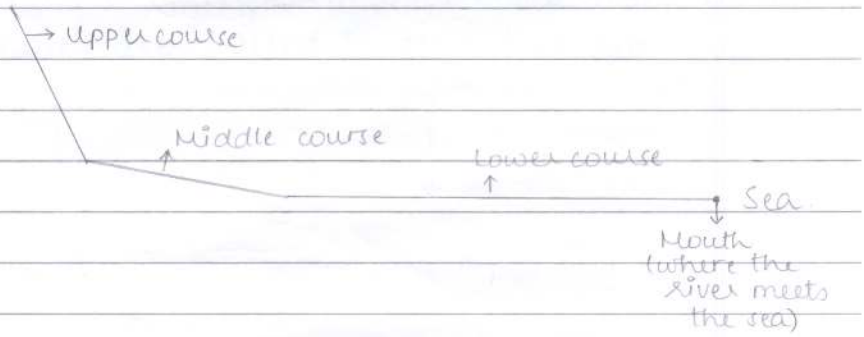
- Solution load is deposited when the river dries up.

⇒ Courses of the River:

→ The upper course when the river is in the mountains

→ The Middle course when the river is in the plains

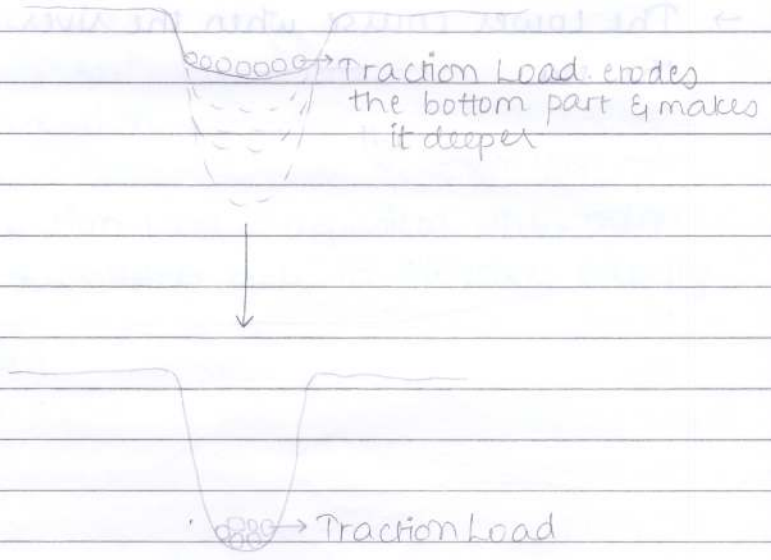
→ The Lower course when the river meets the sea.



Long Profile of the River

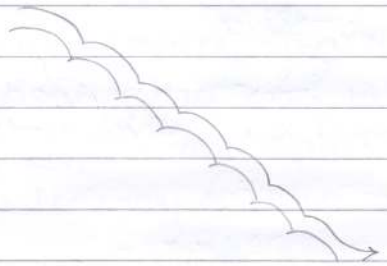
→ The Upper Course:
→ Gradient – Steep Slope
→ Velocity – High
→ Discharge – Low
→ Type of Load – Traction
→ Main Work – Erosion
→ Landforms / Consequences – V shaped Valley
- Rapids
- waterfall.
- Potholes.

• Vshaped Valley:



• This is cutting down
• It is more prominent due to preserve of traction load.

- Rapids:

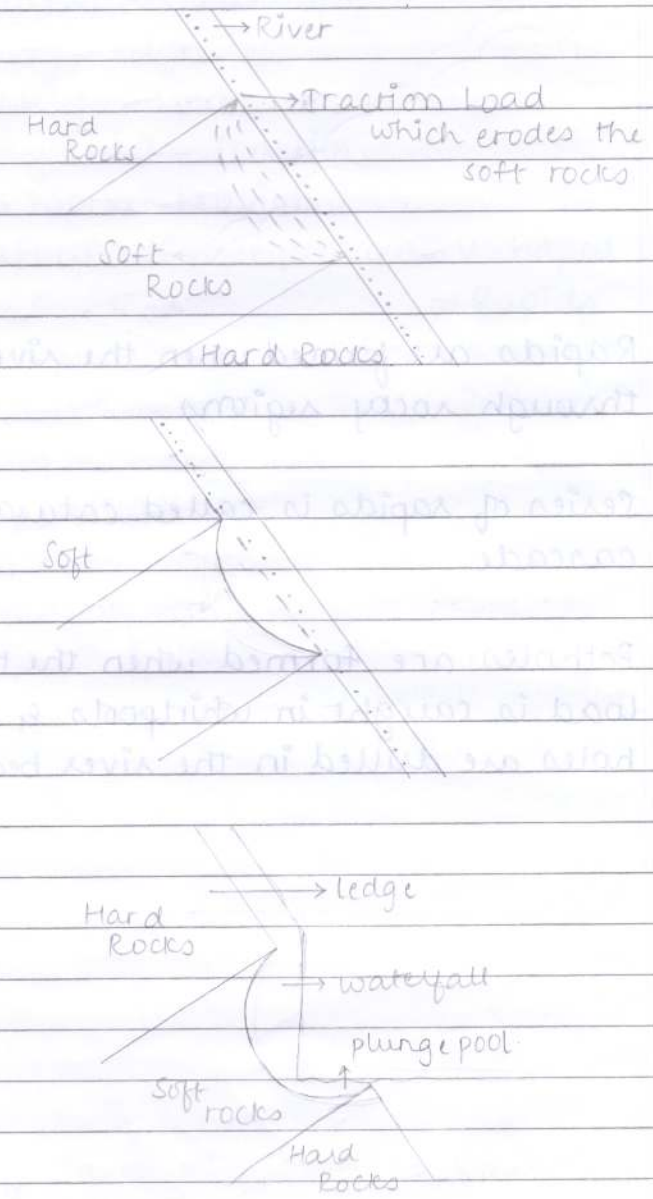


Rapids are formed when the river passes through rocky regions.

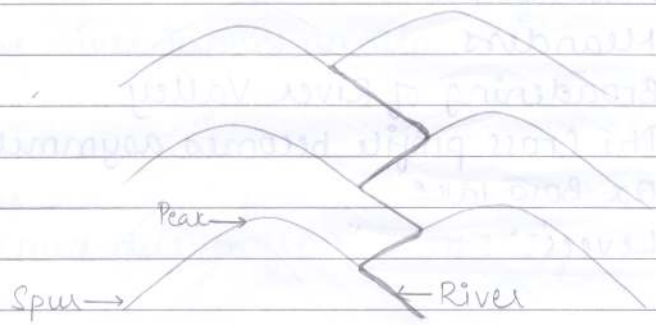
Series of rapids is called cataract or cascade.

- Potholes are formed when the traction load is caught in whirlpools & as a result holes are drilled in the river bed

- Waterfalls:



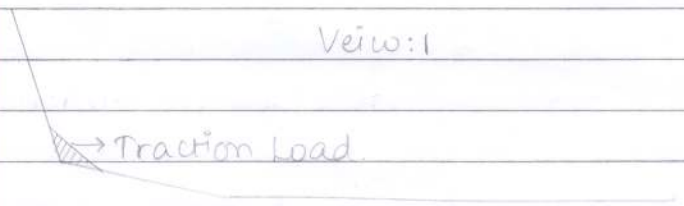
The upper course ends when the river doesn't have enough energy to carve its own path. Hence, after the upper course, while coming ~~to~~ down to the middle course through the mountains & hills, the river finds its way through interlocking spurs.



Interlocking Spurs.

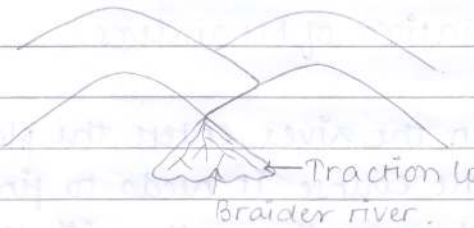
⇒ Middle Course:
→ Gradient - Gentle
→ Velocity - Moderate
→ Discharge - Moderate
→ Type of Load - Suspended
→ Main Work - Transportation
→ Landforms / Consequences -
· Alluvial Fan
· Meanders
· Broadening of River Valley
· The Cross profile becomes asymmetrical.
· Ox Bow lake
· Levees.

• Alluvial Fan:



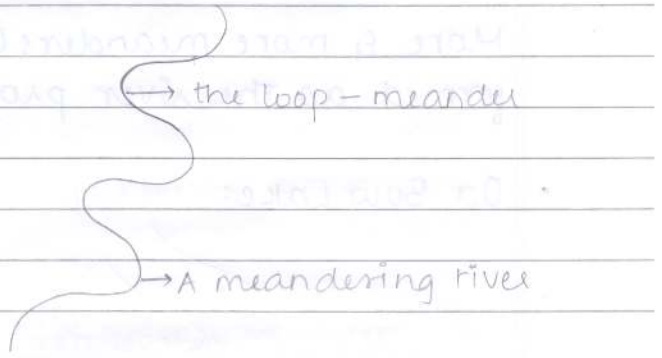
· The traction load is dropped at the end of the upper course.
· This happens because the river looses its ability to carry it as the gradient falls resulting in slow

Veiw: 2.



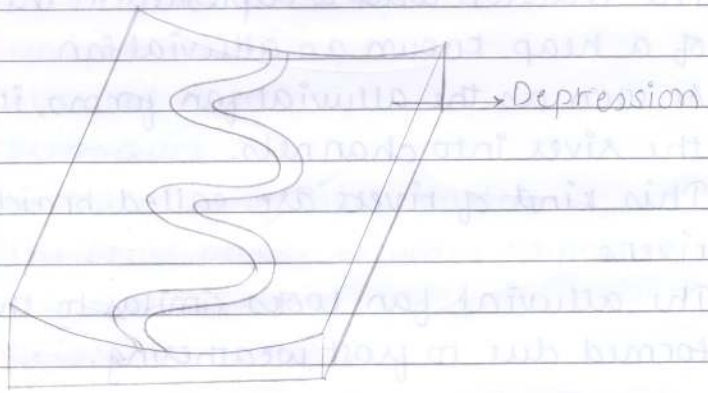
- The traction load is deposited in the form of a heap known as alluvial fan.
- As soon as the alluvial fan forms, it breaks the river into channels.
- This kind of rivers are called braided rivers.
- The alluvial fan looks similar to the scree formed due to frost weathering.

- Meanders.



Formation of Meanders

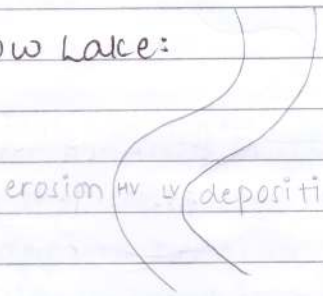
When the river enters the plains, in the middle course, it needs to find its path. It chooses the path with least resistance



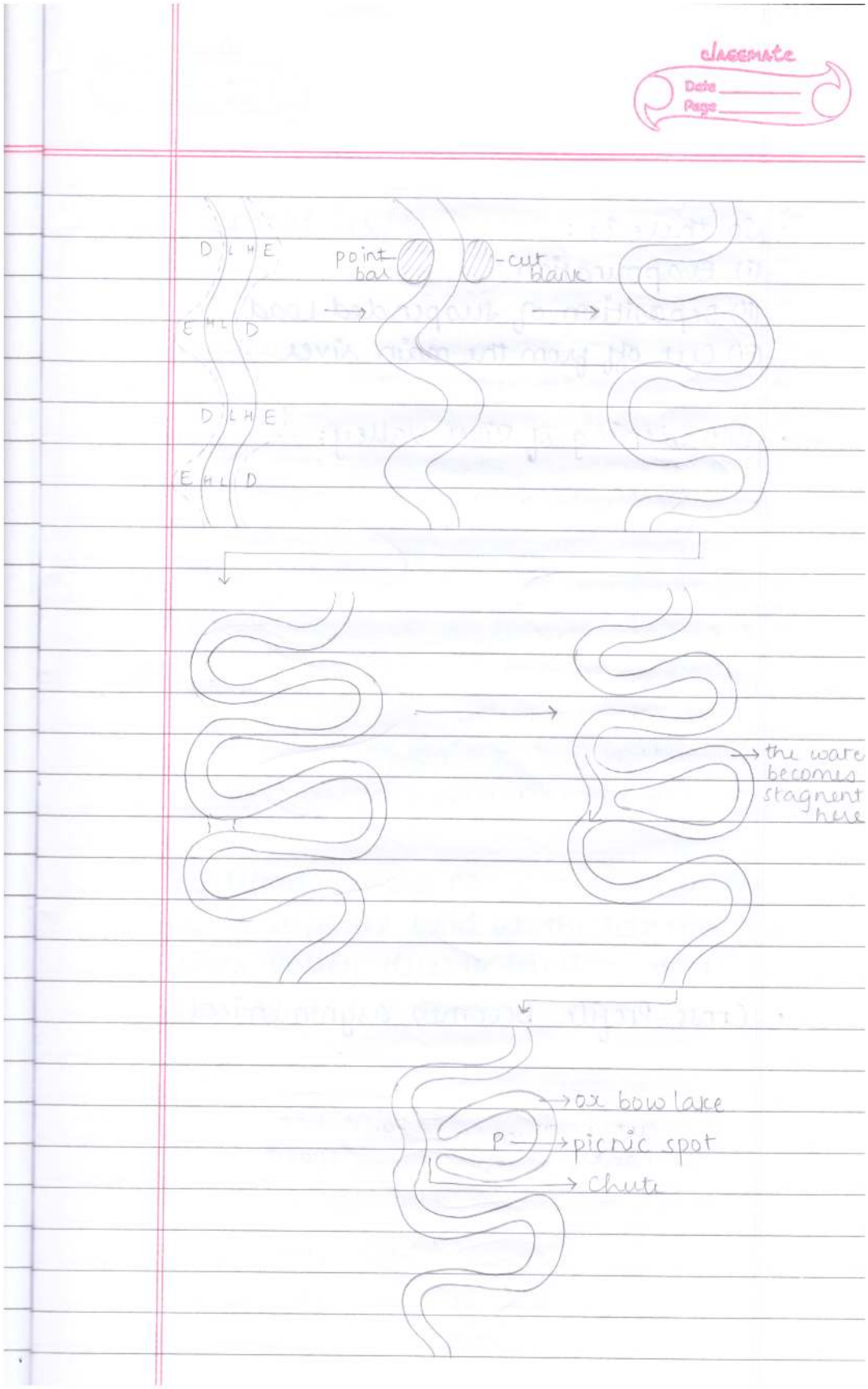
Skate Board Model.

More & more meanders (loops) are formed as the river progreses.

- Ox Bow Lake:

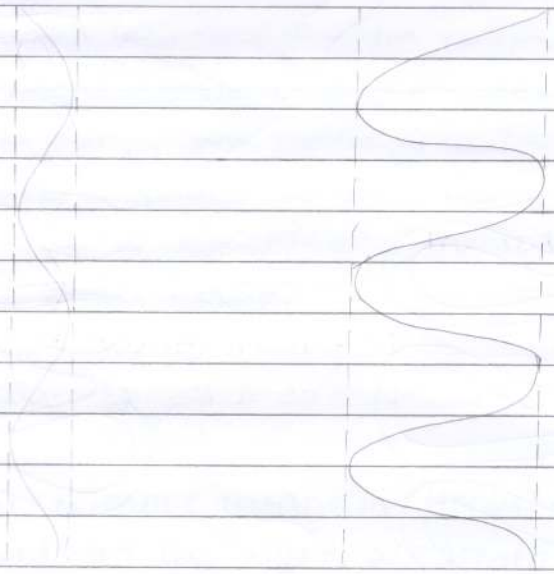


LV: low velocity
HV: high velocity
} because of the turn

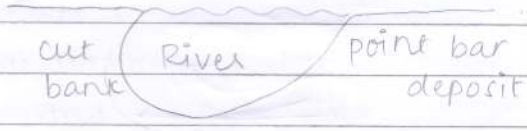

D L H E
point bar
cut bank
E H L D
D L H E
E H L D
the water becomes stagnent here
ox bow lake
P
picnic spot
chute

- So there is:
  (i) Evapouration
  (ii) Deposition of suspended load
  (iii) Cut off from the main river

- Broadening of River Valley:



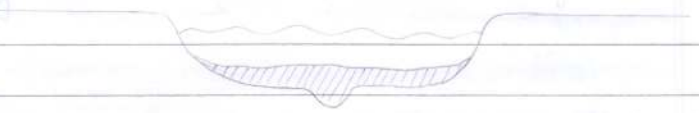
- Cross Profile becomes asymmetrical.



- Natural Levees.

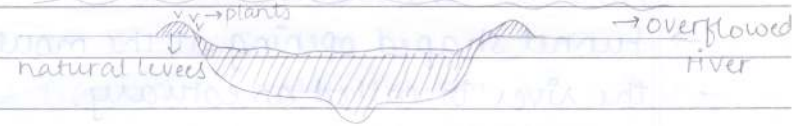
① 

Year 1.



② Year 2.

③ Eventually:



Natural levees are formed when the river deposits load at the banks of the river valley due to friction which is caused due to plants.

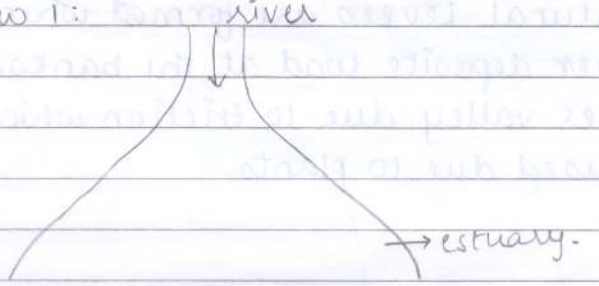
⇒ THE LOWER COURSE:

→ Gradient – Flat
→ Velocity – Dead slow
→ Discharge – High
→ Type of Load – Suspension & Solution Load.
→ Main work – Deposition
→ Landforms/Consequences – Formation of Delta.

⇒ DELTA:

→ A Delta is formed on the continental slope/shift due to deposition of the load of the river at its mouth.
→ Funnel shaped opening at the mouth of the river is called an estuary.

View 1:



Date
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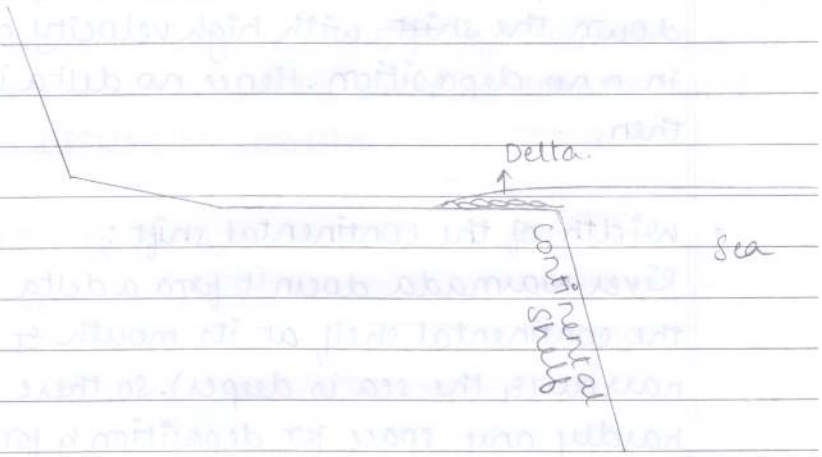
Veiw 2:



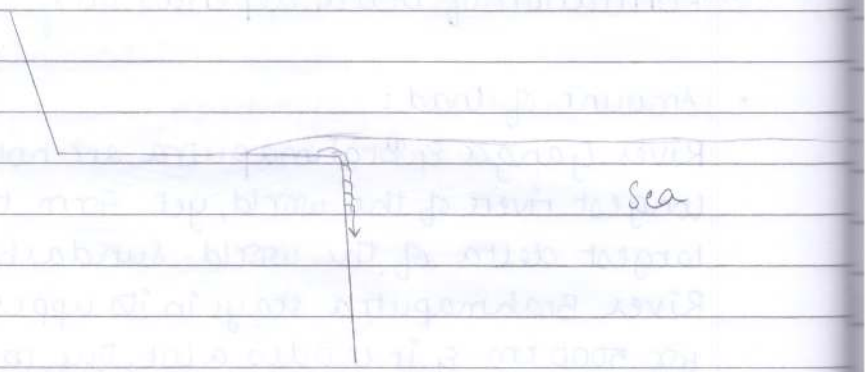
→ Formation of Delta depends on:

- Amount of load:
River Ganga & Brahmaputra are not the longest rivers of the world, yet form the largest delta of the world - Sundarbans. River Brahmaputra stays in its upper course for 5000 km & it erodes a lot. Due to a lot of load carried, the deposition of that load forms the sundarbans.

- Velocity of the river at the mouth:
If the continental shift is gentle, the velocity of the river would remain slow. This will help in deposition & formation of Delta. The ~~gentler the del~~ But, if the continental shift

is sharp, the load would be transported down the ~~shift~~ cliff with high velocity, resulting in ~~&~~ no deposition. Hence, no delta is formed then.

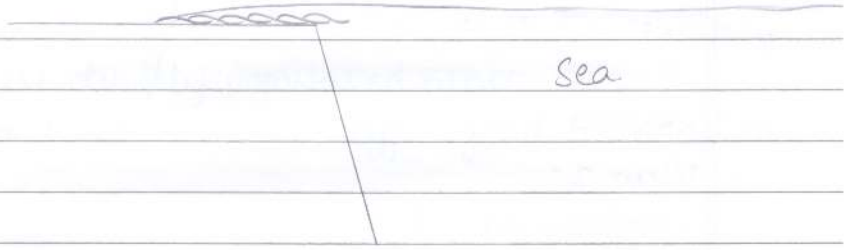
- Width of the continental shift:
River Narmada doesn't form a delta because the continental shelf at its mouth ~~is~~ is very narrow (& the sea is deeper). So there is hardly any space for deposition & formation of delta.



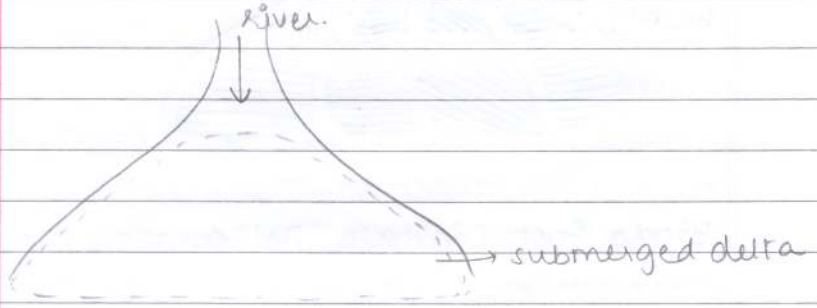
- Discharge at the Mouth:
Delta of river Indus isn't fertile at all. The river is the main source of water in Pakistan. Before it reaches the sea, it is ~~drie~~ dry; there is no water left because many dams are made on it in Pakistan.

→ When a delta begins to form, only some of the delta is risen. Most of it remains submerged in the water. Such a delta is called an ESTUARINE DELTA.

View 1:

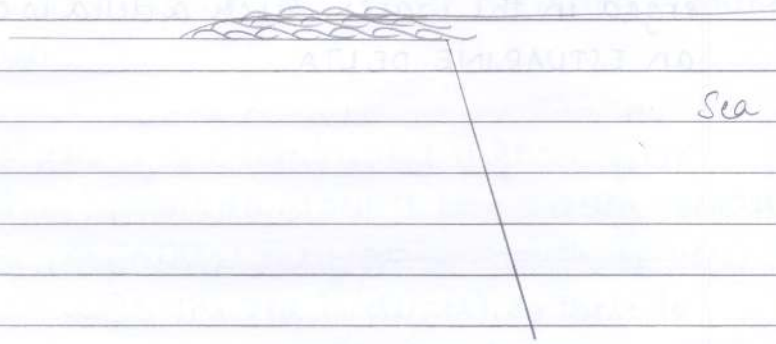


View 2:

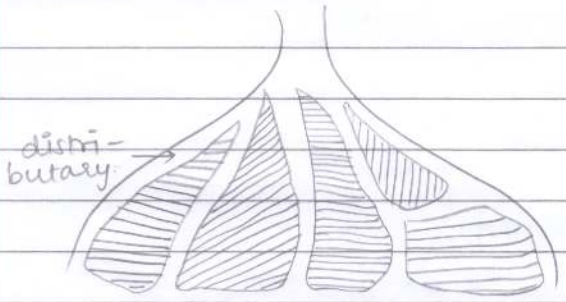


→ With increase in deposition, some part of it rises above the water. This/Such a delta is named BIRD'S FOOT DIGITATE DELTA.

View 1:

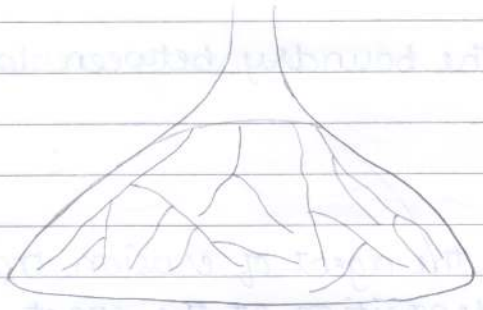


View 2:



Bird's Foot Digitate Delta

→ If the entire delta or majority of its part rises up, the water (the river) gets distributed into networks of channels. Such a delta is called ARCURATE DELTA.



→ Deltas are fertile because the soil is renewed continuously by the river. They are densely populated hence.

→ But, Deltas don't offer good foundation.