

1.5: Understand how *ocean waves and currents* change the face of coastal areas. (Chapter 3)



1. Hydraulic Action/Pressure - air being forced into crack in rocks.



2. Corrosion (Solution)

- Minerals such as calcium carbonate & limestone dissolve in the water



3. Abrasion

- rock & sand particles suspended in the water bump, grind, scrape & gouge surfaces the water hits





Hydraulic Action

- Hydraulic action is a form of **mechanical weathering**
- Caused by the force of moving **water currents** rushing into a crack in the rockface.
- The water **compresses the air** in the crack, pushing it right to the back.
- As the wave retreats, the **highly pressurized** air is suddenly released with explosive force
- Capable of chipping away the rockface over time.



Hydraulic Action



Emerging vs. Submerging Coastlines

- **Emerging**
- **Caused by lowering water levels and/or rising land level**
- **Land “springing up after glacier is gone.**
- **Steep land features, cliffs etc.**
- **Submerging**
- **Caused by RISING sea levels**
- **Were once river valleys now submerged**
- **Results in more sand from deltas and/or outwash plains**
- **Lower, gradual slope**



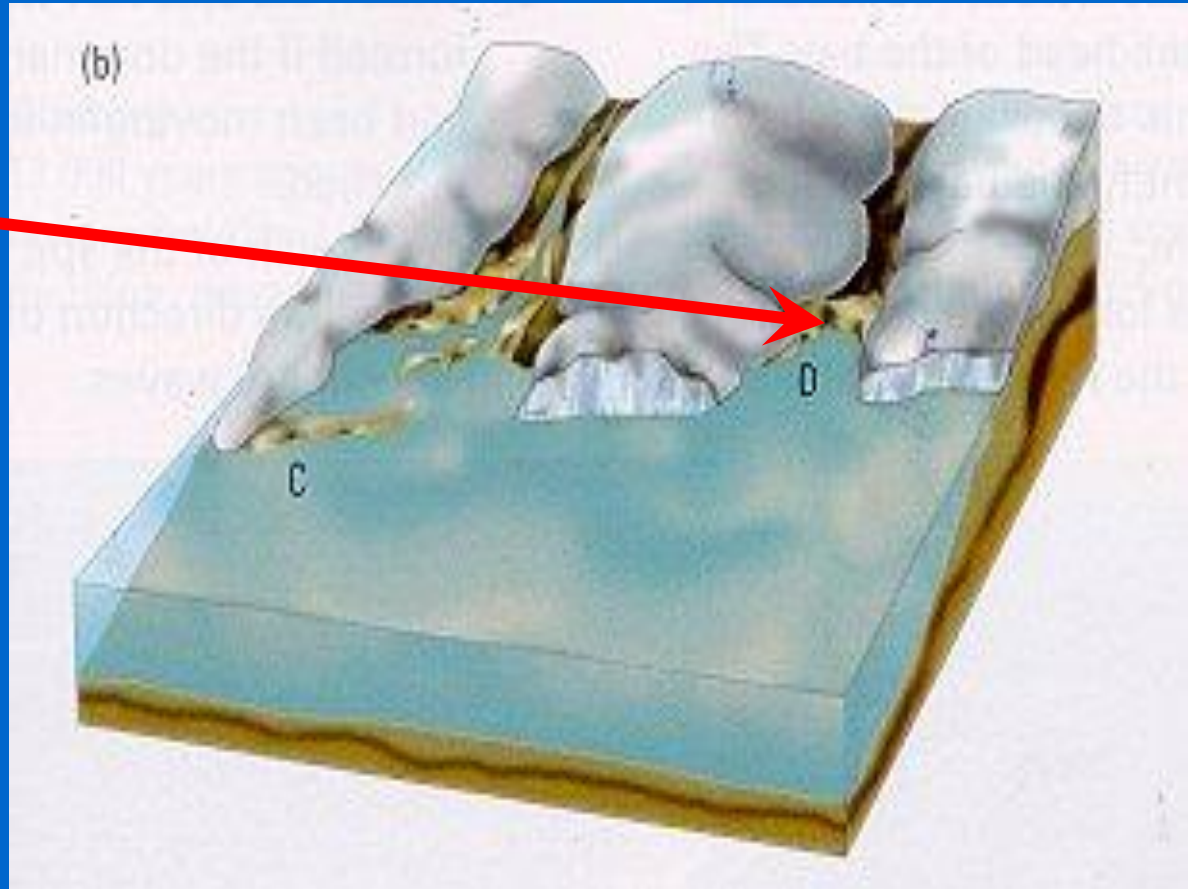
Define the terms

- bay beach
- bay bar
- spit
- (P. 44-45)



Bay Beach

- Small beach of sand found between two peninsulas or headlands
- An accumulation of sediment deposited by waves and longshore drift along a bay.



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Bay Beach – Bonne Bay



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Bay Beach

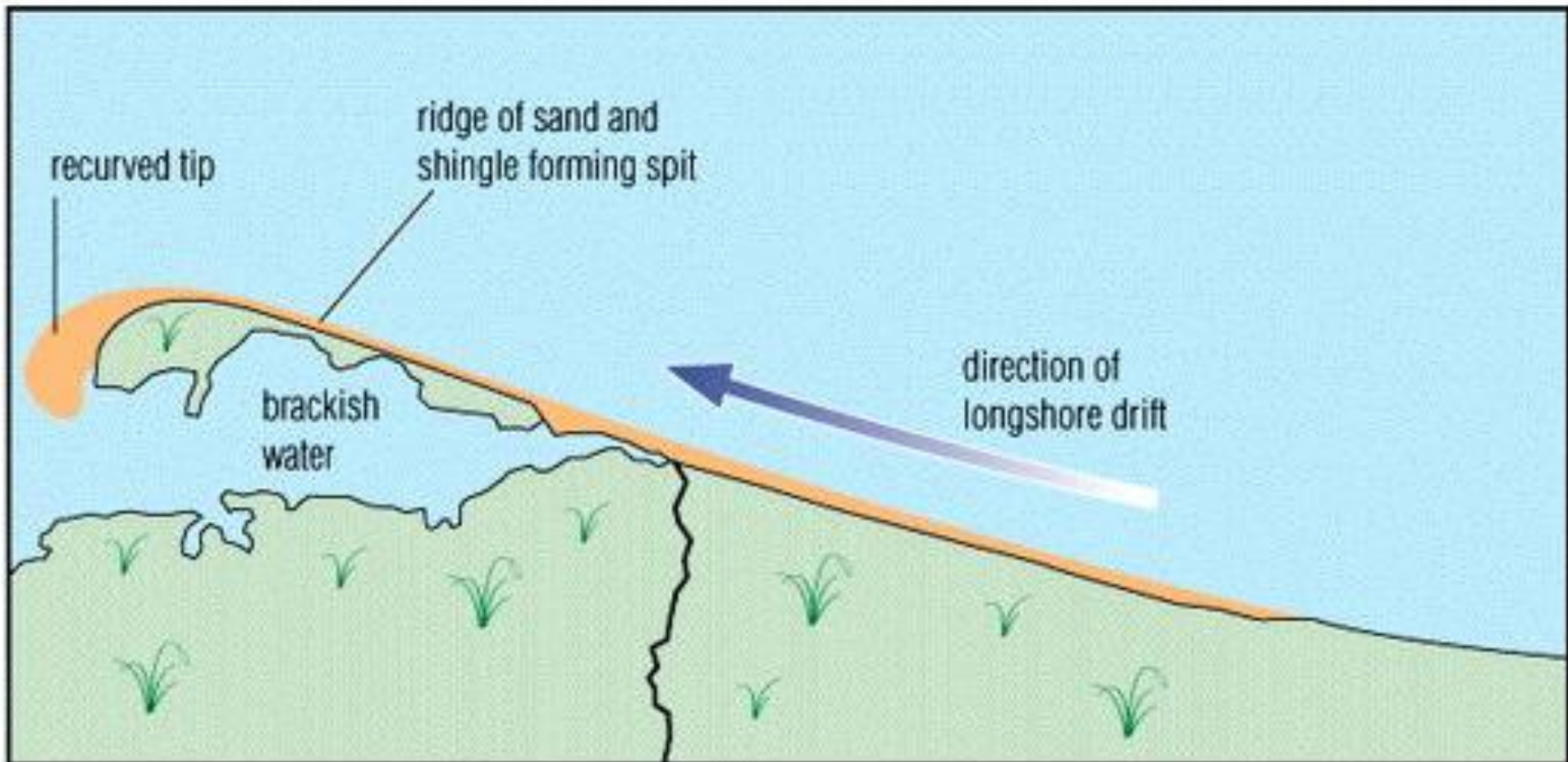


Spit



- Ridge of sand projecting from the land into a body of water
- usually with a curved seaward end.
- Spit grows in the prevailing direction of longshore drift.
- Ends are curved by the action of waves in different directions

Spit



Spit



- What can you tell about the direction of long shore drift?
- Is there any indication a bay bar might form?
- Sandy Point Newfoundland!

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Spit - California





Bay Bar



- A ridge of mud, sand or silt extending across a bay.
- **Formed when spits stretch across the mouth of the bay**
- Notice the spit has closed off the mouth of the harbor/bay
- **Would these be a tourist attraction or distraction?**

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Bay Bar



Goodyear's Cove, South Brook, NL. ?



Bay Beach



1. Where does all the beach sand come from? Can you propose two sources?

2. The point of land on top of the picture would be called?

Define the terms

- bay beach
- bay bar
- spit
- (P. 44-45)

Are these landforms caused by erosion or weathering?

• Describe how

sea caves, sea arches and sea stacks
are formed. (P. 48)

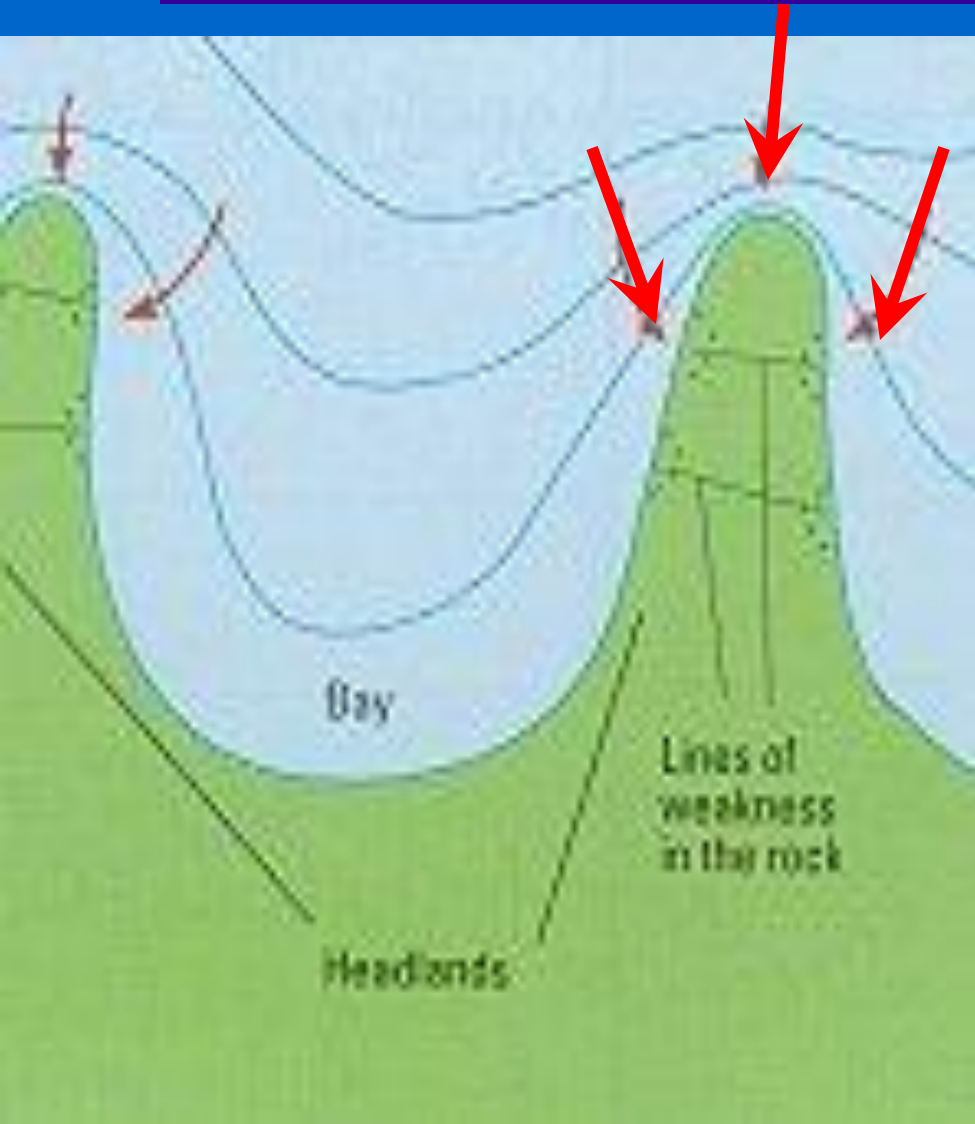


- These three coastal structures occur on “emerging” coast lines with steep cliffs & a headland.

• 1st Sea caves form , 2nd sea arches form and 3rd sea stacks form.

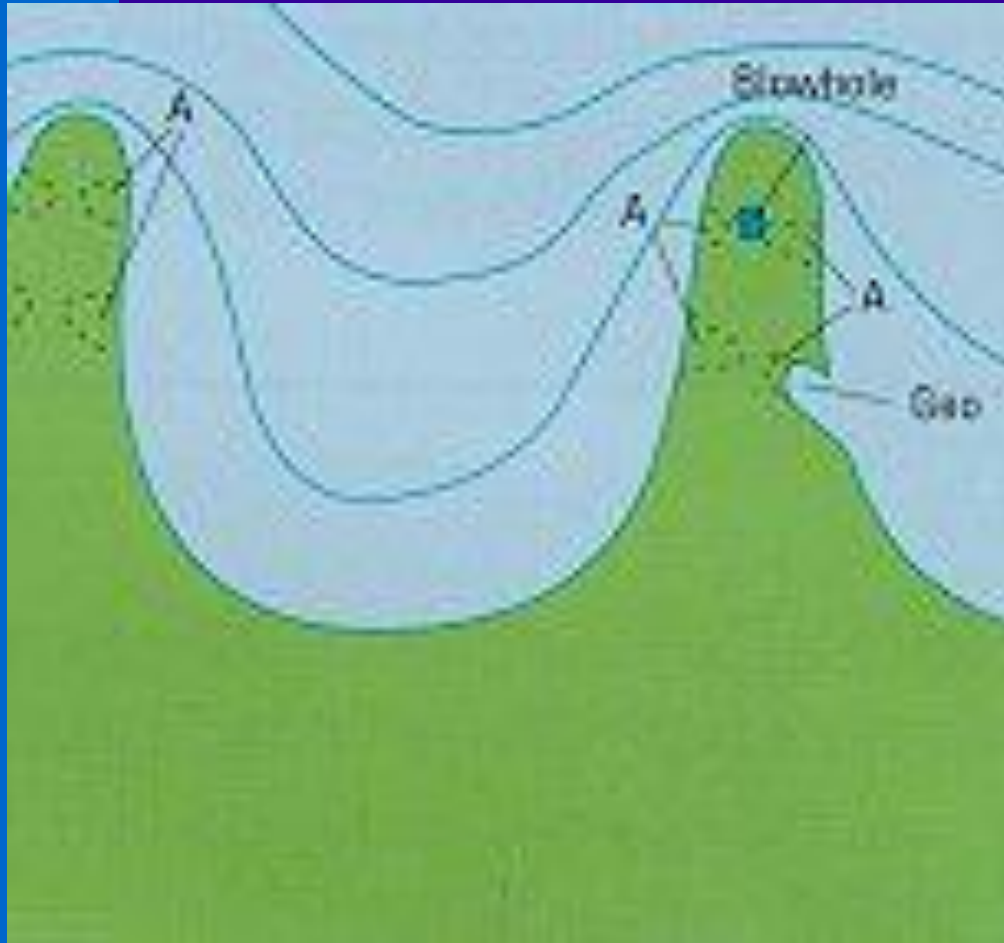


Describe how sea caves are formed. (P. 48)



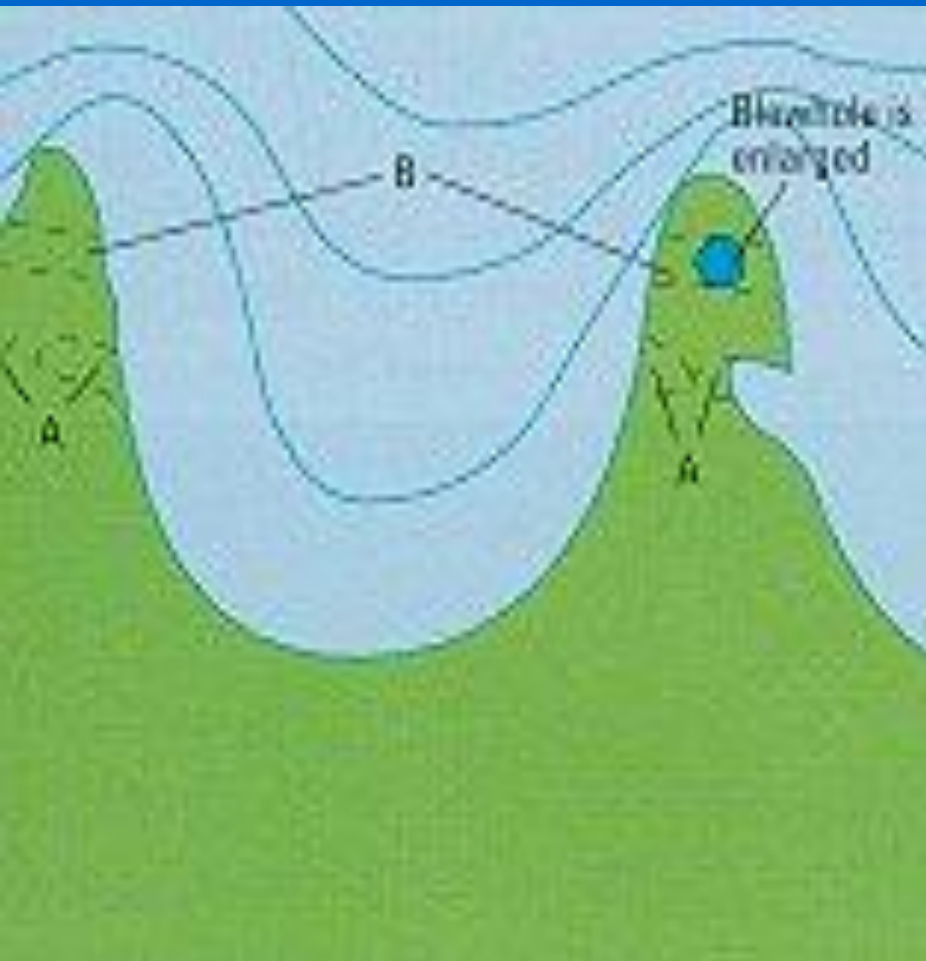
- Waves strike the headland first.
- **Waves refract** around the headland and put **hydraulic pressure** on the sides of the headland.

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• **Describe how sea caves are formed.**
(P. 48)



- The hydraulic pressure rips away sections of weakened rock.
- Erosion of the weak portions create caves & blow holes in the sides of the headland.

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• Describe how sea arches are formed.
(P. 48)



- Most sea arches are formed from the wave erosion of a headland where the backs of two caves have met and broken through.
- a complete passage way or tunnel or “arch” through the head land !!

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- It is difficult to see or imagine from the top view.

However the **side view** provides a better picture.

Sea Arch - England



Jackson's Cove, Green Bay NL.



Sea Arch

Parson's Pond, Northern Pen., NL

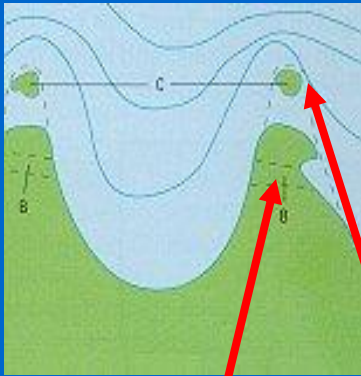


Sea Stack

- **Isolated pillar of rock** that has become separated from a headland by coastal erosion.
- It is usually formed by the **collapse of an arch**.
- Further erosion will reduce it to a **stump**, which is exposed only at low tide.

Describe how sea stacks are formed.

(P. 48)



- Continuous erosion causes the **collapse of the ground over the arch.**
- This leaves a pillar or column or “STACK” of land standing alone where the headland was.
 - Sea stacks are common in eastern Canada.
 - Many have plant growth on top.

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Sea Stack - Harry's Harbour NL.



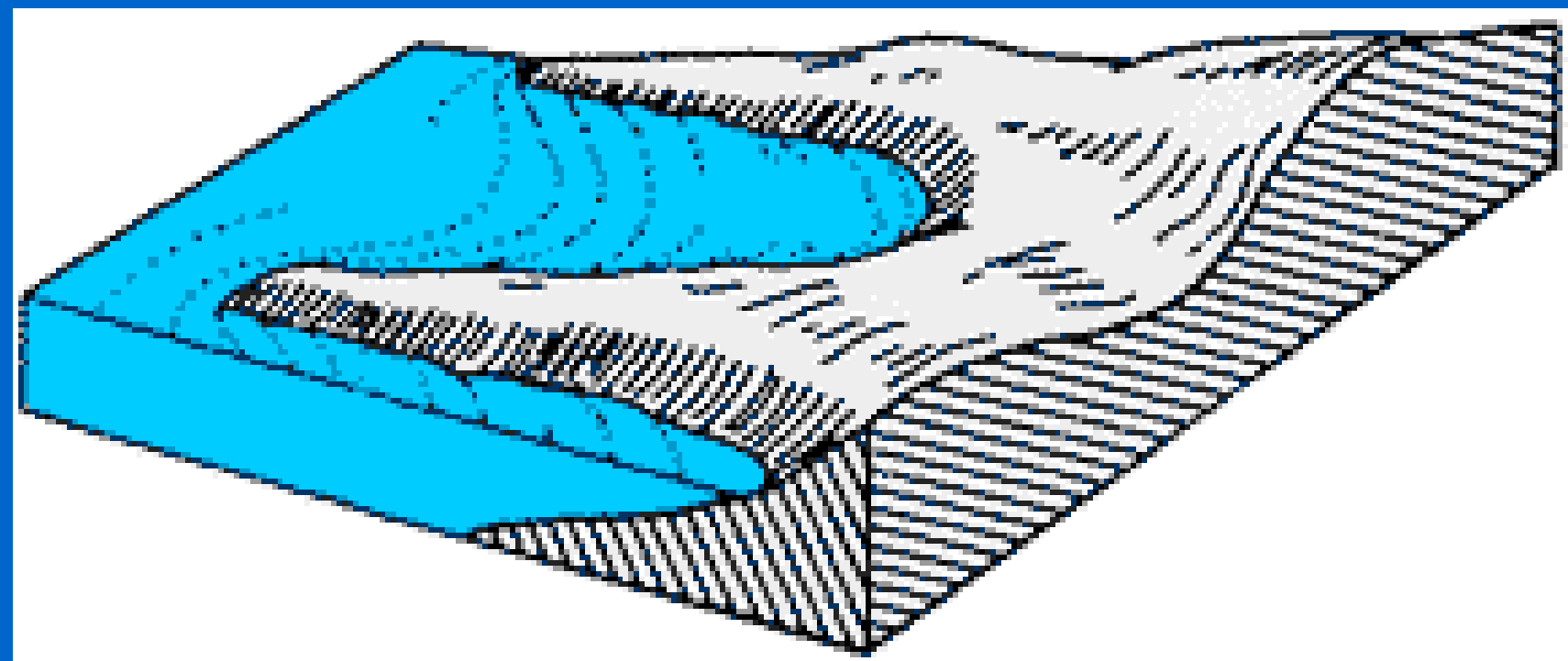
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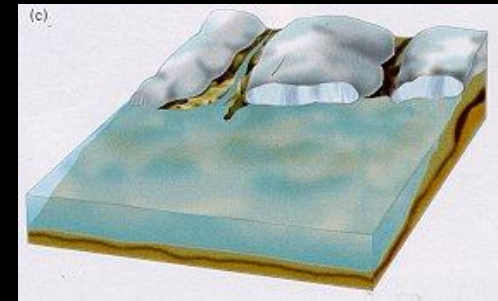
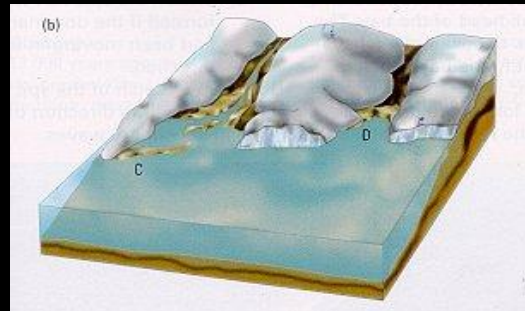
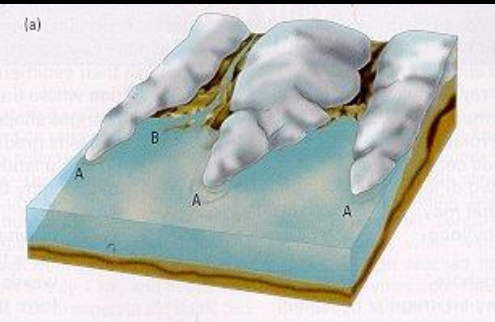
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Analyze the processes that result in the "straightening out" of an irregular coastline. (P. 43)

[submerged]



1. Weathering of Headland

- What forces cause the weathering & erosion?
- Hydraulic
- Corrosive
- Abrasive

2. Transportation of silt

- How is silt transported?
- Longshore Drift
- Waves
- Currents

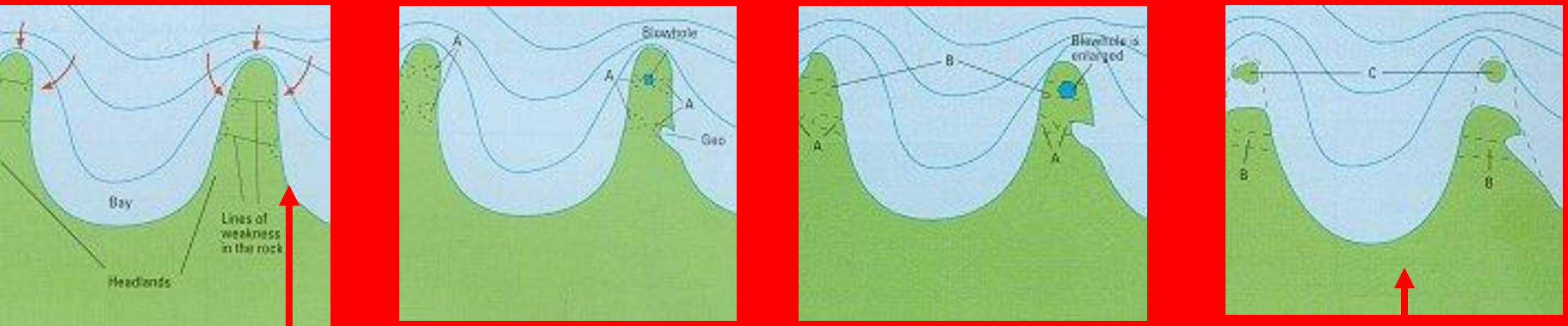
3. Deposition of silt

- Where does deposition occur?
- Bay beaches; filling inlets
- Bay bars; closing off inlets

4. Summary: Submerged coasts straighten due to weathering and erosion.

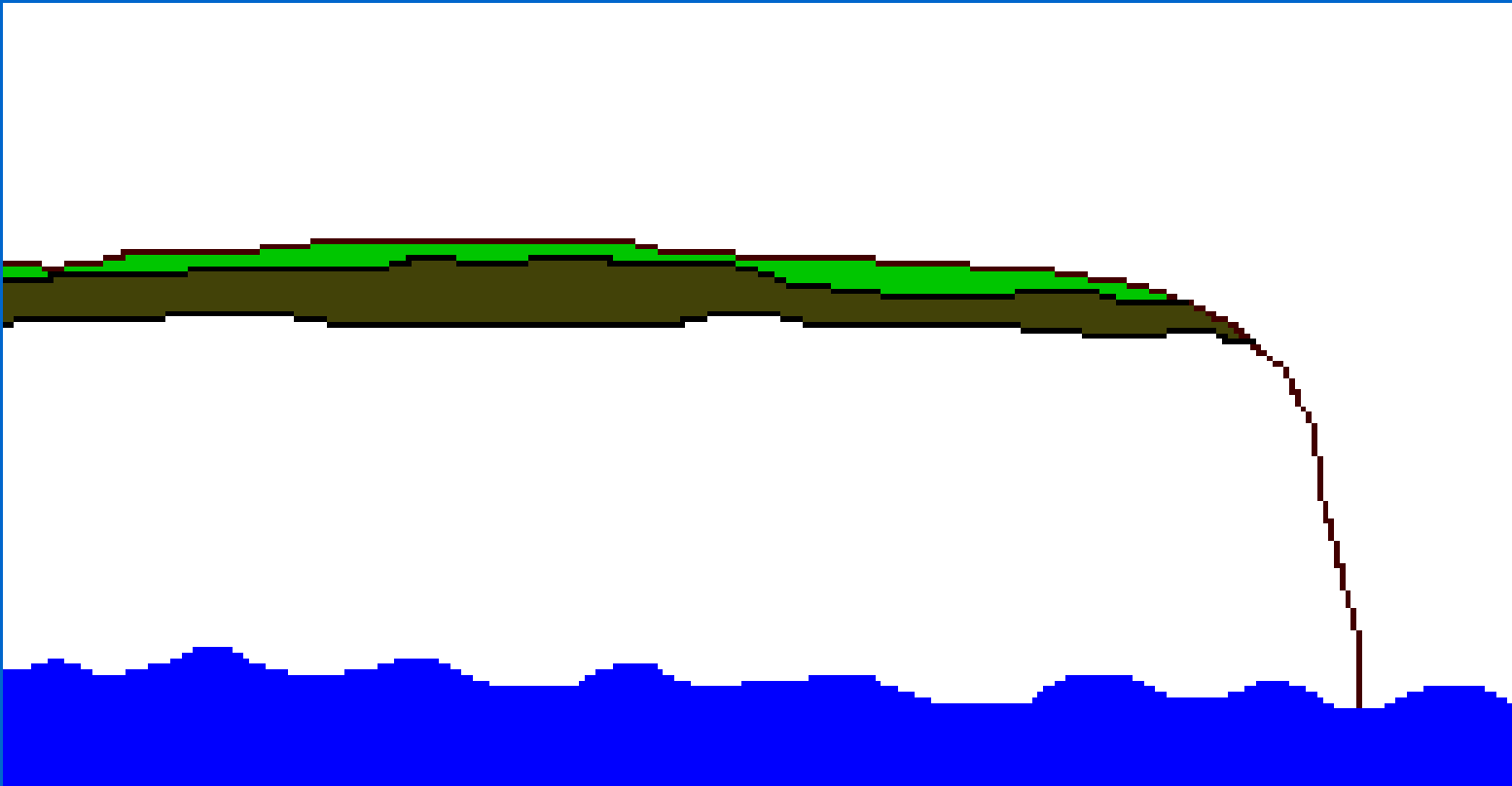
Analyze the processes that result in the "straightening out" of an irregular coastline. (P. 48)

[emerging]

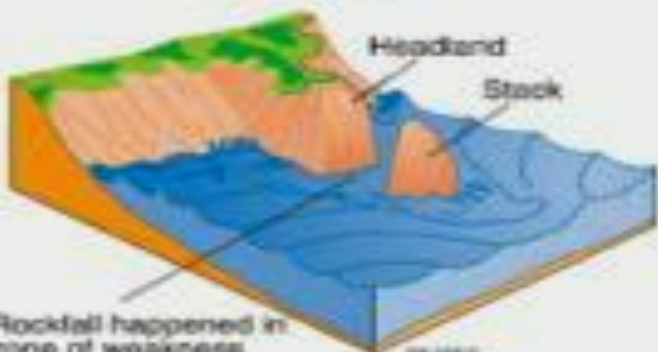
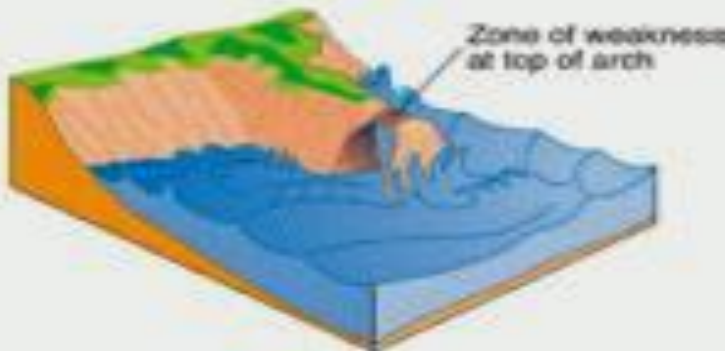
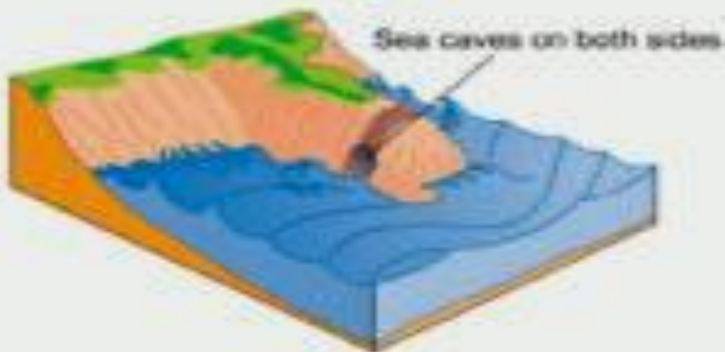
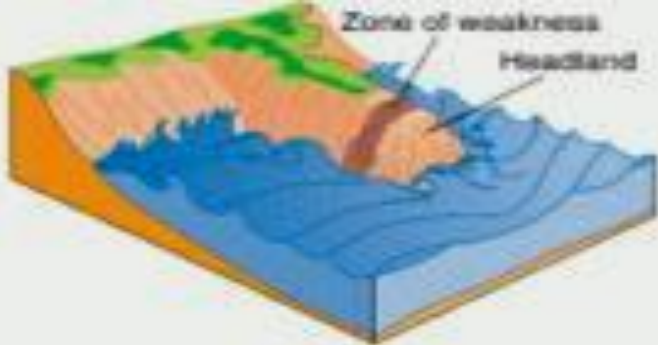


- Emerging coastlines straighten in much the same fashion as submerging coastlines.
- Weathering and Erosion of headlands creates sea caves, sea arches and sea stacks instead of bay beaches, spits & bay bars. However the result is similar in that headlands are reduced in size.

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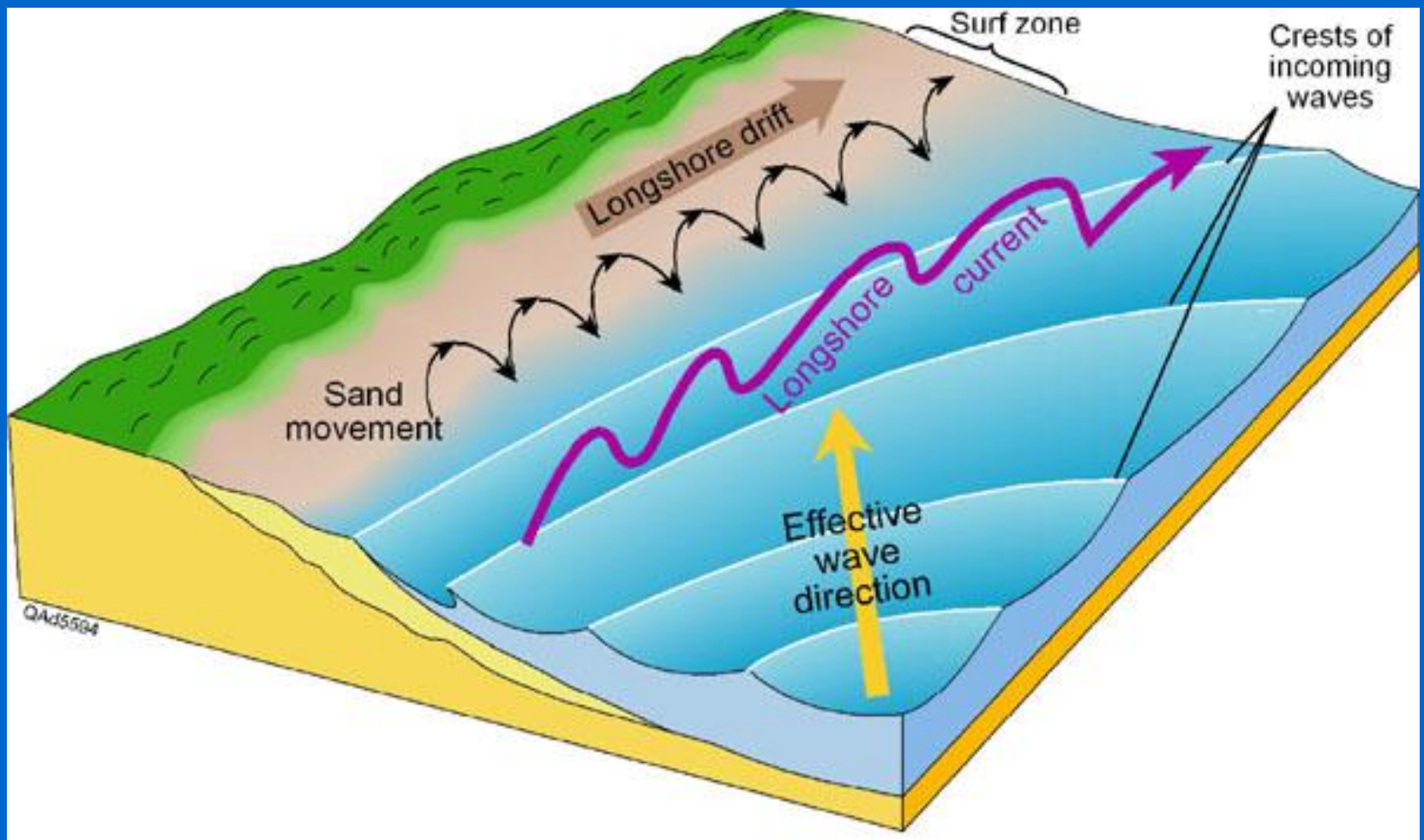
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Rockfall happened in zone of weakness



Longshore drift



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Longshore drift

