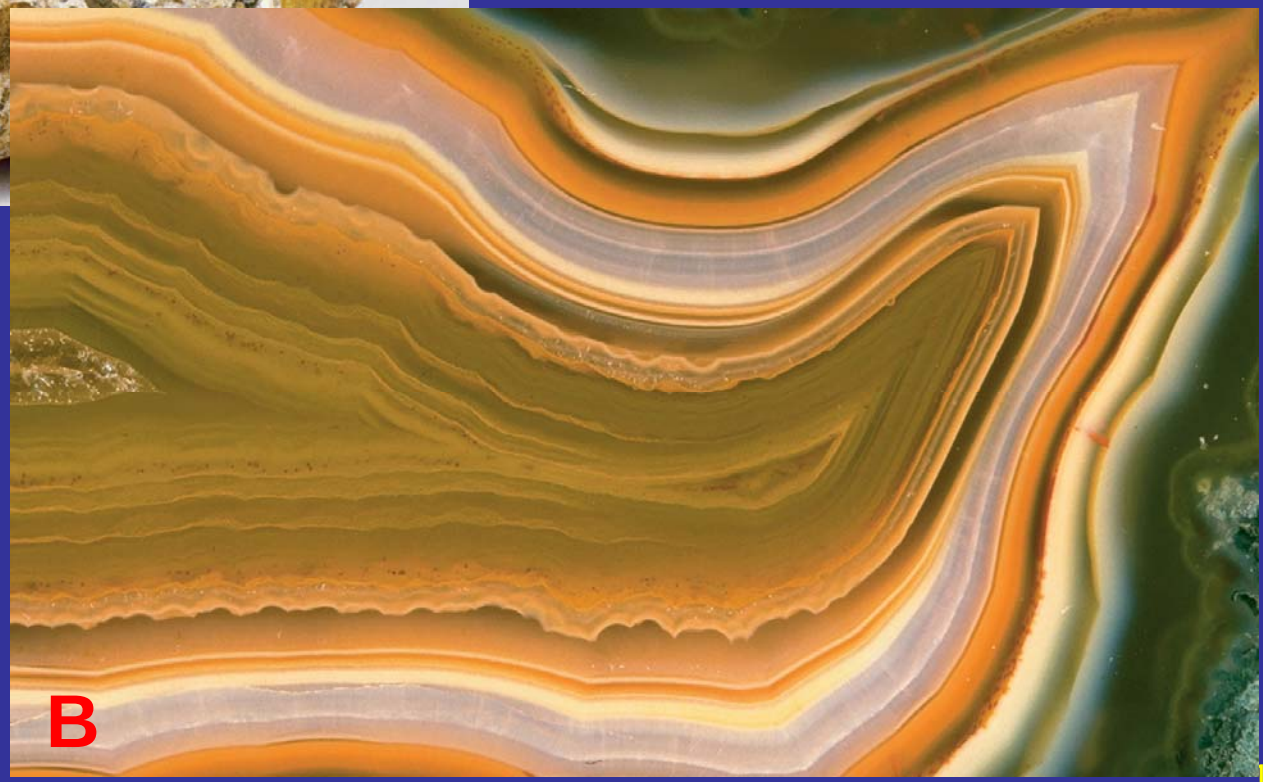


Which of these is a sedimentary rock?

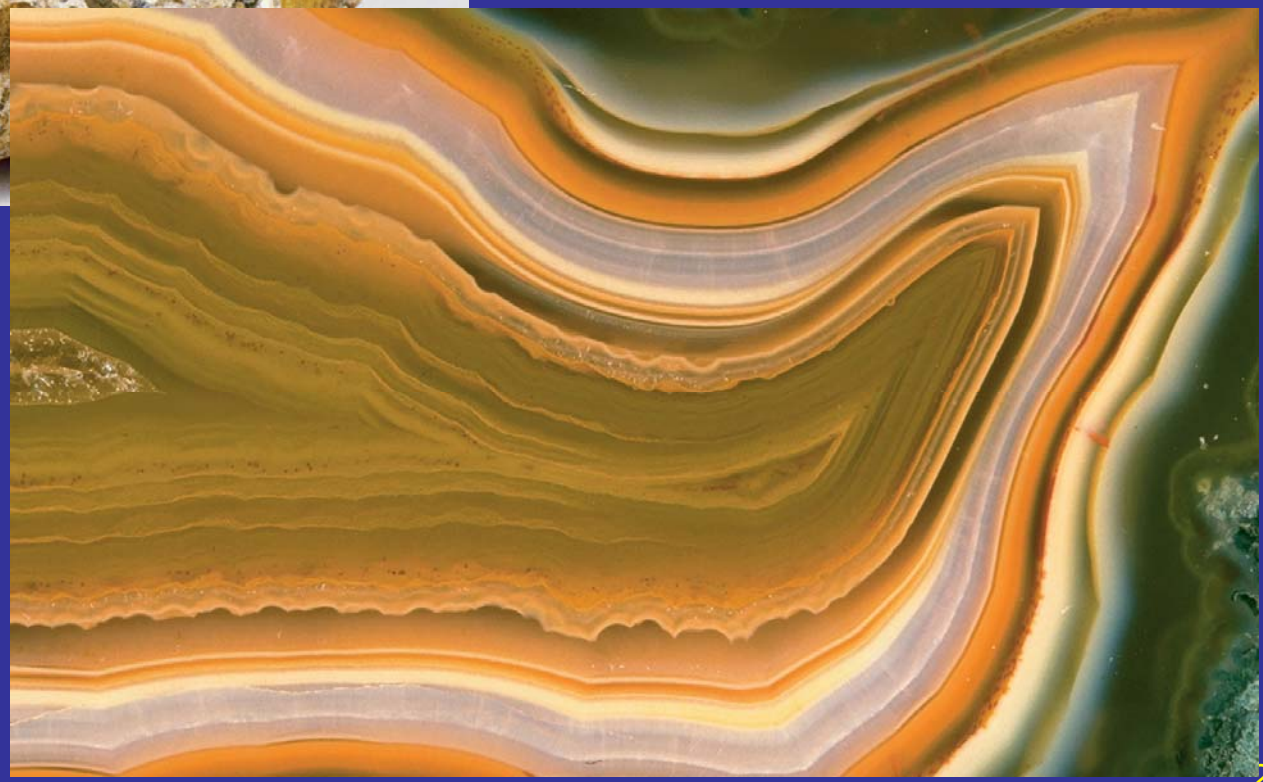
A) A, B) B
C) both, D) neither





Detrital
(Latin *detritus* “to wear away”)

Chemical



What changes something from a sediment to a rock?





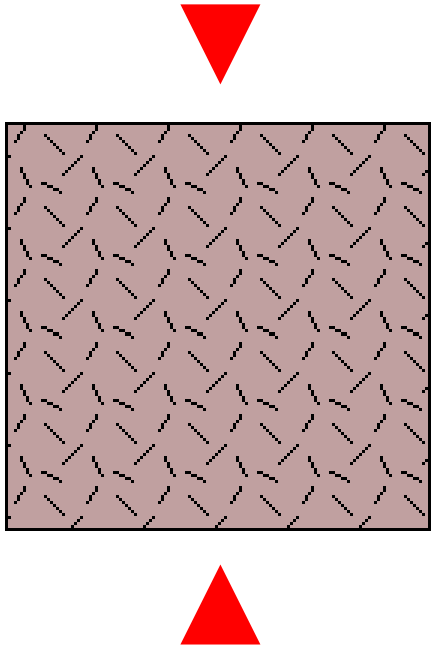


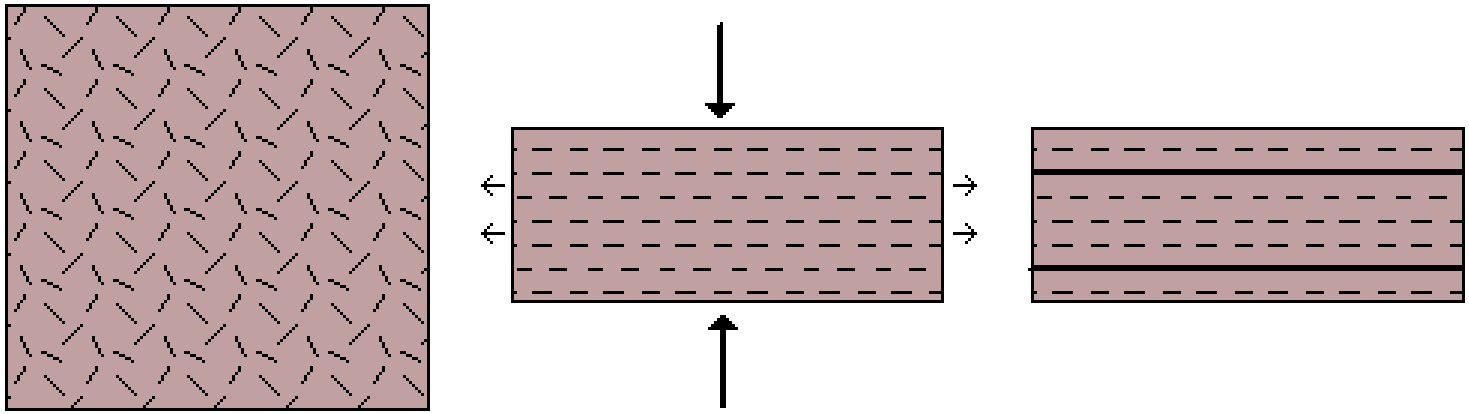






How is porosity changing?



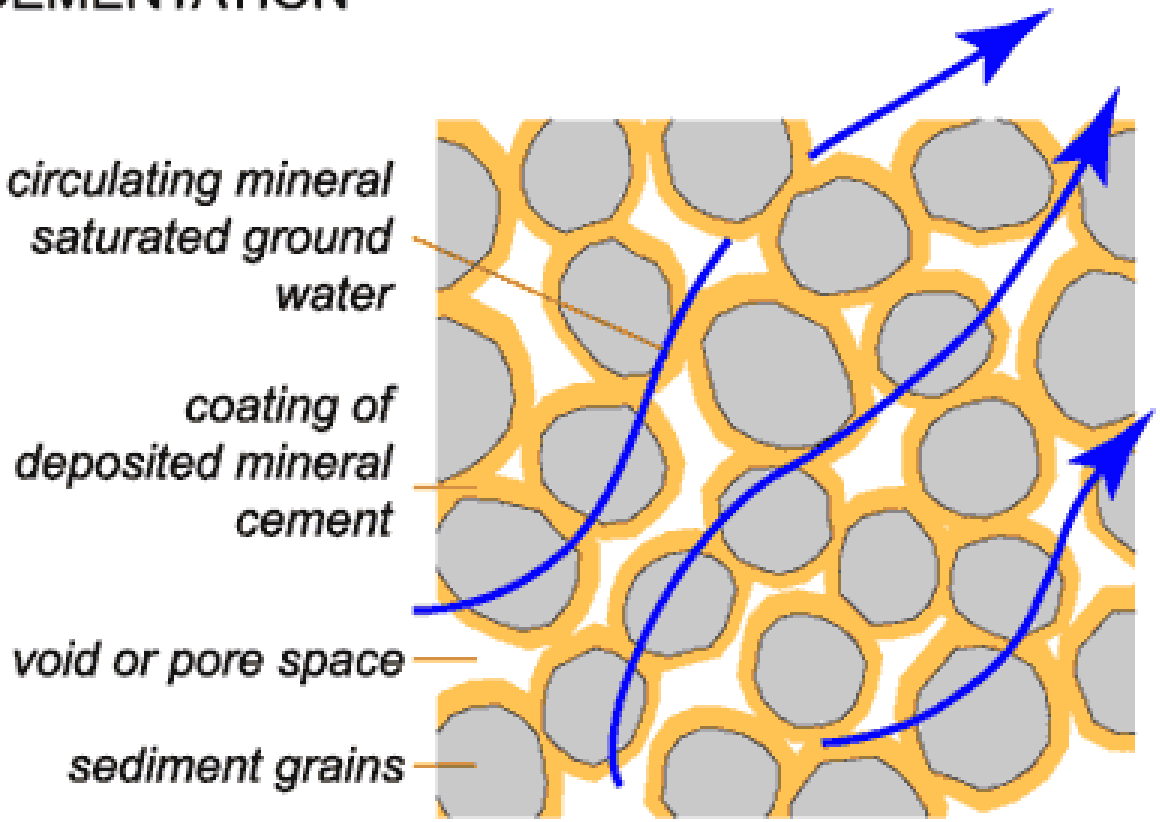


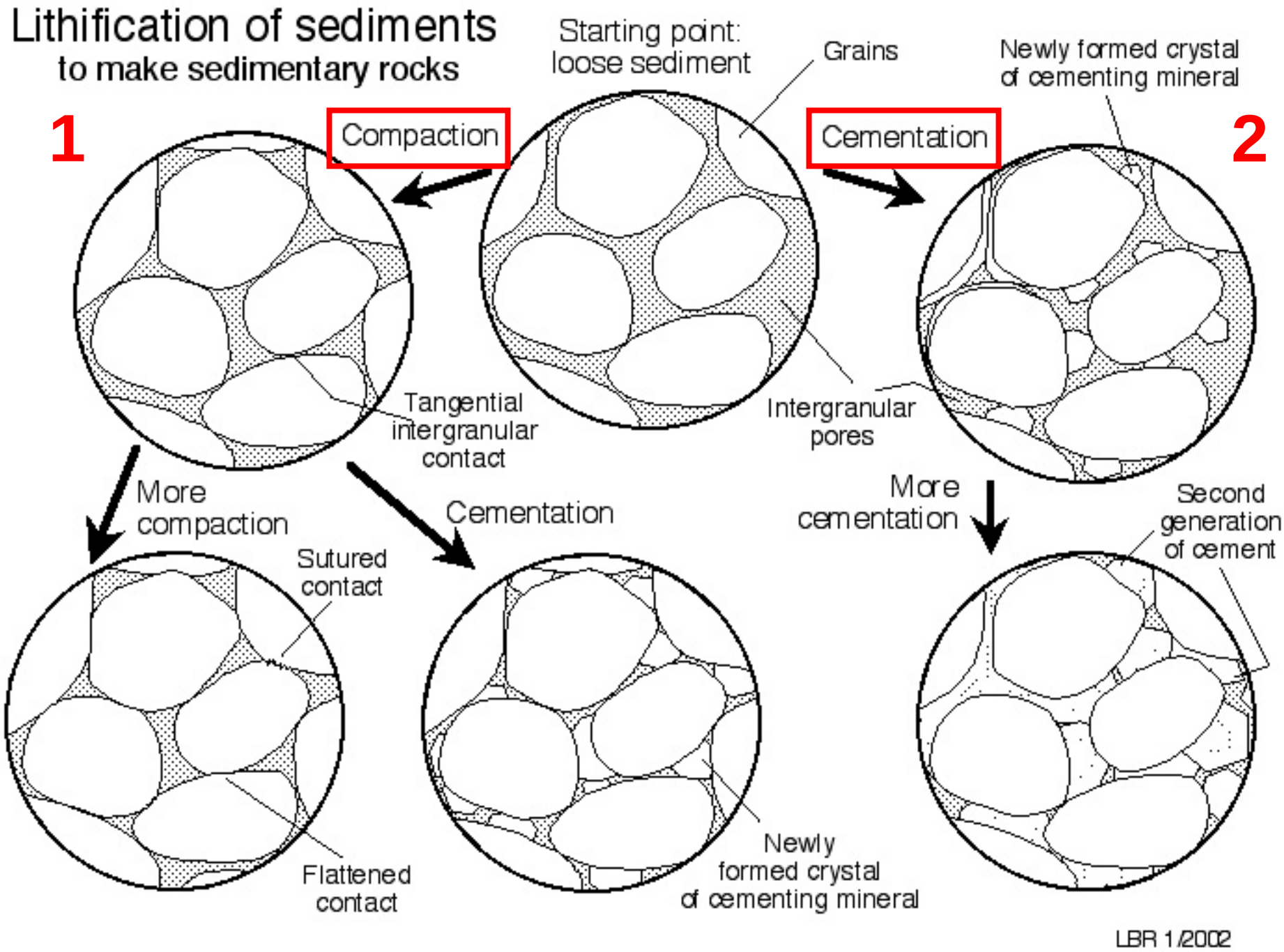
Wet Mud

Compacted Sediment
(water expelled)

Cemented Shale
(splitting surfaces)

CEMENTATION




Lithification of sediments
to make sedimentary rocks
Starting point:
loose sediment
Grains
Newly formed crystal
of cementing mineral
1
Compaction
Cementation
2
Tangential
intergranular
contact
Intergranular
pores
More
compaction
Cementation
More
cementation
Second
generation
of cement
Sutured
contact
Flattened
contact
Newly
formed crystal
of cementing mineral
LBR 1/2002

How far were the materials in this rock transported?
A) A long distance, B) A short distance









Detrital sedimentary rocks

Highest energy?







Largest grain size?





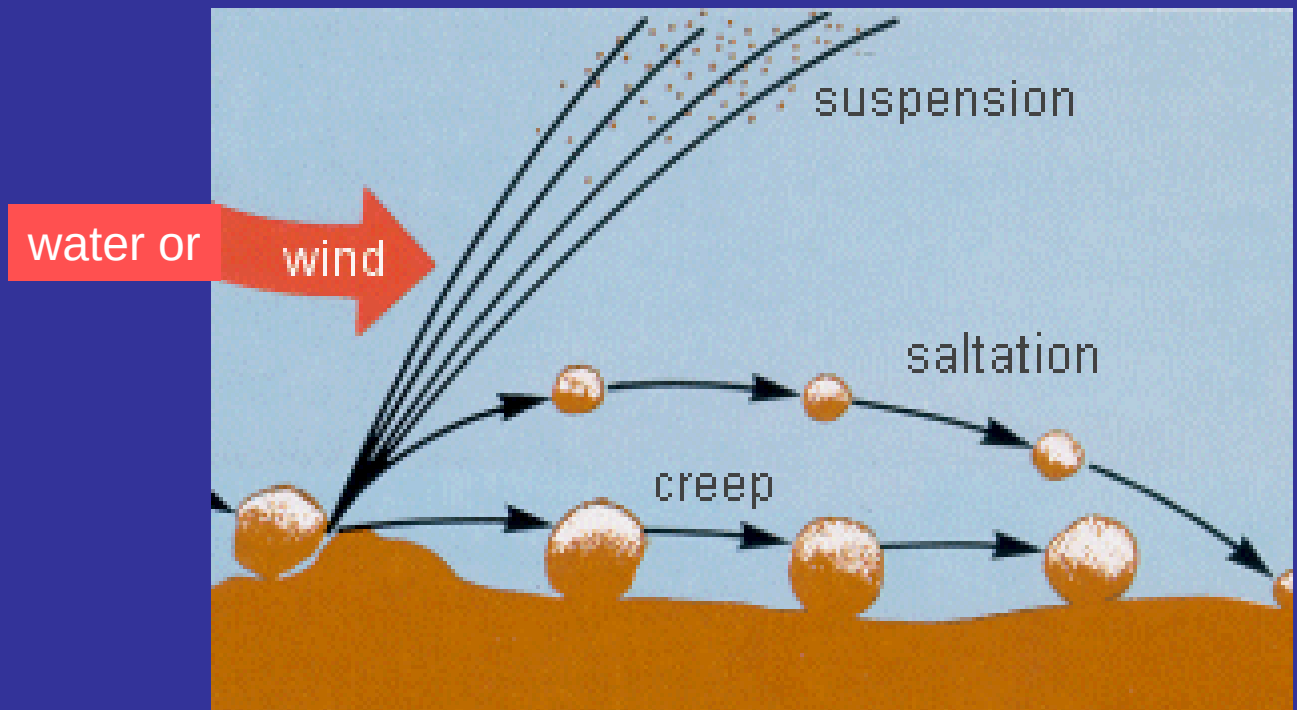








Low Energy **Medium Energy** **High Energy**









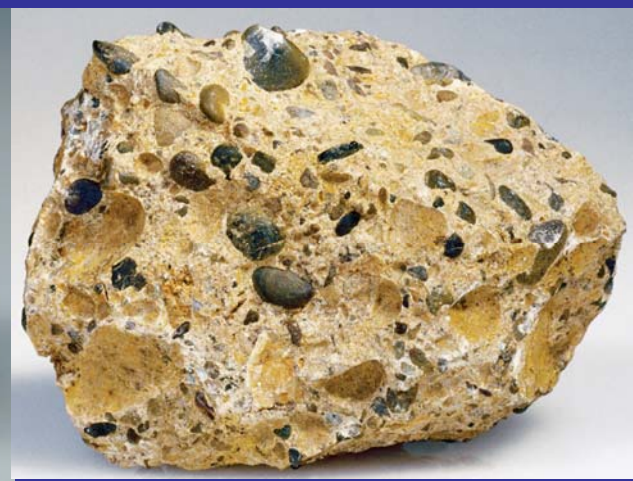
Low Energy
Small particles

Medium Energy
Medium particles

High Energy
Large particles



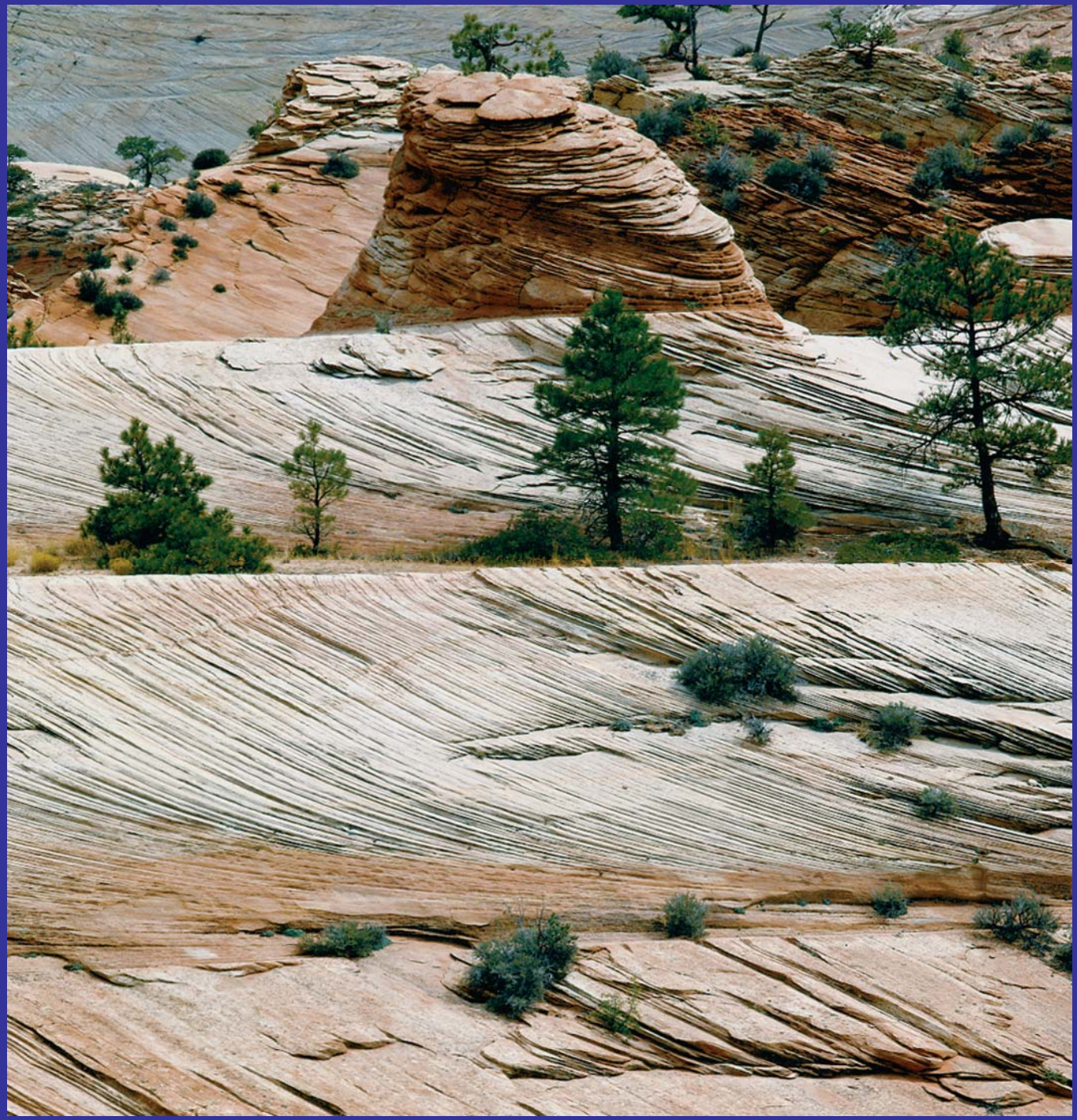




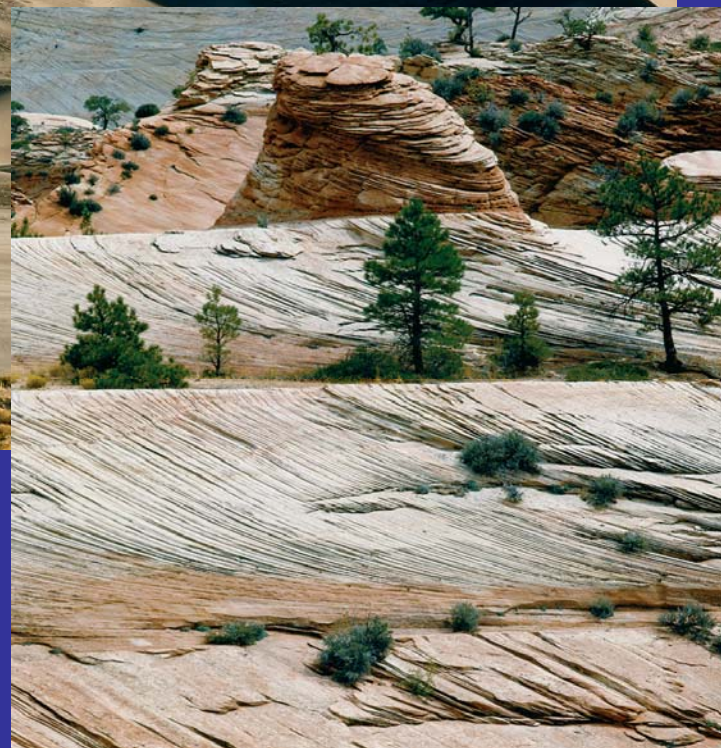




Ripple marks







Sand dunes



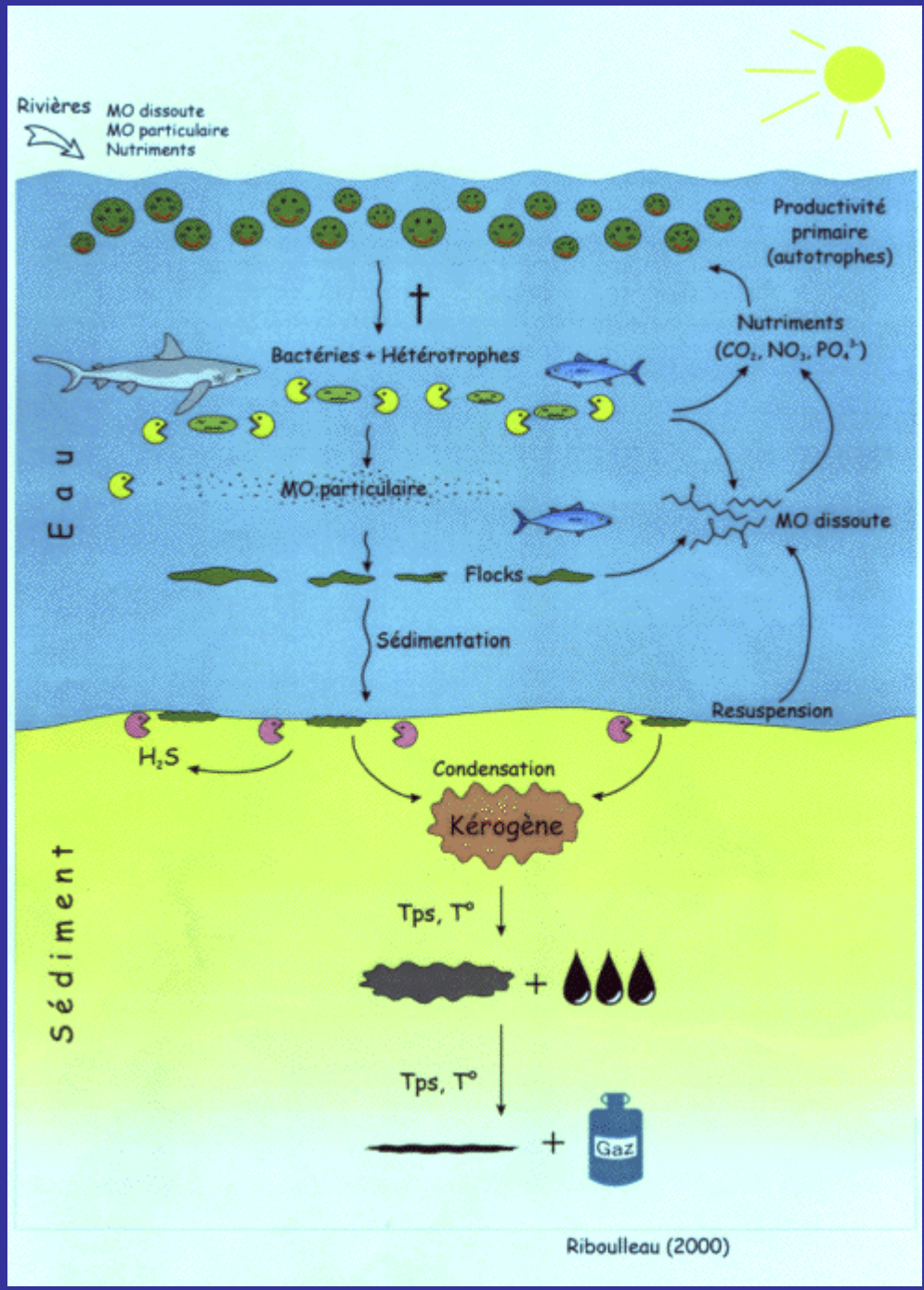
Fossils



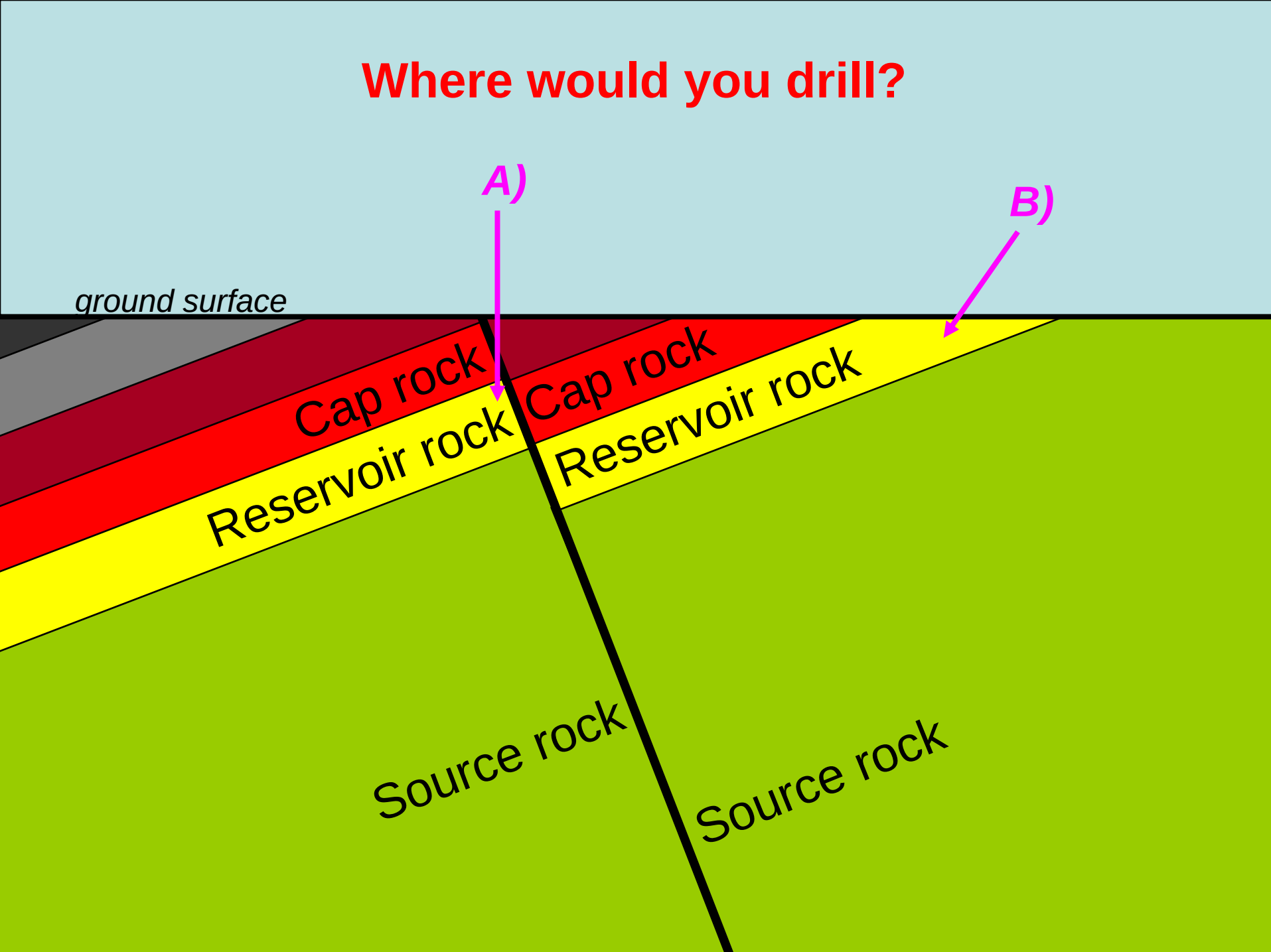


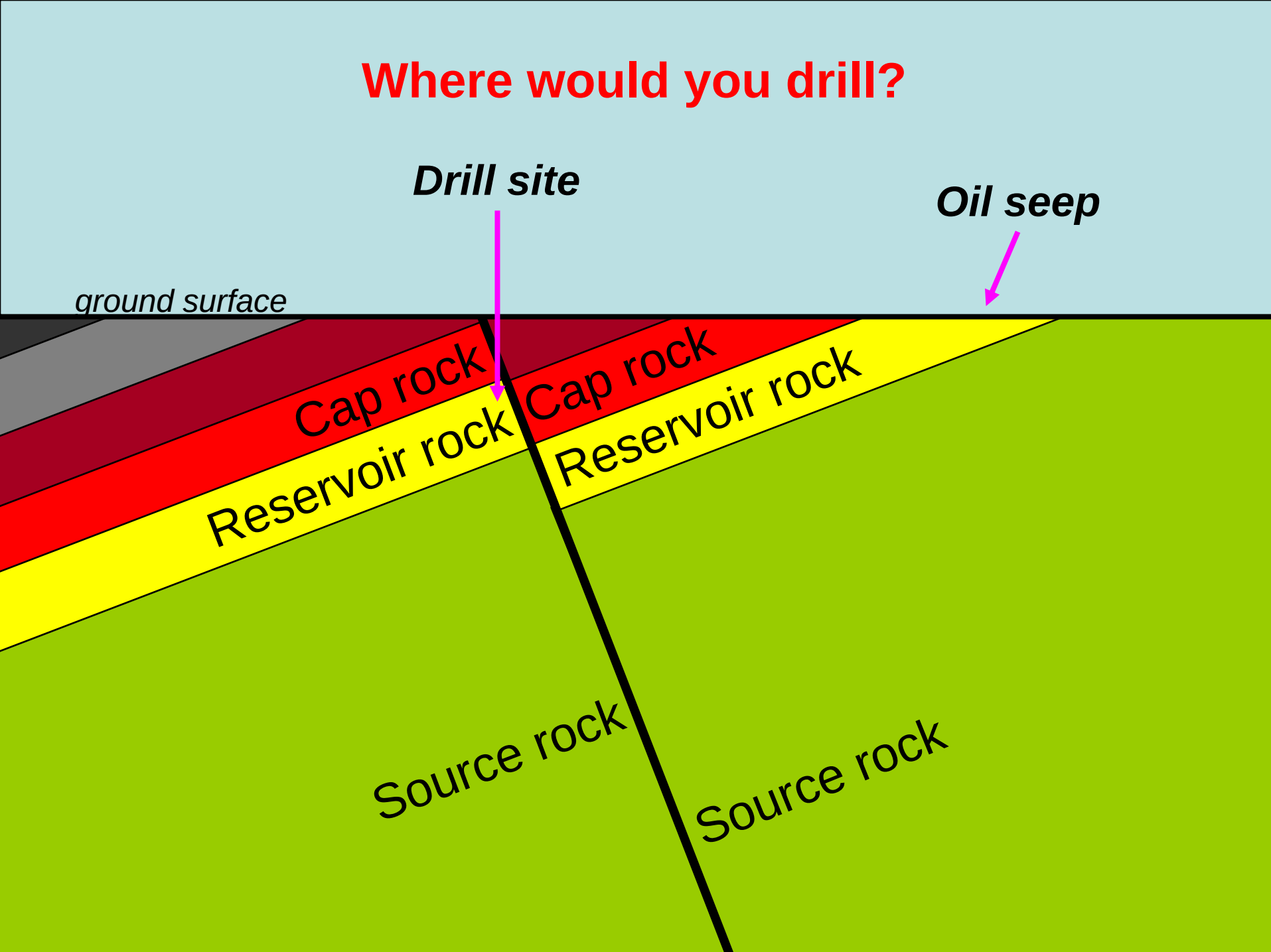




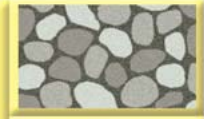
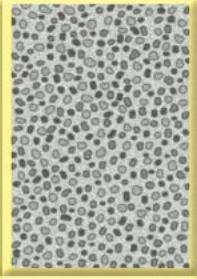

Rivières
MO dissoute
MO particulaire
Nutriments
Productivité primaire (autotrophes)
Nutriments (CO_2, NO_3, PO_4^{3-})
Bactéries + Hétérotrophes
Eau
MO particulaire
MO dissoute
Flocks
Sédimentation
Resuspension
H_2S
Condensation
Kérogène
Sédiment
Tps, T°
+
Tps, T°
+
Gaz
Riboulleau (2000)

Where would you drill?




Where would you drill?
Drill site
Oil seep
ground surface
Cap rock
Reservoir rock
Cap rock
Reservoir rock
Source rock
Source rock

Detrital Sedimentary Rocks

Clastic Texture (particle size)		Sediment Name	Rock Name
Coarse (over 2 mm)		Gravel (Rounded particles)	**Conglomerate**
		Gravel (Angular particles)	**Breccia**
Medium (1/16 to 2 mm)		Sand (If abundant feldspar is present the rock is called **Arkose**)	**Sandstone**
Fine (1/16 to 1/256 mm)		Mud	**Siltstone**
Very fine (less than 1/256 mm)		Mud	**Shale**







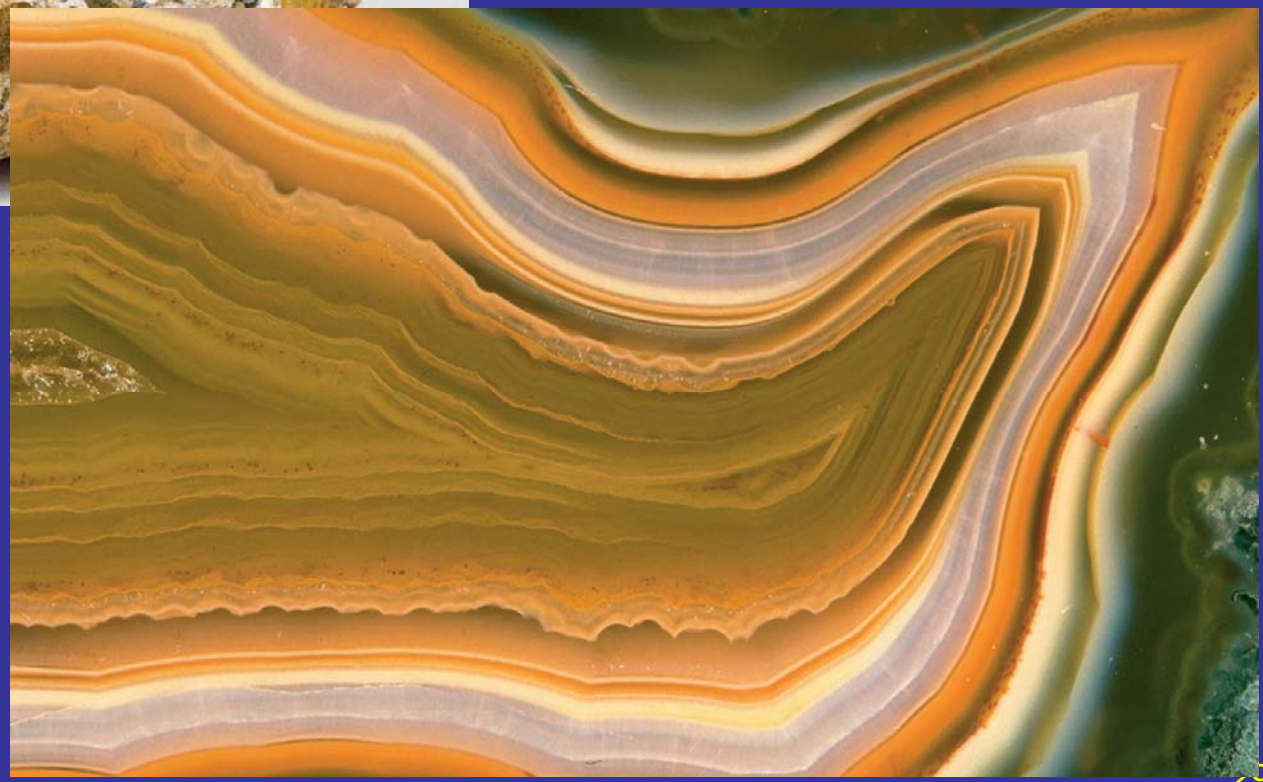




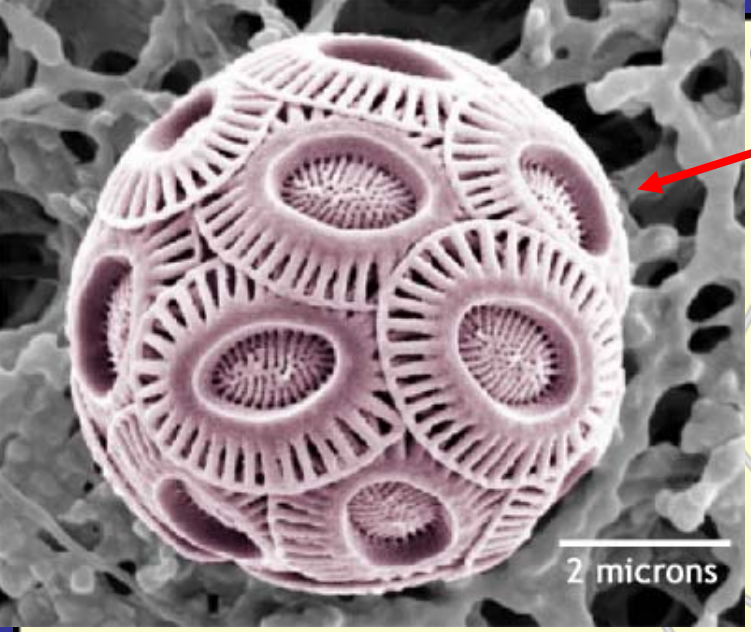
Detrital

(Latin *detritus* “to wear away”)

Chemical







Coccolithophore

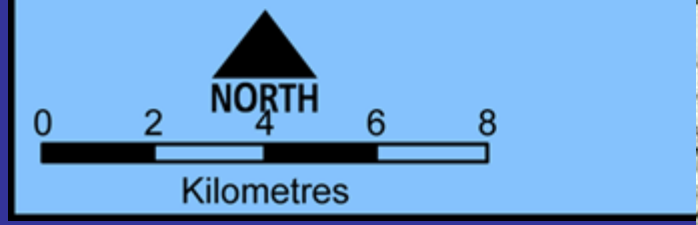
Deal

Dover

White Cliffs of Dover

Folkestone

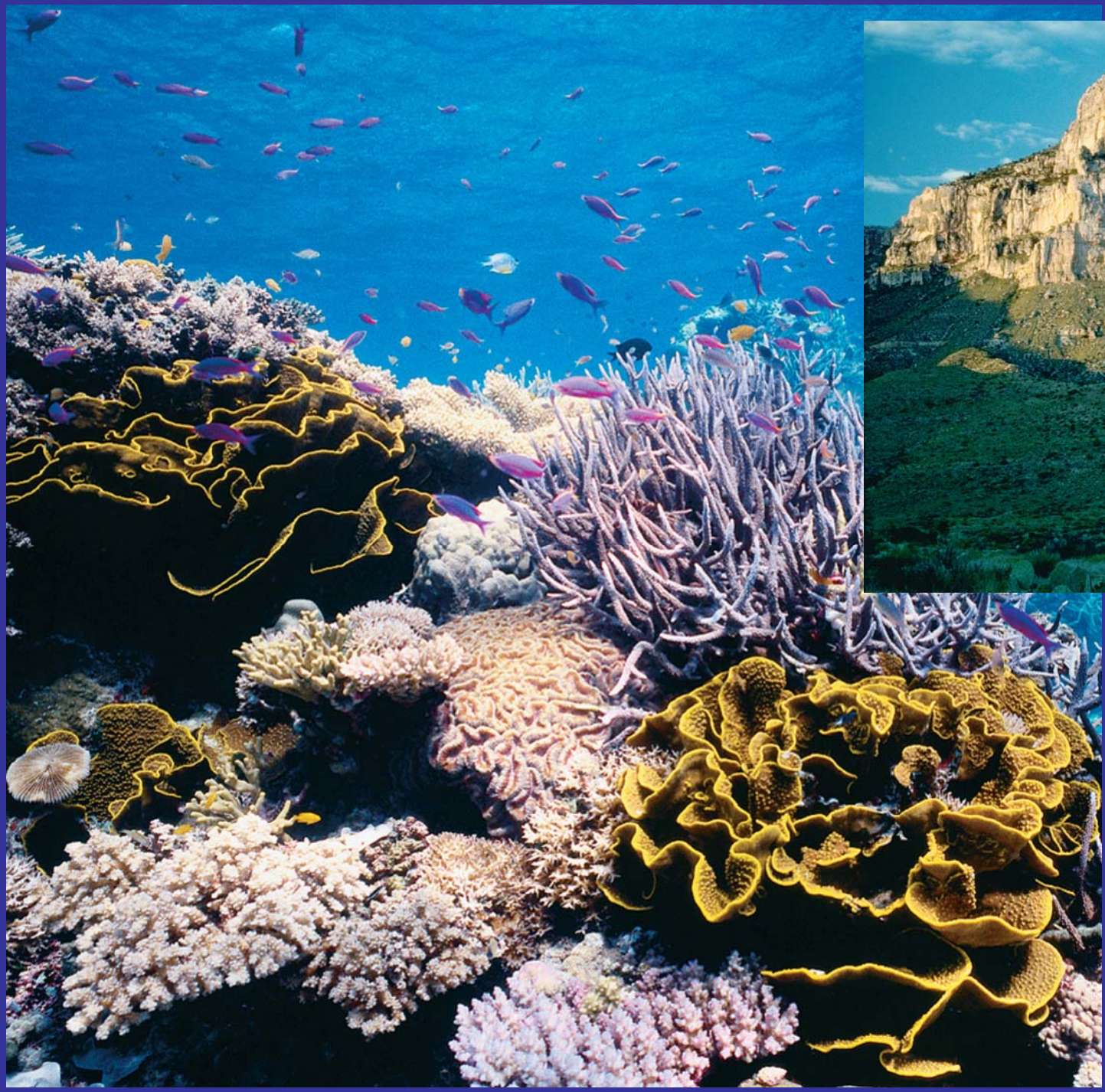




Chalk

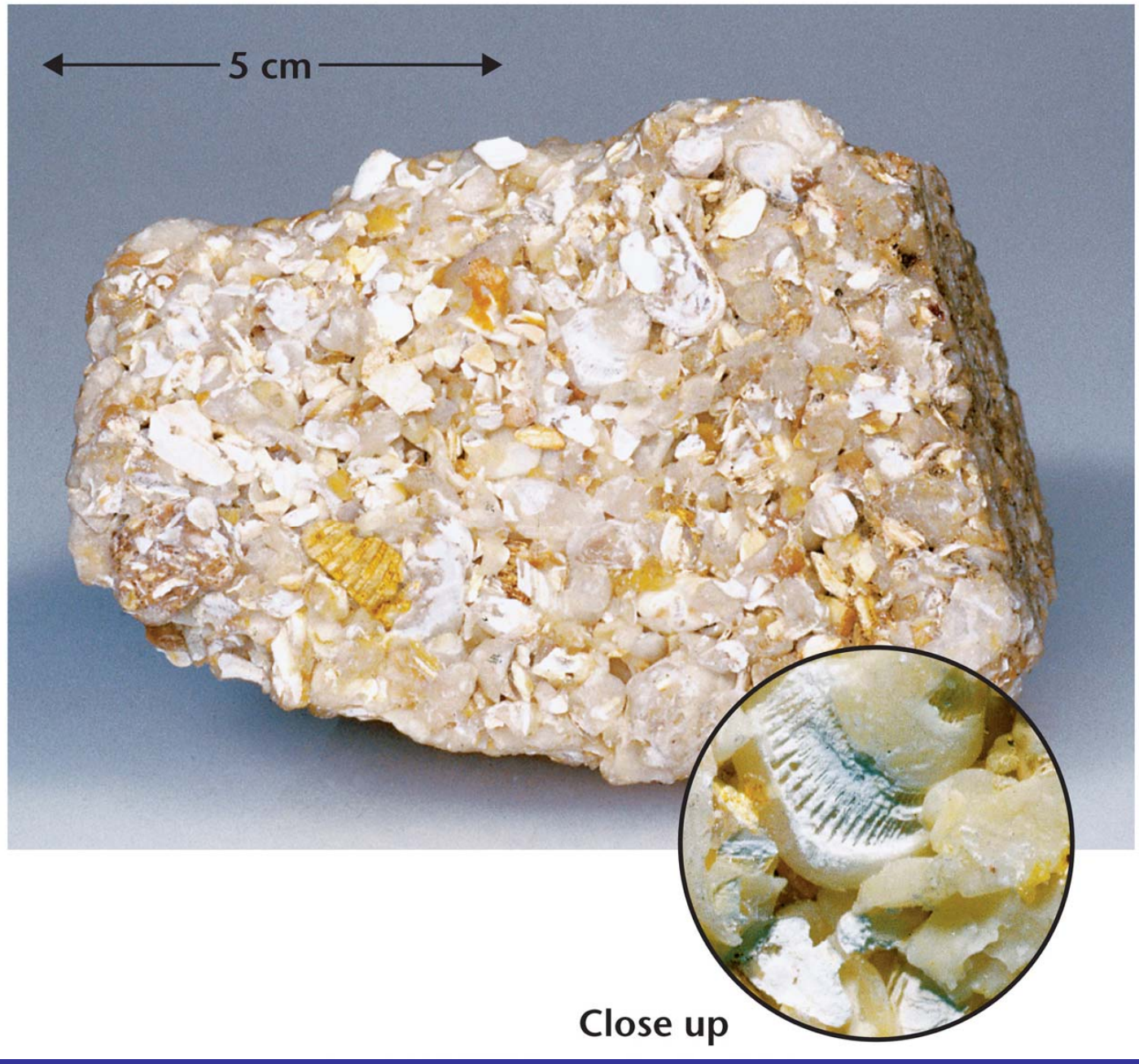








Coral Reef



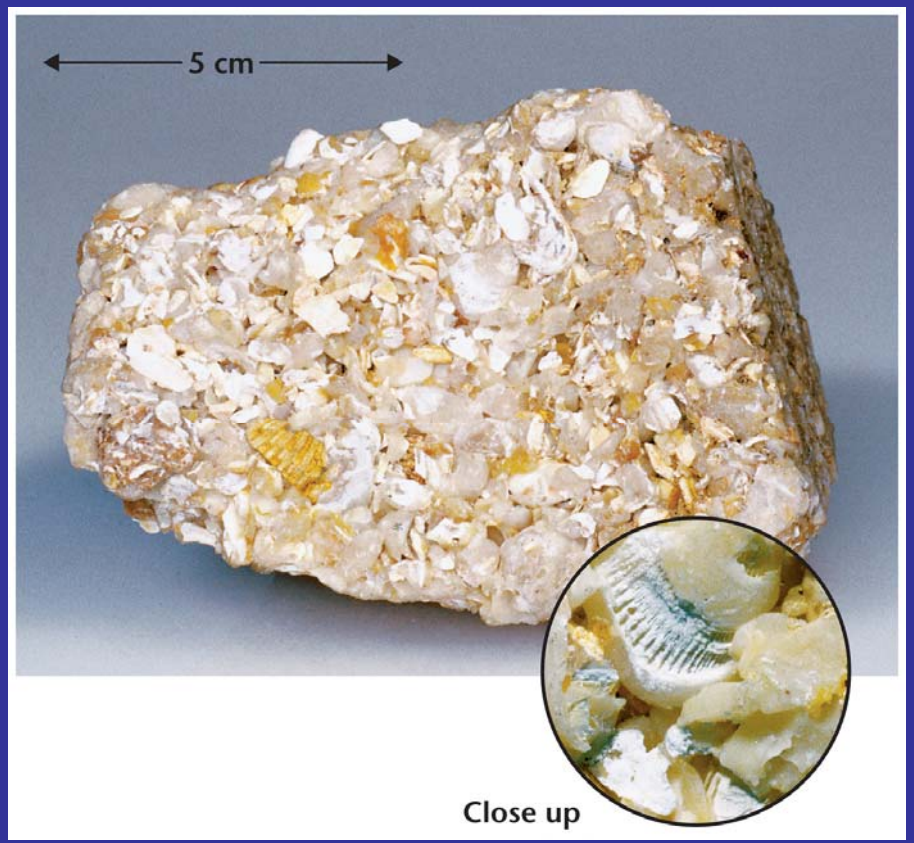
What kind of sedimentary rock is this?

A) Detrital
B) Chemical

Biochemical Sedimentary Rocks

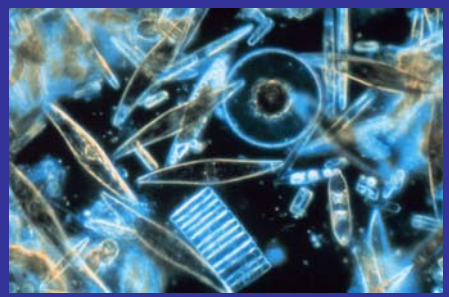
Limestones ($CaCO_3$)

1. Coral Reefs
2. Coquina
3. Chalk



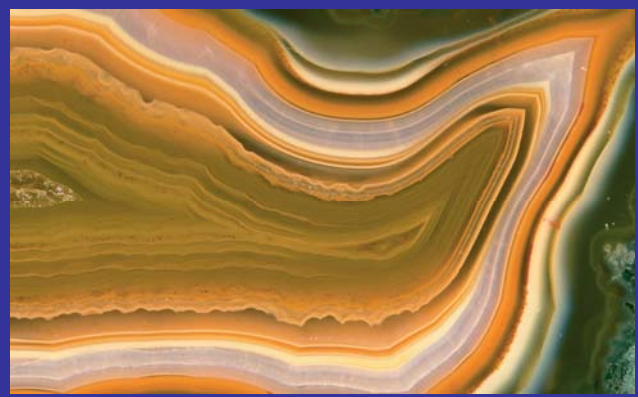
Chert (SiO_2)

1. Flint
2. Jasper
3. Agate











Gypsum $CaSO_4 \cdot 2H_2O$







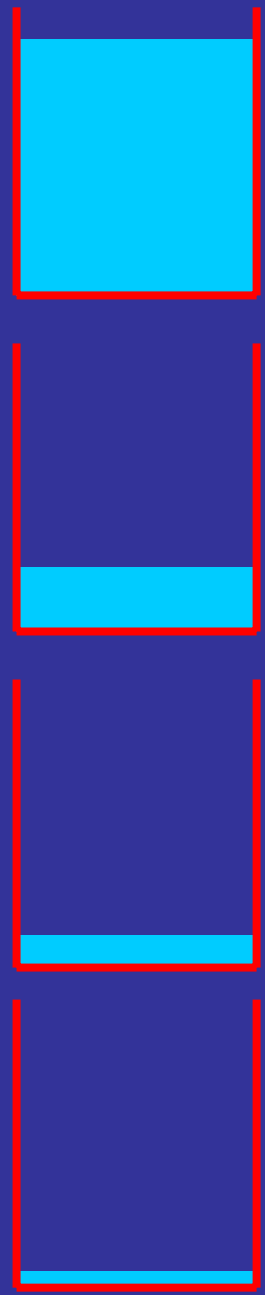
Chemical Sedimentary Rocks -

Evaporites









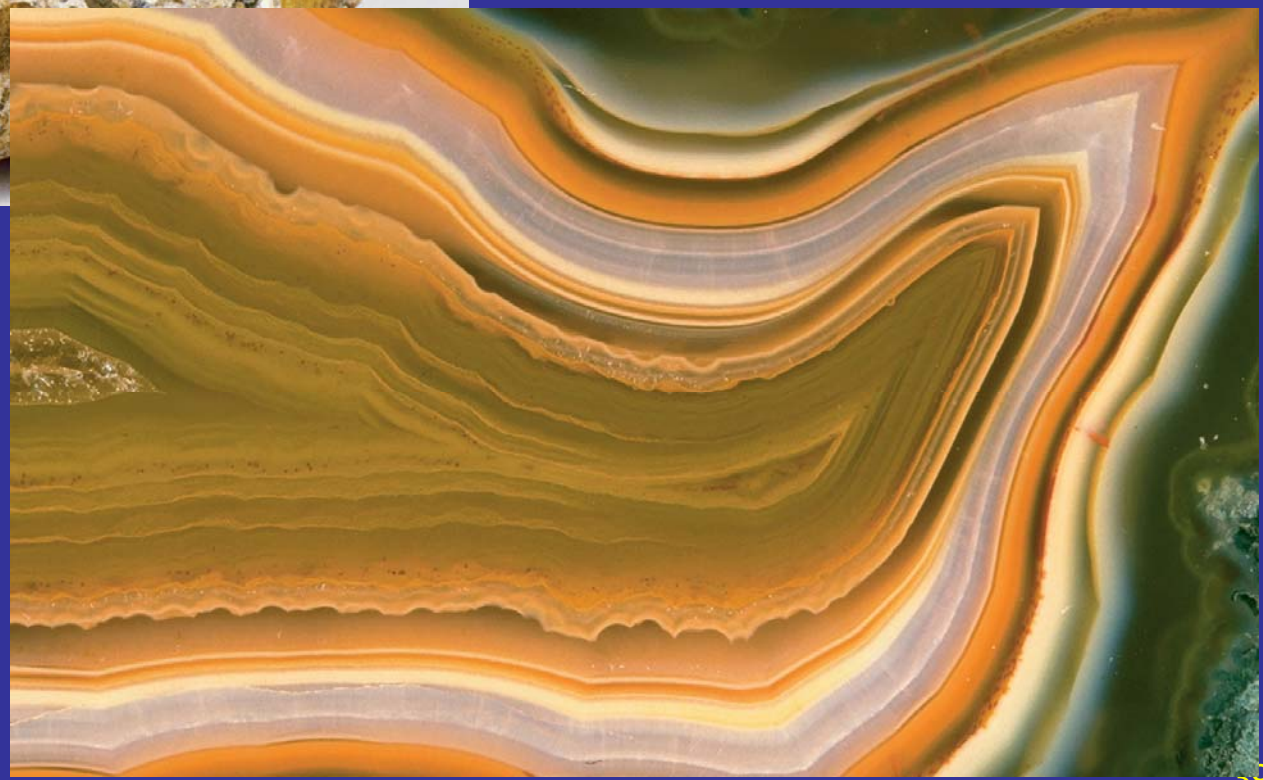


Detrital

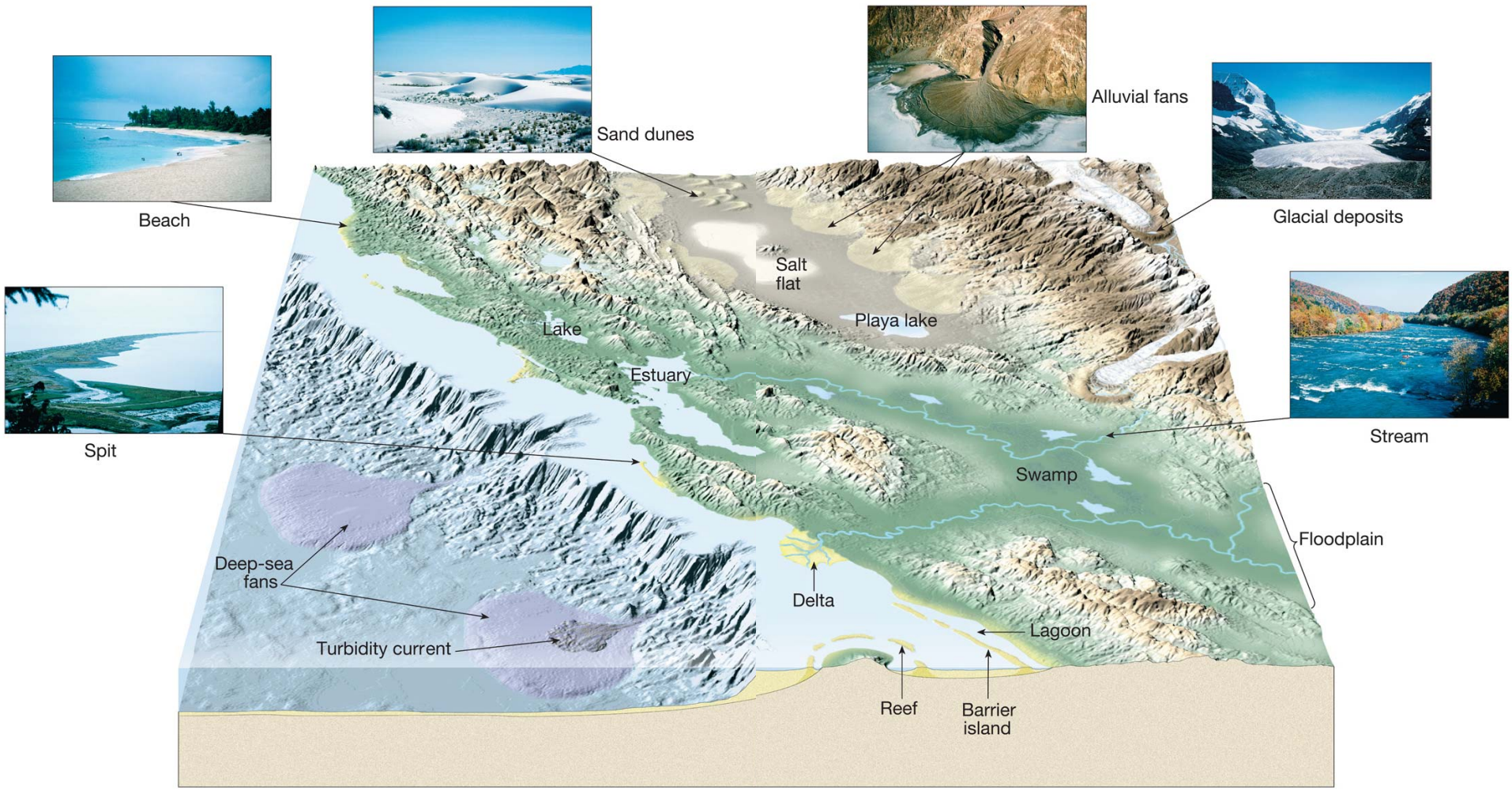
Shale
Siltstone
Sandstone
Breccia
Conglomerate

Chemical

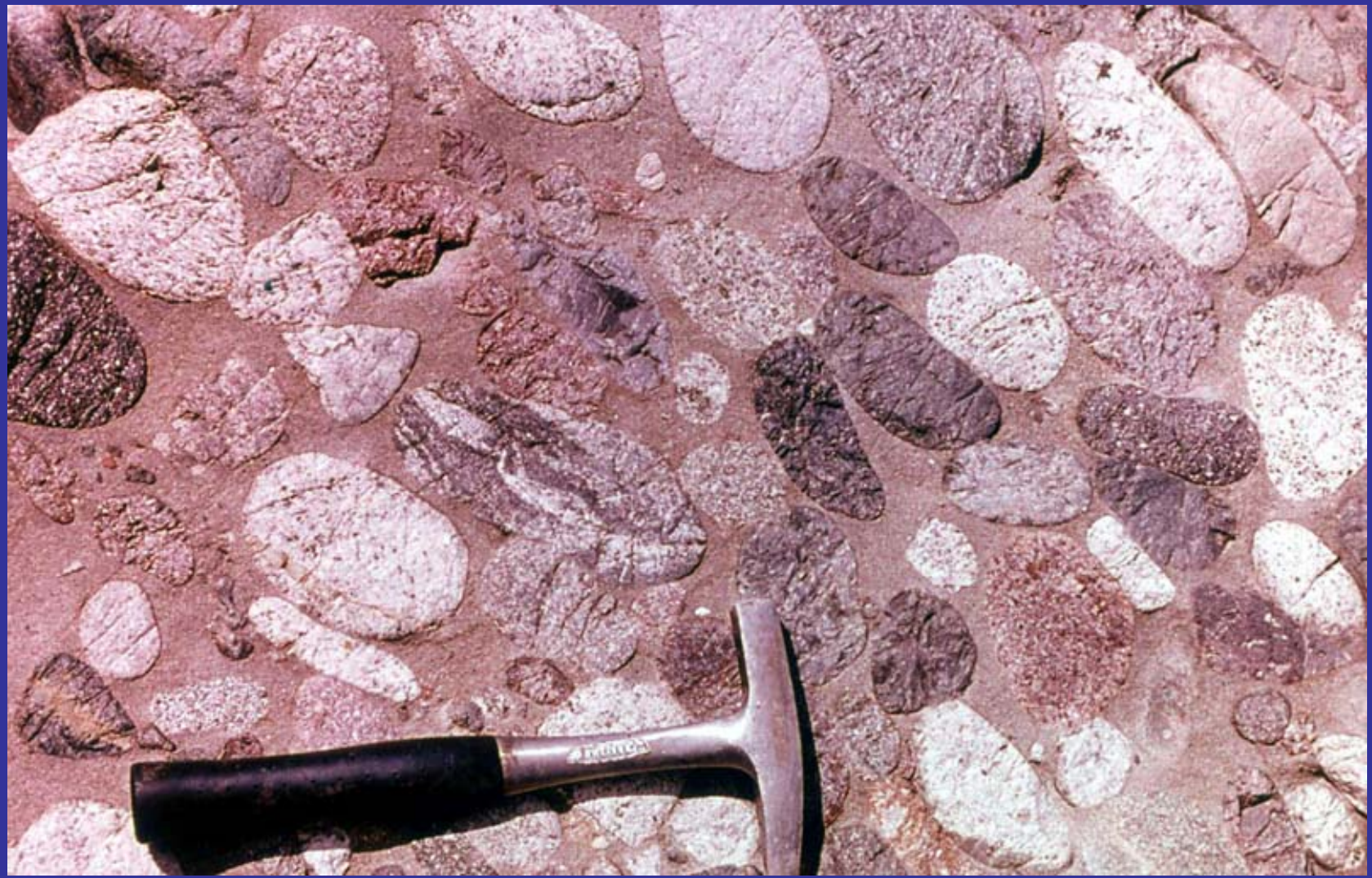
Biochemical
Evaporites



What would each of these rocks look like?




Victoria Falls, Zimbabwe / Zambia











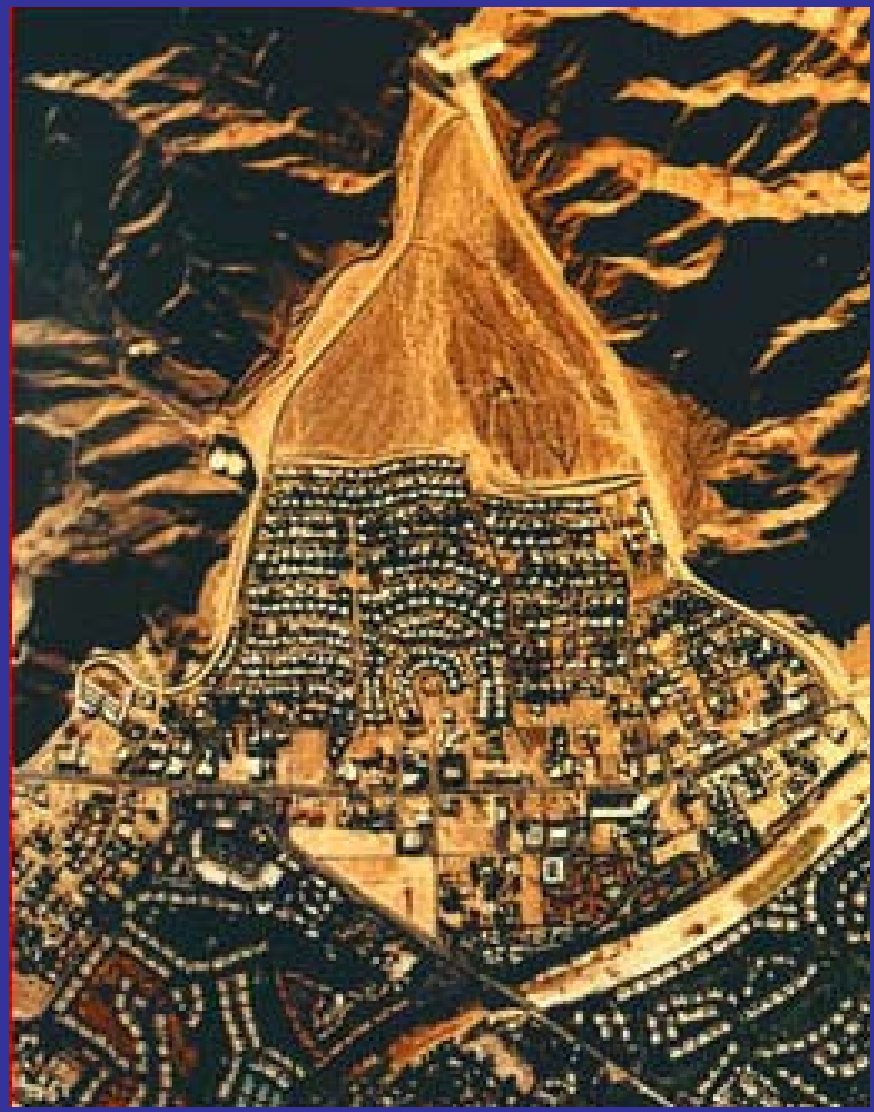




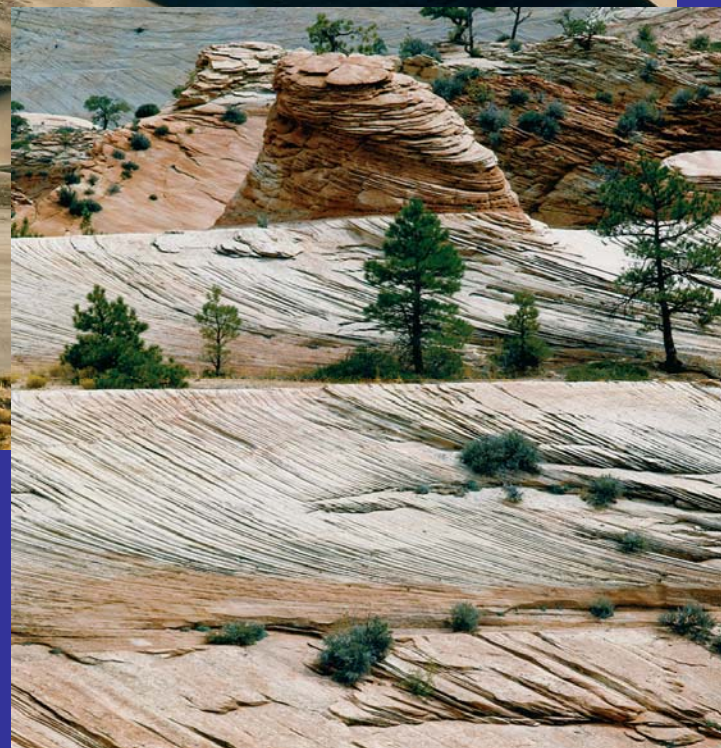
Fanglomerate



What's wrong with this picture?



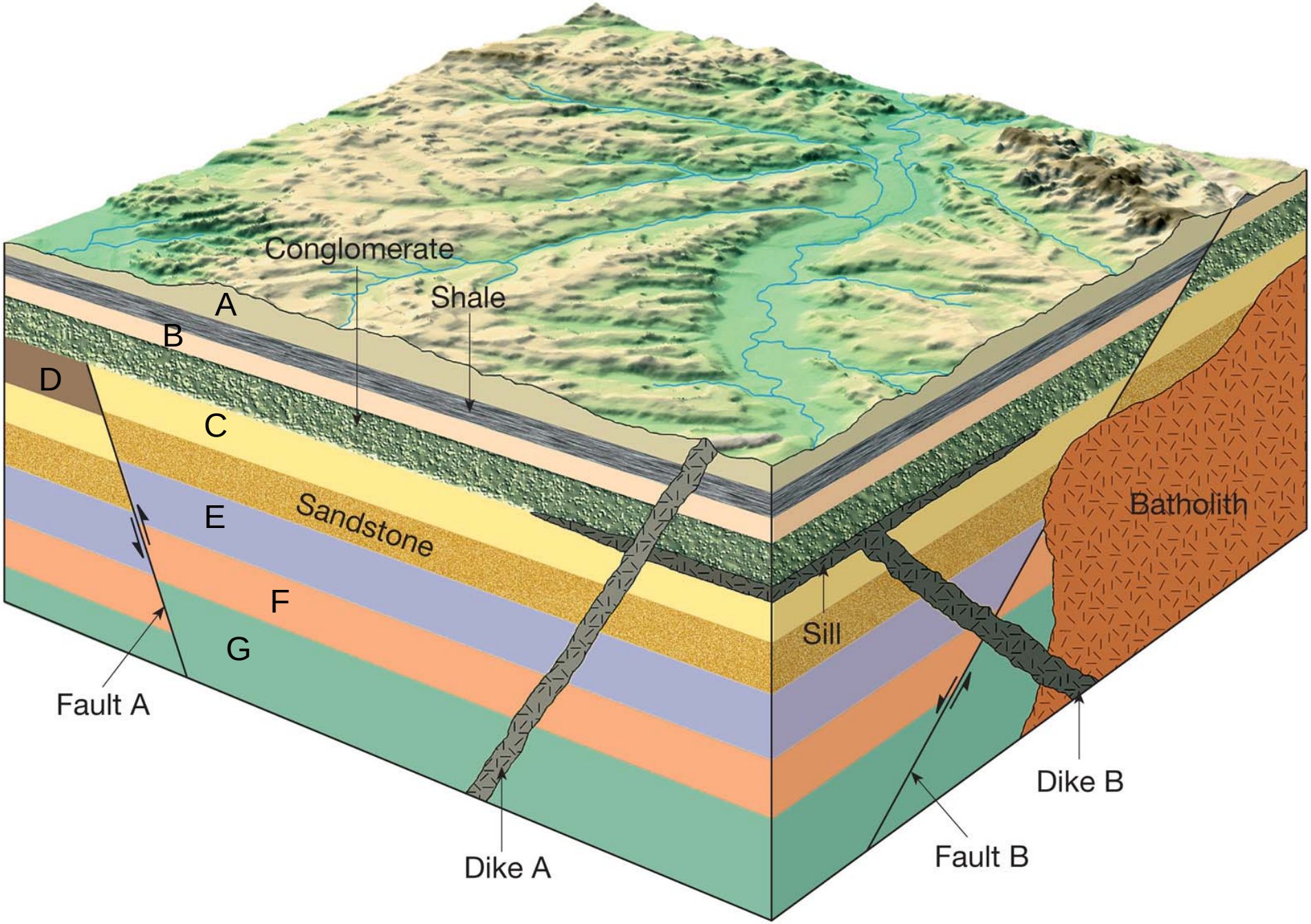




Sand dunes






Conglomerate
Shale
A
B
D
C
E
Sandstone
F
G
Fault A
Dike A
Sill
Batholith
Dike B
Fault B