

Benha University
Faculty of Science
Geology Department
Date: 17-1-2017
3rd year Geophysics



Paleoecology (315 G)
Final Exam (24 marks)
Time One Hour

I- Write on the following: (10 marks)

a- Classification of bivalves according to their mode of life and locomotion.

According to **Stanley** (1968) **Bivalves** subdivided ecologically on the basis of locomotion and attachment method into seven groups;

1- **Reclining:** lying immobile and un attached on the seafloor (*Gryphea*, *Exogyra*)

2- **Burrowing:** actively moving through the sediments (*Macoma*)

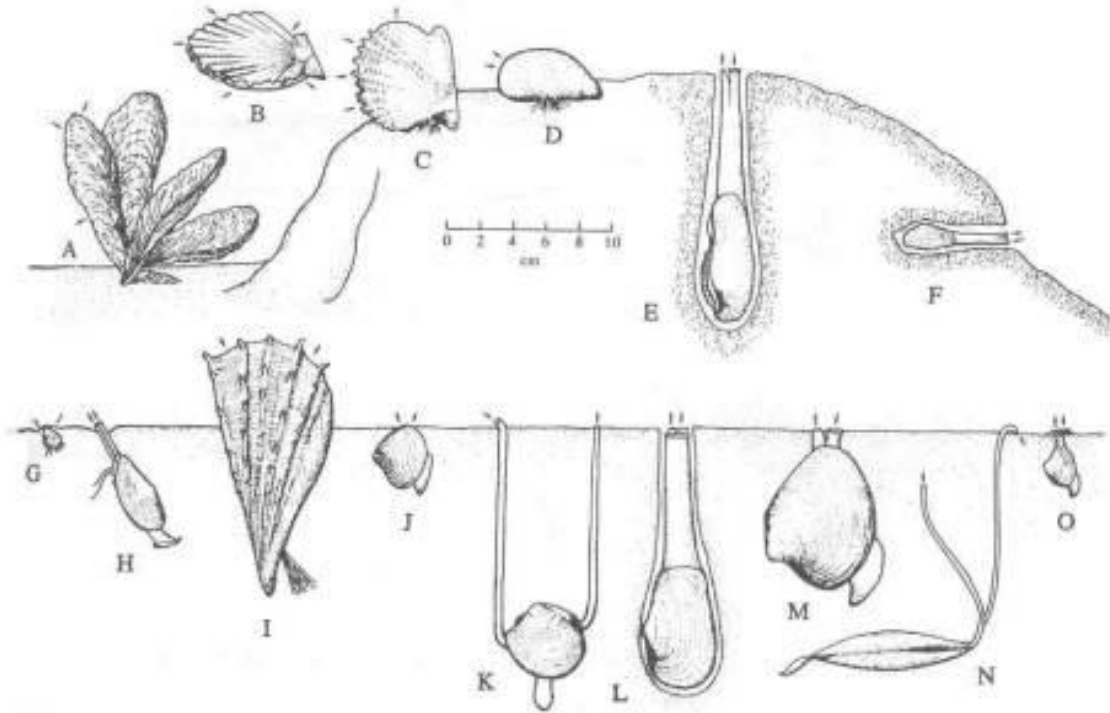
3- **Boring:** boring into a hard substrate (*Pholas*, *Lithophaga*)

4- **Bysally attached:** attached to the substrate by byssal threads (*Mytilus*, *Pinna*)

5- **Cemented:** attached to the substrate by secreted shell material (*Ostrea*, *Chama*)

6- **Swimming:** nectonic animals moving through the water but usually reclining or bysally attached (*Pecten*, *Lima*)

7- **Nestling:** living within a preexisting cavity in a hard substrate (*Isognomon*, *Barbatia*)



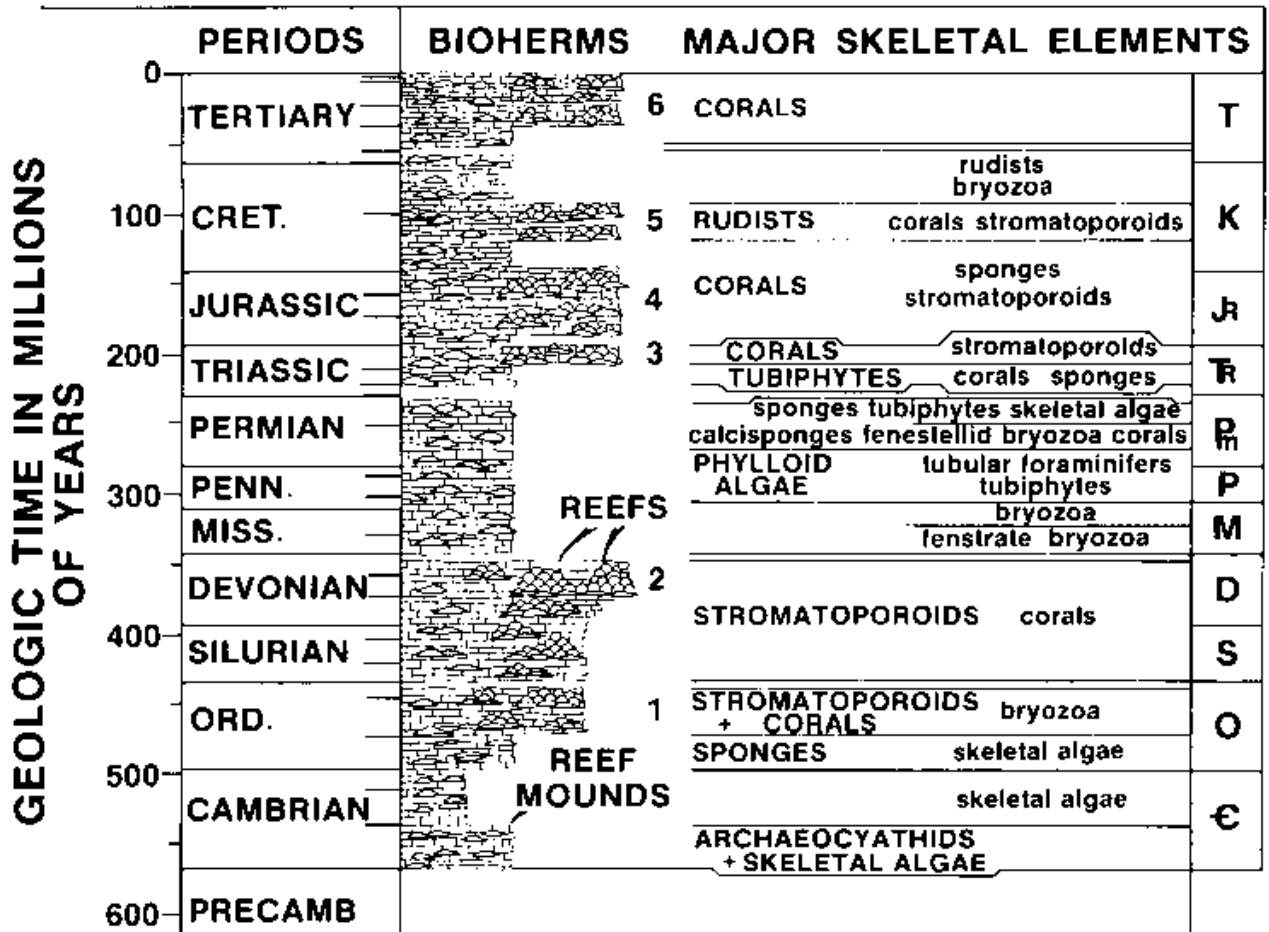
b- The strategies that a brachiopod might use to keep from sinking into a soft substrate.

The strategies that a brachiopod might use to keep from sinking into a soft substrate:

- 1- Reduce the density by having a thin, smooth shell
- 2- Develop a broad, flat shape to distribute the body weight over a maximum area
- 3- Retain a small size to reduce total mass
- 4- Keep the commissure high so that feeding can continue even when the shell is largely buried.

c- Reef builders through the Phanerozoic.

The dominant reef-builders and reef-dwellers have changed through time as a result of extinction and evolution



d- The value of shell concentrations in deducing the paleoenvironment

- Shell concentrations or dense accumulations of fossils are formed through the combination of three groups of factors:
- Biological processes, physicochemical processes, and time (Fuersich, 1995).
- Or by combination of mechanical and biological processes (Boyer et al. 2004).
- Shell concentrations: the term shell concentrations is used to denote deposits of any geometry containing a relatively dense accumulation of biogenic hard parts larger than 2mm .

II- Complete the following sentences:

(4 marks)

- a- The abundance of deep infaunal bivalves indicate shallow water, which can confirmed by low Planktic / Benthic foraminiferal ratio.
- b- The abundance of deposit-feeders organisms indicate quiet water, while the abundance of corals, and echinoids indicate normal marine salinity.

III- Correct the following sentences:

(4 marks)

- a- Trace fossils are usually preserved *in situ*.
- b- Ostracods are euryhaline organisms.
- c- The substrate play an important role in the distribution of the benthic organisms.
- d- The abundance of corals and echinoids indicate water of normal marine salinity.

IV- Compare between the following:

(6 marks)

- a- Palaeosynecology and Palaeoautecology

Palaeosynecology: This is the study of the interactions of organisms with one another and with the physical environment.

Palaeoautecology: The relationship of individual or small groups of organisms to their environment.

b- Bioherm and biostrome

- Bioherms are mound- or lens-shaped structures composed mainly of the skeletons or shells of carbonate-secreting organisms. Some are true, *in situ* reefs, whilst others formed as banks of loose, transported skeletal material.
- Biostromes are ribbon or sheet-shaped structures, also made largely of skeletal material, either in growth position (reefs in the strict sense) or transported.

c- Tempestites and tsunamiites

Storm layers or Tempestites (storm deposits from the Latin *tempestus*): are sheet-like sand, silt and mud beds of considerable lateral extent.

Grain size distribution and composition of tempestites vary greatly.

- Tsunamiites (Tsunami beds):
- Tsunami waves are generated by submarine earthquakes, large volcanic eruptions, submarine mass movements, and meteorites impacts onto the sea surface.
- These waves have very large wave length (up to 100-200 km), long wave periods (10-20 minutes) and therefore a very deep wave base

They range from coarse-grained (sand and gravel) to silty and muddy types as well as from siliciclastic types with hardly any fossil remains to calcareous

d- Tolerance and preference.

Tolerance: The range of conditions which an organism can withstand and survive.

Preference: A narrow range of conditions in which an organism functions best, with respect to physical conditions and competition with other organisms.

(Best Regards)

Dr. Gamal El Qot