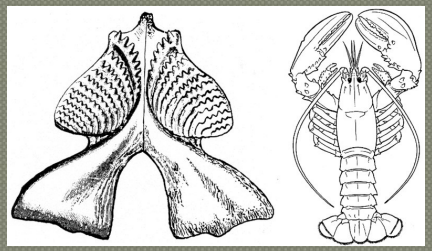
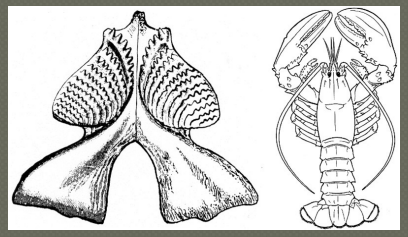
There was no Mesozoic marine revolution



Spencer G. Lucas and Adrian Hunt
New Mexico Museum of Natural History and Flying Heritage and Combat Armor Museum

Observations

- The phrase "Mesozoic marine revolution" refers to the Mesozoic origin of durophagous predators, and the co-evolutionary response of their prey as well as an increase in infaunalization.
- However, using "revolution" for a process that takes many tens of millions of years is semantically improper hyperbole.
- Durophagous predators and their prey began to coevolve by the Devonian, continued into the late Cenozoic and encompassed many distinct and convergent evolutionary events.
- Infaunalization has a similar, prolonged and complex history.
- Identifying a single "revolution" confounds understanding of the multiple events and evolutionary convergences that took place, so "Mesozoic marine revolution" should be abandoned.

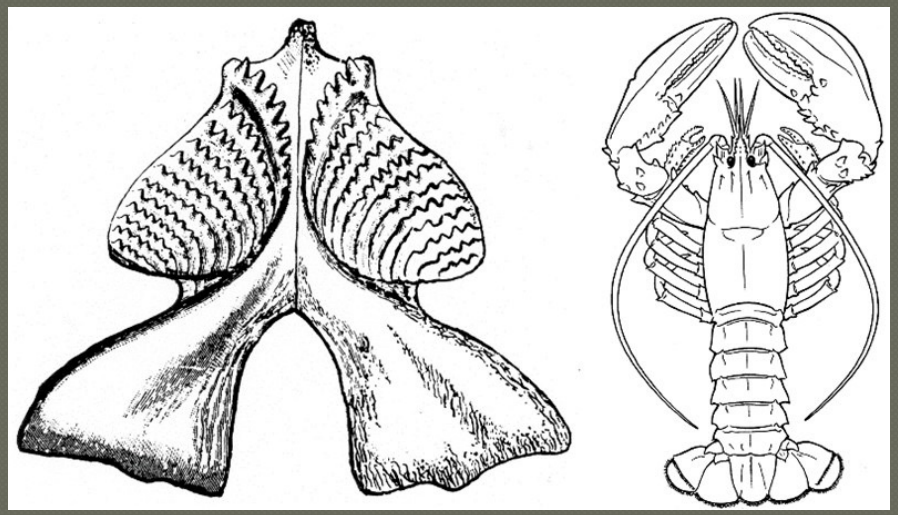


What is a "revolution?"

- "A sudden, radical, or complete change"—Merriam Webster
- Relatively short duration
- Not a series of events taking place over tens of millions of years
- Use of "revolution" in paleontology usually intended to hyperbolize events

Durophagy, infaunalization

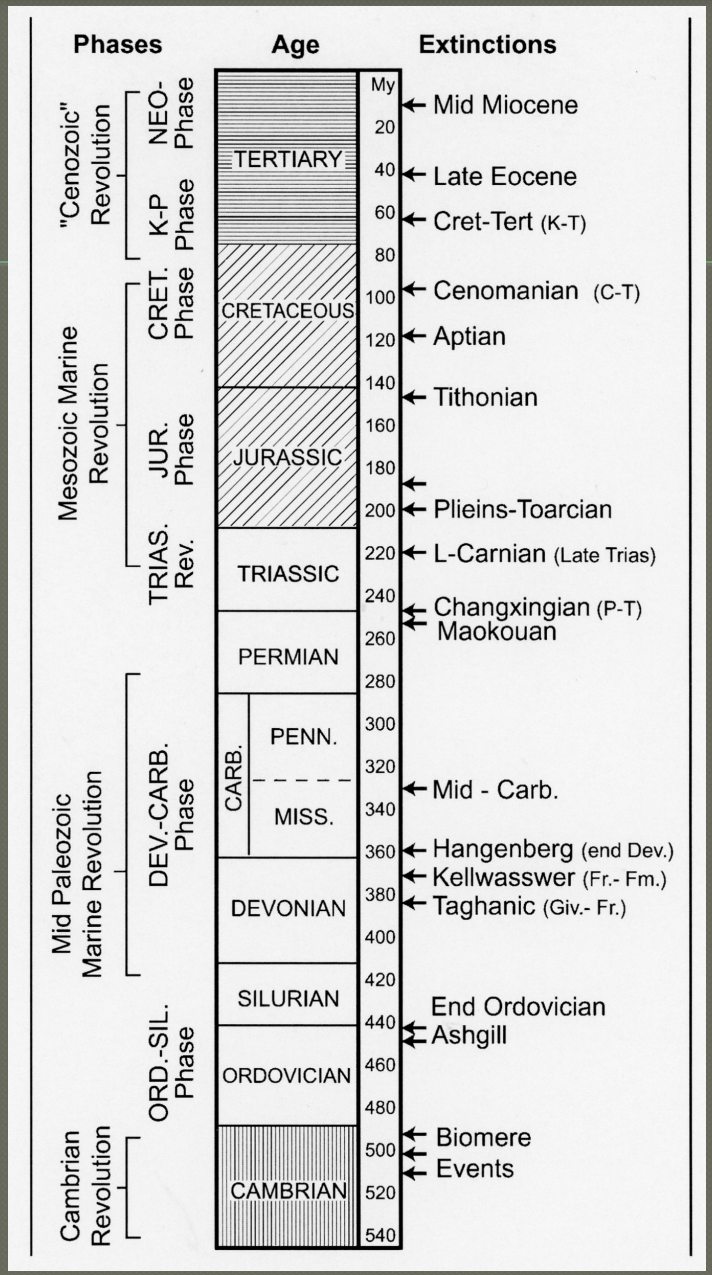
- Processes that began in the Paleozoic and continue to at least the Miocene
- Many evolutionary events
- Much convergence
- Not a single event, not a single "Mesozoic marine revolution."



- Two unrelated durophages that evolved hundreds of millions of years apart.
- Left: Carboniferous lungfish jaw, right, Modern lobster.

A single "Mesozoic marine revolution:"

- Conceals complexity
- Makes many disparate, not necessarily connected processes appear to be part of a single process that did not take place.
- Ignores the prolonged, multiple evolutionary events that produced different durophages and very different kinds of infauna



from Walker & Brett (2002)

Conclusions

- No single event can be called the Mesozoic Marine Revolution (MMR).
- Levels of predation and infaunalization increased during the Mesozoic as part of a lengthy set of processes that began in the Paleozoic and, over many tens of millions of years by multiple convergent evolutionary events, restructured benthic communities.
- Durophagy first evolved in the Paleozoic and continued to appear in diverse taxa that evolved disparate morphological adaptations to durophagy through the Neogene.
- When you combine multiple events into one, as the concept of the MMR does, you conceal complexity.
- Thus, not only is the term MMR simply semantically misleading, it also embodies a view of the history of the marine biota that is not matched by the fossil record.