

SOME MARINE PELECYPOD FAMILIES AND GENERA THAT ARE RELICTS OR LIVING FOSSILS

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The book *Living Fossils* (1984, edited by Eldredge and Stanley) was recently reviewed by Thomson (1987). He pointed out that the 32 contributors to this book had different ideas as to what a living fossil is. Some of the contributors were of the opinion that a living species that can be traced back to the Cretaceous would be a living fossil. Others would consider a lineage that has changed little through a great span of time (bradytely) would be considered a living fossil group. Still others would consider those lineages that were once much more widespread and diverse than they are now as living fossils. These groups are now represented by one or a few species with endemic or disjunct geographic distributions and may be phyla, classes, orders, families, or genera (Nicol, 1981). The term used for this phenomenon is a relict. In this essay I will briefly review nine groups of pelecypods that are relicts and can be considered living fossils. These nine groups have a good geologic record as verified by the *Treatise on Invertebrate Paleontology* (R. C. Moore, ed., 1969, 1971) and *Tertiary Faunas* (Davies, Vol. 1, 1971).

The relict family Cucullaeidae was common and diverse during the Jurassic and Cretaceous. The family is now represented by a single variable species of *Cucullaea* that lives in the Indo-West Pacific region (Nicol, 1950b).

The Gryphaeidae can be considered a relict family in Recent seas. The family is now represented by one subfamily, the Pycnodontinae, with six species that occur in either the Tropical or North Warm Temperate zones (Harry, 1986). Two subfamilies and two tribes are extinct, and this family was much more diverse in the Jurassic and Cretaceous seas (Nicol, 1984).

The Trigoniidae are commonly considered living fossils. The family comprised many genera and had a world-wide distribution during the Jurassic and Cretaceous but is now represented by a single genus

with five or possibly six species (Stanley, in Eldredge and Stanley, eds., 1984). The unusual aspect of the geographic distribution of the Trigoniidae is that they have been confined to the seas around Australia throughout the Cenozoic.

The Fimbriidae is a relict group that was widespread in warm seas during the Jurassic and Cretaceous. The family became less diverse and its geographic range contracted during the early Tertiary, and it now is represented by two living species of *Fimbria* that occur in the Western Pacific (Nicol, 1950a). The Fimbriidae is a conservative stock; the Cretaceous species look much like the Recent ones.

Astarte is a relict genus with a markedly disjunct geographic distribution. About six species live in Boreal and Arctic waters, and one tiny rare species lives in the Antarctic region. The Astartidae is poorly represented in Recent seas (Boss, 1971) as compared with the family during the Jurassic and Cretaceous.

The Arctidae is a relict family that was represented by many genera and species during the Jurassic and Cretaceous, but *Arctica* has one living species confined to the Boreal North Atlantic (Nicol, 1951a). Relatively few species and genera of the Arctidae occur in Tertiary strata.

Glossus is a relict that is represented by a single species that lives from the Mediterranean Sea northward to Norway and Iceland (Nicol, 1951b). It was more widely distributed and diverse in the Tertiary.

Meiocardia is a relict with a disjunct geographic distribution. It is presently living in the Caribbean and the Gulf of Mexico and also in the Philippines, East Indies, and Hawaii. There are possibly four or five living species, but this genus was more diverse and widely distributed during the Tertiary. *Glossus* and *Meiocardia* are not closely related because the hinge teeth, shell shape, and ribbing are quite different between the two genera (Davies, 1971).

Pholadomya, which is found today as a single rare species in deep water in the Caribbean, is a notable relict. Cox and Newell (in Moore, ed., 1969) mention that the small-sized species in the Antarctic do

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not belong to the genus *Pholadomya*. The family Pholadomyidae is not diverse in Recent seas (Boss, 1971), but it was particularly common in the Jurassic and to a lesser extent in the Cretaceous, gradually waning throughout the Tertiary.

Possibly *Miltha*, *Kuphus*, and the Clavagellidae can be considered living fossils on the basis of their past and present geographic distributions. Further careful work on the phylogenetic histories of living marine pelecypod groups will likely unearth additional relicts or living fossils.

The genus *Tellidorella* Berry, with one living species found in the Eastern Pacific, has been cited as a living fossil by Chavan (in Moore, ed., 1969). The genus has been allocated to the Cardiniidae by Chavan, but there is no geologic record of this family in Cretaceous or Paleogene strata. *Tellidorella* may be an example of homeomorphy, which is not a rare phenomenon amongst the pelecypods.

Some of the relict groups have changed little in the physical habitat since the Mesozoic. An example is Fimbriidae, which has always been confined to warm water. Others, for example *Astarte*, *Arctica*, and *Pholadomya*, lived in warm and shallow water and were widely distributed during the Jurassic and Cretaceous. *Astarte* and *Arctica* are now confined to cold and cold-temperate water and *Pholadomya* is now found in deep water. It is often fallacious to base paleoecological interpretations on present relict groups. Species of Eocene astartids do not necessarily indicate cold or cool water. In this instance the present is not a key to the past.

Almost every major geographic province has at least one living relict group. Five of the nine groups reviewed here have part or all of their geographic distribution in the warm water of the Western Pacific. However, the Western Pacific encompasses a

large area of shallow water and has the most diverse marine pelecypod fauna in the world, and on the basis of the total pelecypod fauna, it may not have the highest percentage of relicts.

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