

# Sci p2 phyletic gradualism and punctuated equilibrium

[Science](#), [Biology](#)



The paper "Phyletic Gradualism versus Punctuated Equilibrium" is a great example of an essay on biology. Phyletic Gradualism believes in the constant rate of evolution and the gradual transformation of ancestral species to produce new ones. Gradualists affirm that the incompleteness of fossil record is responsible for the nominal manifestations of transitional forms among species. The philosopher Daniel Dennett also believes in the gradual process of evolution. Charles Darwin was believed to be a gradualist, though not in the concept of evolutionary rates but of adaptations. (Ridley) On the other hand, Punctuated Equilibrium, based on scientists Stephen Jay Gould and Niles Eldredge, affirms that species undergo little changes in a very long period of time. Moreover, this theory explains that evolution happens from a small group of species coming from the main body then gets separated from it geographically, undergoes changes, then forms a new breed of species. (WGBH Educational Foundation and Clear Blue Sky Productions, Inc., 2001) Punctuated Equilibrium suggests that fossil record cannot give an account to the speciation process. For instance, if one records the existence of ancestral species in a certain place, there is a chance that new species are evolving in another place. This evolution trend reduces the probability of the species to be fossilized. Fossils from the new species are possible only if it happens to return to its ancestral range or be a different type that coexists with its relatives.

Bryozoans, which are coral-like sea organisms, show evidence of punctuated equilibrium. The fossil record shows that the existence of one species 140 million years ago and no changes in the said species were found in the first 40 years. This pattern of diversification and stability then recurred in many

years.

Nevertheless, the frequency of this evolution pattern remains an issue. Its occurrence is being questioned as a standard event or simply a rare phenomenon. Punctuated equilibrium is also challenged to conduct further studies as to the factors that affect rapid evolution or period of stability.

(WGBH Educational Foundation and Clear Blue Sky Productions, Inc., 2001)

There are eight processes that produce rapid evolution. These are stasis; isolation; strong selection and rapid change; no preservation; reintroduction; expansion and stasis; preservation; and the occurrence of evolution in sharp jumps with speciation events. (University of California Museum of Paleontology, 2012)

Stasis is where a population of species live, die, and become fossils in hundred thousand years interval. The said fossils provide only insufficient evidence of evolution. Isolation is where a small number of certain species get separated from the entire population. After which, a rapid evolutionary change takes place caused by its new environment and small population. This new environment gives out selection pressures to the isolated population. Hence, the rapid evolutionary change begins among the isolated group of species.

Due to the minute size of the isolated group of species, their rapid change, and remote location, there is relatively no possibility of fossil preservation among them. Eventually, reintroduction occurs, wherein the sea level rises and the isolated population species get reunited with another population of the same lineage. The population of the species that were isolated then grows in size causing it to outnumber and overpower the original large

population. Thus, punctuated equilibrium shows a pattern of stasis-rapid change-stasis. It is the large population that normally undergoes the stage of stasis and it is the isolated population that goes through rapid evolution.

(University of California Museum of Paleontology, 2012)

There are certain phenomena in our present generation that support the long history of life on earth. The unique orientation of our Solar System produces life. Earth is found to possess the proper conditions that are ideal to sustain life such as carbon, amino acids, and proteins.

Heterotrophs are believed to have started life on earth. These heterotrophs lived in the sea and took in organic materials made from Earth's reactions.

The produced building blocks served as the food source, thereby, giving birth to the concept of the food chain. When these organisms died, their organic materials decomposed and combined with the original organic matters that made them up.

Life on earth possesses natural adaptability for survival. Diversification from previous species was believed to have taken place about three billion years ago. Autotrophs were able to produce energy from inorganic materials like the Sun. This inexhaustible source had sustained life on earth since then.

(Biology Online)

Phyletic gradualism is primarily corroborated by fossil evidence. However, there are still missing links in this evolution hypothesis. Paleontologists found fossil records to be lacking. There are still debates among evolutionists as to the real pattern of gradualism, particularly with regard to “intermediate” forms of life. (Luskin, 2004)

Punctuated equilibrium is evident in a certain population of animals, plants,

and fungi, which had shown signs of rapid change. Instead of using fossil records, Mark Pagel and his colleagues used phylogenetic trees obtained from related species. Based upon the examination conducted on these phylogenetic trees, 30 to 35% of these had corroborated punctuated equilibrium while the rest provided evidence for gradual evolution.

Researchers had found more evidence of punctuated equilibrium among plants and fungi than animals, though there are still possible loopholes in these findings like extinction rates and misdated events. (Phillips, 2006)