Punctuated Equilibrium Encyclopedia Article

Punctuated Equilibrium

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Contents

Punctuated Equilibrium Encyclopedia Article.....1

Contents.....2

Punctuated Equilibrium.....3

Punctuated Equilibrium

Punctuated equilibrium is an evolutionary theory put forward by Niles Eldredge and Stephen Gould in 1972 that runs counter to Charles Darwin's evolutionary theory of gradualism. Darwin's evolutionary theory maintains that adaptation in species are the result of a continuous process of gradual change. Within the tenants of gradualism, an adaptation would take many millions of years and all intermediate forms would exist for a long period, leaving a large likelihood for intermediate fossil types to exist. Surprisingly, intermediate forms are rare within the fossil record, and this lack of intermediate fossil evidence lead Eldredge and Gould to formulate the theory of punctuated equilibrium.

Contrary to Darwin's gradualism, punctuated equilibrium suggests that new species may have arisen rapidly over only a few thousand years and then remained unchanged for many millions of years before the next period of adaptation. Rather than occurring over the majority of the population, punctuated equilibrium postulates that change occurred in only a small part of the population. With change occurring rapidly within a small portion of the population, intermediate species would not likely be represented in the fossil record. Adaptation would be swift and profound to have such a major effect.

The sort of macro mutations that Gould and Eldredge envisioned include mutations within regulator genes which simultaneously affect a whole operon and, thus, drastically affect the development of the organism. The incipient species would have to then supplant the original species and natural selection would eliminate intermediate types.

Darwin himself had recognized that such events may occur and contrary to some peoples beliefs punctuated equilibrium can be quite easily explained by and accepted into the system of natural selection.