



Purposeful Evolution

Ron Deming

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Purposeful Evolution is an interesting, science-based examination of life on Earth.

Two dominant paths that lead to plant and animal evolution receive scrutiny in Ron Deming's *Purposeful Evolution*.

Taking a scientific approach, the text cites two ways that genetic changes occur: through purposeful evolution, in which changes help species to survive; and through undirected evolution, which occurs at random, without regard to outcome. Plant and animal examples are presented in order to compare and contrast these pathways.

The book's main theme is articulated in the opening chapter: that competition among plants and animals, predator and prey, prompts purposeful evolution, and that this creates a balanced ecosystem rather than a utopia. How this theme plays out in the development of new species, among ecosystems, and in the development of symbiotic relationships is the subject of following chapters. A final chapter sets forth the idea that the evolution of life on Earth mirrors the workings of the universe.

Numerous examples drawn from flora, fauna, and ecosystems are a highlight and are presented in a way that is comprehensible for nonexperts in the sciences. Guppies are used to illuminate the myriad complex adaptations needed to sustain a species over time, with the example that, when predators are numerous, female guppies grow smaller, mature sooner, and produce more offspring, giving the species a greater chance for survival. Conversely, the text argues, when predators are few, females are larger, mature later, and have fewer but larger offspring. Interesting insights into how scientists draw conclusions from fossil records are included.

Woven through the interesting and accessible examples from the physical world are intricate and technical explorations. When the book turns to detailed scientific points, it becomes less accessible to general readerships. Undefined technical terms make up a large part of the text and slow the pace of reading. The writing in the more technical sections is turgid and often unclear. Reading ease is further hindered by the book's layout, through which narrow pages and short lines force single sentences onto multiple lines.

The final chapter borrows from quantum mechanics and other sciences to propose a third way of understanding evolution, framing it as a process that mirrors the universe's swings from explosive growth (as in purposeful evolution) to long periods of stasis (seen in the gradualism of undirected evolution). In this view, the two processes work together, with undirected evolution creating the random combination of molecules that became complex and successful through purposeful evolution. Though the idea is credible and intriguing, its presentation ranges across too many subjects, is not explained in enough depth, and seems more like an assertion than a proof.

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SUSAN WAGGONER (December 11, 2019)

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