

Charles Darwin: *The Origin of Species* (1859)

Opposition to evolutionary theory has always been most vigorous among those who felt that their religious beliefs required them to reject it. Darwin was acutely aware of this fact and tried whenever he could to accommodate religious sensibilities. In the following overview of his theory of natural selection he emphasizes not only how much more rational the theory is than the claim that each species was separately created, but argues that it is marvelous and worthy of a majestic creator as well. In the final paragraph he lays down the basic elements of his theory: that individuals in every species tend naturally to vary from the norm, and that when there are so many members of a species sharing an ecological niche that they are competing for survival, only those whose variations give them decisive advantages will survive. They will pass these characteristics on to their descendants. Despite many disagreements among scientists about the details of evolution, some of which are mentioned in the footnotes below, most of them agree that a century and a half of accumulated evidence supports the broad outlines of this elegant theory which explains nature's oddities, failures and even occasional ugliness as the products of chance operations rather than of an omnipotent god.

What examples does Darwin give of features of nature that seem like errors ("less than perfect")?

As natural selection acts solely by accumulating slight, successive, favorable variations, it can produce no great or sudden modifications; it can act only by short and slow steps. (1) Hence, the canon of "*Natura non facit saltum*," (2) which every fresh addition to our knowledge tends to confirm, is on this theory intelligible. We can see why throughout nature the same general end is gained by an almost infinite diversity of means, for every peculiarity when once acquired is long inherited, and structures already modified in many different ways have to be adapted for the same general purpose. We can, in short, see why nature is prodigal in variety, though niggard (3) in innovation. But why this should be a law of nature if each species has been independently created no man can explain.

Many other facts are, as it seems to me, explicable on this theory. How strange it is that a bird, under the form of a woodpecker, should prey on insects on the ground; that upland geese which rarely or never swim, should possess webbed feet; that a thrush-like bird should dive and feed on sub-aquatic insects; and that a petrel should have the habits and structure fitting it for the life of an auk! and so in endless other cases. But on the view of each species constantly trying to increase in member, with natural selection always ready to adapt the slowly varying descendants of each to any unoccupied or ill-occupied place in nature, these facts cease to be strange, or might even have been anticipated.

We can to a certain extent understand how it is that there is so much beauty throughout nature; for this may be largely attributed to the agency of selection. That beauty, according to our sense of it, is not universal, must be admitted by every one who will look at some venomous snakes, at some fishes, and at certain hideous bats with a distorted resemblance to the human face. Sexual selection has given the most brilliant colors, elegant patterns, and other ornaments to the males, and sometimes to both sexes of many birds, butterflies, and other animals. With birds it has often rendered the voice of the male musical to the female, as well as to our ears. Flowers and fruit have been rendered conspicuous by brilliant colors in contrast with the green foliage, in order that the flowers may be easily seen, visited, and fertilized by insects, and the seeds disseminated by birds. How it comes that certain colors, sounds, and forms should give pleasure to man and the lower animals,--that is, how the sense of beauty in its simplest form was first acquired,--we do not know any more than how certain odors and favors were first rendered agreeable.

As natural selection acts by competition, it adapts and improves the inhabitants of each country only in relation to their co-inhabitants; so that we need feel no surprise at the species of any one country, although on the ordinary view supposed to have been created and specially adapted for that country, being beaten and supplanted by the naturalized productions from another land. Nor ought we to marvel if all the contrivances in nature be not, as far as we can judge, absolutely perfect, as in the case even of the human eye; or if some of them be abhorrent to our ideas of fitness. We need not marvel at the sting of the bee, when used against an enemy, causing the bee's own death; at drones being produced in such great numbers for one single act, and being then slaughtered by their sterile sisters; at the astonishing waste of pollen by our fir-trees; at the instinctive hatred of the queen-bee for her own fertile daughters; at ichneumonidae (4) feeding within the living bodies of caterpillars; or at other such cases. The wonder indeed is, on the theory of natural selection, that more cases of the want (5) of absolute perfection have not been detected. . . .

Authors of the highest eminence seem to be fully satisfied with the view that each species has been independently created. To my mind it accords better with what we know of the laws impressed on matter by the Creator, that the production and extinction of the past and present inhabitants of the world should have been due to secondary causes, like those determining the birth and death of the individual. When I view all beings not as special creations, but as the lineal descendants of some few beings which lived long before the first bed of the Cambrian (6) system was deposited, they seem to me to become ennobled. Judging from the past, we may safely infer that not one living species will transmit its unaltered likeness to a distant futurity. And of the species now living very few will transmit progeny of any kind to a far distant futurity; for the manner in which all organic beings are grouped, shows that the greater number of species in each genus, and all the species in many genera, have left no descendants, but have become utterly extinct. We can so far take a prophetic glance into futurity as to foretell that it will be the common and widely-spread species, belonging to the larger and dominant groups within each class, which will ultimately prevail and procreate new and dominant species. As all the living forms of life are the lineal descendants of those which lived long before the Cambrian epoch, we may feel certain that the ordinary succession by generation has never once been broken, and that no cataclysm has desolated the whole world. (7) Hence we may look with some confidence to a secure future of great length. And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection. (8)

It is interesting to contemplate a tangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other, and dependent upon each other in so complex a manner, have all been produced by laws acting around us. These laws, taken in the largest sense, being Growth with Reproduction; Inheritance which is almost implied by reproduction; Variability from the indirect and direct action of the conditions of life, and from use and disuse; a Ratio of Increase so high as to lead to a Struggle for Life, and as a consequence to Natural Selection, entailing Divergence of Character and the Extinction of less-improved forms. Thus, from the war of nature, from famine and death, the most exalted object which we are capable of conceiving, namely, the production of the higher animals, directly follows. There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.

(1) One modern school of thought rejects Darwin's gradualism, arguing that sudden and widespread change after long periods of stability has been more characteristic of evolutionary history.

(2) Nature makes no leaps.

- (3) Miserly.
- (4) A kind of wasp.
- (5) Lack.
- (6) About 700,000,000 years ago
- (7) Darwin has in mind not only the Biblical flood, but theories of nature which attributed all traces of large-scale change to various catastrophes. Ironically, most modern Darwinians have integrated the belief in at least one great cataclysm--the cometary impact which evidently ended the age of the dinosaurs--into evolutionary theory.
- (8) This view has been disputed by some scientists who argue that later forms are not necessarily "better" than later ones.

The Complete Text of The Origin of Species

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