

# Evolution and sacrifice: Cooperation as a scientific principle

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Followers of the media furor about evolution and God may be forgiven for imagining that they have to choose between Darwinian theory and belief in divine providence. After all, the most vociferous current contestants in this long-running debate are either atheistic supporters of evolutionary theory or Christian supporters of the riposte position known as intelligent design.

I suggest that there is a way to avoid this false disjunction altogether. I would argue that new discoveries about the phenomenon known to evolutionary theorists as cooperation give us fresh reasons to regard evolutionary theory and classic Christian theism as entirely compatible—indeed, richly and convincingly so. To make this case, however, we first have to clear some important theological ground. Without clarity on a fundamental point, nothing can go well.

The main presumption insidiously bedeviling so much debate about science and religion is that God and the evolutionary process are somehow competing for space. God is perceived as a bit player (a very big one, of course) whose effects somehow have to be fitted into a system that is already close to being fully explained by science. This God is thus found to be redundant; or squeezed into some special locus of activity seemingly not yet explained by Darwinian theory; or cut down to size as an individual who is himself in process and development—a God with a so-called open future.

Why do I view all these options as theological mistakes? The reason is that, on a classical view of divine creativity and divine providence, God's causality is necessarily unique and *sui generis*. It is quite unlike any specific created causal act, because it operates on a completely different level. God is creator of all that is. Thus, when God causes something to be or to happen, there is no reason—either logical or empirical—why this should involve any conflict with what Thomas Aquinas called the secondary causations that are simultaneously operating at the created level.

Let us presume that we can get our minds around this noncompetitive and bilevel understanding of God's relation to the world and to events in the created order. So far so good. There is no metaphysical reason why God may not be operating as transcendent undergird and cause of the entire created evolutionary process, and is doing so without obstructing or impeding any of the particular mechanisms of evolutionary development so brilliantly outlined by Darwin.

If the atheist detractor were to find this bit of theological footwork laughable, I would invoke Stephen Jay Gould's idea of "two magisteria" and declare evolutionary processes and divine providence as at least metaphysically compatible. But what would it take for belief in a divine providential causality to become both attractive and convincing, as opposed to merely one theological hypothesis that secular scientists, by definition, have no need of?

It is here that recent developments in the mathematicalization of evolutionary theory are so suggestive and important, especially as they bear on the evolutionary phenomenon of cooperation. In the past 50 years or so, game theorists have been trying to work out the conditions under which an evolutionary strategy that involves an immediate loss to an individual in terms of fitness (in a population in which another thereby gains) can nonetheless become stable and go on recurring in populations.

To put it another way: such a strategy, known technically by evolutionary theorists as cooperation, ought not to work if selfishness is the sole key to success in evolutionary development. Cooperation surely ought to die its own natural death.

But in fact it does not; and the Harvard evolutionary biologist Martin A. Nowak has identified the five precise conditions in which cooperation works (see his "Five Rules for the Evolution of Cooperation" in *Science*, December 2006). This strategy works so interestingly across the entire evolutionary spectrum, from bacteria to *Homo sapiens*, that Nowak states that cooperation must be counted a third evolutionary principle alongside the classic Darwinian duo of mutation and selection. Cooperation, Nowak's analysis shows, can be a kind of contrapuntal accompaniment, without which selection itself would not go on operating as it does: extreme competitiveness dethrones itself.

Darwin had already asserted, in *The Descent of Man*, that factors beyond mere mutation and selection (in the case of hunter-gatherers, some kind of community solidarity) were doing something important to evolutionary processes. But he could

not precisely pin down those other factors. Now, with the aid of mathematical accounts of evolutionary processes, we can.

What do these developments in evolutionary theory mean for the discussion of the relation of God to the evolutionary process? We need to be clear and honest about a couple of things. First, no one can compel an assent to belief in God: it is a subtle matter of many cumulative factors—spiritual and emotional as well as intellectual. But the intellectual aspects do count, and they often combine with the others.

Second, it is not part of empirical science to discuss the possibility of a god and that god's relation to evolution. None theless, since atheistical science often veers into the realm of the metaphysical itself (quite dogmatically at times), it is reasonable for theology to put its own metaphysical cards on the table also.

These recent discoveries about cooperation might help to shift the discussion. What we now see is that “Nature, red in tooth and claw” has a subtle sustaining matrix of another sort. Let us call it the rich “purple line” of sacrifice. We can now explain it mathematically, but what might it mean ethically and theologically?

Cooperation in the technical, evolutionary sense does not have the same evocations as it carries in ordinary language. In the case of bacteria or cancer cells, it does not, obviously, involve intentional working together, or good feelings or empathy toward others. The news about cooperation in evolutionary processes is not, therefore, a warm, fuzzy riposte to the story of evolutionary competitiveness or selfishness. What it does show us is that the whole evolutionary struggle has a sacrificial accompaniment, which in certain conditions creatively recurs and forms a vital part of the dynamism of evolutionary development. As this strategy is observed higher up the evolutionary scale, we start to find accompaniments to its manifestation which are truly intriguing—the widespread sacrificial activities of social insects, for instance, or the practice of a school of dolphins in surrounding a dying companion, even at great risk to themselves.

These phenomena may suggest that cooperation (as mathematically understood) provides a sort of evolutionary preparation for a higher and fully intentional human altruism that can arise only when the cultural and linguistic realm is reached. In other words, ethical tendencies to self-sacrificial and forgiving behaviors, themselves productive and creative within populations, may have their preliminary roots in forms of life much lower than the human.

And that is a very remarkable discovery indeed. If there is a god—even a trinitarian God of compassion, providential involvement and sacrificial love—this is the sort of evolutionary process he might well have made. Evolution delivers to us humans, made in “his image,” the greatest possible inheritance of responsibility: to crown those regular intimations of evolutionary cooperation, long established and refined, with acts of intentional sacrificial altruism that now alone can save the planet.

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