# The Friendly Universe and We Humans

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Is the universe bio-friendly? This is a question much discussed these days. To my mind the critical issue here is "friendliness." I would like to approach it first from the view of a scientist and then from that of a religious believer.

I wish to present a fundamental distinction which is at the basis of understanding what science does and what it cannot, as such, do and, therefore, how it might understand "friendliness." This is the distinction between what is meant by "origins" and what is meant by "creation." In so doing I wish to set a cosmological background to the discussion of friendliness as understood in biological evolution.

The key to understanding the difference between creation and origins is the notion of change. Changes in nature are the object of study for the natural sciences. From pure energy to matter, from hydrogen to hydrocarbons, from giant molecular clouds to star clusters, from single cells to organs, from amino acids to the human brain - these are all objects of investigation for the natural sciences. They all require an existing entity which changes. The natural sciences do not deal with the issue of existing at all; they deal with existing in a specific way and the changes in nature which bring about specific ways of existing.

Creation, on the other hand, speaks to the very existence of whatever exists. It does not speak to change. Creation does not deal with the chain of events which bring about a specific kind of being. It deals with the source of being of whatever exists. It does not address the evolution of one kind of being from another. To create, therefore, is not to work on or with some already existing material. Creation is not, therefore, a cause in the usual sense of the word. Or, if you wish, creation is the complete cause of all things.

So there can, in principle, be no necessary conflict between the theological doctrine of creation and any scientific explanation of origins. The natural sciences seek to account for change and the origins of change. Whether the changes described are biological or cosmological, have a beginning or not, are unending or temporally finite, they remain processes. Creation accounts for the existence of things, not for changes in things. So, given that something exists, how did life originate from this something is a scientific question. Why is there something rather than nothing is not a scientific question.

Since I have alluded to creation as an issue for philosophical and theological considerations, do religious traditions have anything to say about the friendliness of the universe? Christianity at its very birth asserted that the Lord and Savior was also the Creator of the world and, through the *logos* theology of John, that there was a rational structure in creation which derived from the very triune nature of the Creator. Thus, the world of the senses was worth investigation through the experimental method. The question arose, however, as to whether there is a necessary connection between the Creator and the rationality of the universe or whether God freely chose that rational structure. With the birth of modern science the delicate balance between the search for necessity and for spontaneity in the evolution of the universe became a central issue.

In the context of this discussion of origins and creation I would like to introduce a discussion of the life sciences. Such a scientist observes changes that take place in living systems and he seeks to understand those changes by looking for natural processes. In seeking such natural explanations a scientist, as such, takes no position on any elements that lie outside nature. So creation, a creator, an intelligent designer are simply outside the confines of scientific investigation. To be more specific it is simply not possible within the confines of the sciences to have recourse to an intelligence at the origin of natural phenomena. Always realizing the limits of their methodology, scientists by profession seek only natural causes for natural phenomena. If they do not succeed today, they seek to do so tomorrow. That methodology places no limits on the total reality of the universe and of life. It simply admits that it cannot as such say anything about what lies outside natural causes. Anyone who does so is not doing science.

The great achievement of Charles Darwin was precisely to bring the study of life into the ambit of the sciences already well established in physics and chemistry. With him the origins of the many life forms about us became truly a scientific study. It attempted to explain all natural living phenomena by natural causes. And the attempt is just that: an attempt. And it has to our day had immense success. To date there is no other scientific explanation that rivals that whereby all living beings, including ourselves, come about by chance mutations in the original being which result in stepwise changes in the products carried out by natural selection in the environment in which the products come to exist. Those products survive which can best adapt to their environment. There is, therefore, an apparent destiny, or even teleology if you wish, towards more perfect beings, i.e. better able to adapt, in this process; but the apparent destiny can be explained by the natural process itself, an intrinsic teleology if you wish.

Needless to say, we do not yet know the natural processes whereby life first came to be.
But we do know that the universe in which we have come to be is bio-friendly since evolution is an intrinsic and proper characteristic of the universe. Neither the universe as a whole nor any of its ingredients can be understood except in terms of evolution. And evolution is a daily happening. We, for instance, are constantly exchanging atoms with the total reservoir of atoms in the universe. Each year 98% of the atoms in our bodies are renewed. Each time we breath we take in billions and billions of atoms recycled by the rest of breathing organisms during the past few weeks. Nothing in my genes was present a year ago. It is all new, regenerated from the available energy and matter in the universe. My skin is renewed each month and my liver each six weeks. In brief, human beings are among the most recycled beings in the universe.

The principal fallacy of the intelligent design movement is to have recourse to an explanation for the origins of life forms, which is both non-scientific and not necessary. What I have said above should suffice to establish that intelligent design is non-scientific. It has recourse to explanations that are not natural, not within the ken of scientific explanation. A general statement should first be made about why I say such explanations as intelligent design are not necessary within the confines of the natural sciences. To repeat, a fundamental tenet of the sciences is to seek for natural causes for natural phenomenon. When these natural causes are found, science has succeeded. When they are not yet found, scientists continue to search but they will not allow that it is necessary within the natural sciences to seek for a cause outside nature, an intelligent designer, a "God of the gaps." History has shown, for example, with Isaac Newton, that the "God of the gaps" eventually surrenders to a natural explanation. For this reason and for methodological consistency science will always find recourse to non-natural causes unnecessary.

In the case of intelligent design every example of a biological system that has been proposed as requiring intelligent design has failed. A natural explanation within evolutionary biology has been found. This holds for the flagellum, the cilium and the blood clotting cascade in vertebrates, all of which have been claimed to require intelligent design. The fallacy here is the failure to accept what is at the heart of neo-Darwinian evolution, namely, that by a step-by-step process of mutations and adaptation through natural selection an organism which is the result of former mutations and adaptations and which has a certain function before mutating and adapting again, can have another function afterwards and can, in fact, be integrated into a more complex organism of which it now constitutes a part. Evolution is a creative process and in that sense

the universe is friendly to life. The claim of intelligent design that there are complex systems which could not function unless all of their parts were assembled at the same time according to a design is wrong. At least no such system has been yet proposed which passes the test of requiring design.

While the intelligent design movement claims that this designer is not necessarily the God of religious faith, it is difficult to imagine whom it might be. At any rate, at the heart of life in the universe is placed a designer. This belittles the God of religious faith by making him one who plans or assigns his minions to plan every step in the coming to be of life in the universe and in its evolution. This is far from the God who has truly revealed himself in the universe he created.

For historical reasons, and not truly religious ones, biological evolution has been the enigma of religions. Fundamentalist religious thought denies it. Catholic thought, as it has matured, accepts it as scientifically verified, but hesitates in how to deal with it. Why the denial and the hesitancy? Is it because God must be omnipotent and have everything under his control. The friendly dynamism intrinsic in the universe in evolution seems to escape this omnipotence.

How has thinking within the Catholic tradition matured in this regard. In a message to the Pontifical Academy of Sciences in 1996 Pope John Paul II said that "evolution is no longer a mere hypothesis" as it had been said to be in a previous epoch by Pope Pius XII in his encyclical *Humani Generis*. It is obviously much to early in his papacy to discern how, with Pope Benedict XVI, the sequel to the Church's view in modern times on evolution will go. Nevertheless, on several occasions Pope Benedict has given some indications. At his general audience on 9 November 2005 he continued the series of talks in his catechesis of the prayer of the Church as derived from the Psalms. On this occasion he addressed the so-called "Pascal Hymn" of God's ancient chosen people (Psalm 135) which expresses the glory of God revealed in his creation as it celebrates God's love and fidelity to his alliance with his chosen people. The Pope uses the opportunity to speak indirectly of evolution.

"The first manifestation of this love and fidelity," says the Pope, "is to be found in God's creation: the heavens, the earth, the waters, the sun, the moon and the stars." "Consequently, there exists," affirms His Holiness, "a divine message, inscribed secretly in creation as a sign of God's love and fidelity . . ." The discourse than moves on to more modern concerns with allusions to evolution as the Pope, recalling the thoughts of St. Basil the Great, states: "There are

some who, tricked by their deeply imbedded atheistic stance, imagine a universe with no guidance or order, as if floating along by sheer chance." The Pope, at that point departing from his written text, wonders about how many of those "some" among scientists today, drawn by atheism, see only chance in the world's unfolding, when we know from God's love and fidelity that he created the world out of love according to an intelligent design.

The Pope is speaking, of course, from a purely theological point of view in expressing God's love in creating a world which, to respect his fidelity, is orderly and does not evolve by sheer chance. I must recall at this point that neo-Darwinian evolution does not claim that the world evolves by sheer chance. The Pope says nothing about whether the natural sciences, respecting their own methodology, are capable of discovering God's intelligent design - and this is the critical issue. The Pope's position is that God's love and fidelity are at the source of his creation of the universe. If we use our best scientific knowledge of the fertile expanding and evolving universe to reflect upon the nature of God the Creator we will find, as the Pope suggests, that God is not primarily a designer, an attribute which diminishes his magnificence. He is primarily a lover who in creating shares his love.

In his homily at the Easter Vigil liturgy of 2006 Pope Benedict again alludes to evolution when he suggests that the greatest "mutation" in the history of mankind is found in the Lord's Resurrection . Through God's special intervention the human and the divine have been definitively united. These are, of course, religious and theological reflections but it is interesting that the Pope clearly adopts the language of evolution in expressing them.

Cosmological and biological evolution reveal to the religious believer a God who made a universe that has within it through evolution a certain dynamism and thus participates in the very creativity of God. If they respect the results of modern science, religious believers must move away from the notion of a dictator God, a Newtonian God who made the universe as a watch that ticks along regularly. Perhaps God should be seen more as a parent. Scripture is very rich in this thought. It presents, indeed anthropomorphically, a God who gets angry, who disciplines, a God who nurtures the universe. God is working with the universe. The universe has a certain vitality of its own like a child does. You discipline a child but you try to preserve and enrich the individual character of the child and its own passion for life. A parent must allow the child to grow into adulthood, to come to make its own choices, to go on its own way in life. In just such a manner does God deal with the universe.

These are very weak images, but how else do we talk about God. We can only come to know God by analogy. The universe as we know it today through science is one way to derive analogical knowledge of God. For those who believe modern science does say something to us about God, it provides a challenge, an enriching challenge, to traditional beliefs about God. But there is always the temptation in this reasoning to make God into our own image and likeness. This would be idolatry. And I am afraid that the intelligent design movement has unwittingly fallen into this idolatry by making God or his minions designers.