# A Designed Universe

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*Since Darwin's Origin of Species (1859), many have felt that "survival of the fittest" is the source of apparent design in nature rather than God. Yet recently, serious objections have been raised against the ability of evolutionary theory to explain either the origin of life or its diversity.[1] Consequently, the force of design as evidence for a supernatural alternative is strengthened.*

*In any case, biological evolution can hardly explain design in the nonliving part of nature. And it is just here that recent advances in science have uncovered far more evidence of design than was known in Darwin's time, or even in the 1970s. Let us consider some of this evidence.*

**The Right Chemistry**

All life on earth depends on the cooperation of many complex biochemicals, each containing thousands or even millions of atoms. These include DNA and RNA, which store and transmit information by which living cells operate; and proteins, which provide structural material and speed up chemical reactions so that plants and animals can respond quickly to external changes. These molecules are enormously complex and detailed structures carrying on particular, specialized tasks. Such organization presents a serious challenge to the idea that life arose by chance rather than design, but that is not our subject here.[2]

On a much simpler level, such chemicals as carbon, phosphorus, and water suggest that life didn't just happen. Carbon is the only element in existence which forms chains of almost unlimited length, needed for DNA, RNA, and protein. All the carbon in our universe apparently formed inside stars and was scattered over space as stars exploded. Yet by two coordinated "quirks," carbon is a common element rather than a very rare one. Carbon is formed by a rare collision of three helium nuclei. It happens that the temperature inside stars is right at a "resonance" for carbon, an energy level at which these nuclei stick together unusually well. If this resonance energy were only 4% lower, carbon would be very rare. On the other hand, carbon easily combines with another helium nucleus to form oxygen. But it *just so happens* that the energy of the combination is just above an oxygen resonance, which is thus out of reach. If this resonance were only % higher, nearly all carbon would convert to oxygen. In either case, carbon would be very rare and life itself rare or nonexistent.[3]

Phosphorus is unique among the elements in forming compounds (ATP, ADP) which can store large amounts of energy. Without these compounds there would be no higher animal life since such an efficient method of energy storage is needed for mobility. Yet only phosphorus, of all the elements, has this capability. It looks like phosphorus was *designed* for this purpose.

Water is at least as unusual as carbon or phosphorus. Its molecule (two hydrogens and one oxygen) is lighter than molecules of nitrogen or oxygen, and thus should be a gas at temperatures suitable for life. However, water forms polymers, combinations of two or three molecules joined loosely together, so that it is actually a liquid at these temperatures. As a liquid it is the basic fluid of animal blood, tree sap, and cell plasma. Yet when water evaporates, it no longer forms polymers. This allows it to disperse in the atmosphere so it doesn't stifle life by lying on the earth's surface as an unbreathable gas. No other substance has this property.

Water is also a universal solvent, dissolving the necessary solid chemicals so they can circulate in the bloodstream, plant sap, and living cells. All other liquids which can dissolve a comparable number of chemicals are highly corrosive and deadly to living things.

Water is unusual in being able to absorb a large amount of heat for a given change in temperature. As a result, it moderates the climate of the earth and helps stabilize the body temperature of animals. Like few other substances, it expands rather than contracts on freezing. This prevents oceans and lakes from freezing to the bottom (killing marine life), and it aids in the formation of soil by splitting up rocks. Truly water is a most amazing substance. Together with the thirsty traveler on a hot day, the chemist can say, "There's nothing like it!"[4]

**The Right Environment**

The earth's environment is unique in the solar system and at least very rare in our galaxy. The temperature varies substantially from pole to equator, summer to winter, and from the Dead Sea to Mt. Everest. Yet it exceeds the boiling point of water only near volcanoes and geysers. Temperatures below freezing are more common, yet our oceans never freeze up completely, even in arctic regions. By contrast, the temperature on Venus, our nearest neighbor sunward, is about 900 degrees Fahrenheit. On Mars, the planet just beyond us, it barely gets above freezing even in midsummer at the equator. Earth alone has the right temperature range for life: warm enough for water to be liquid, cool enough that complex life molecules are not destroyed.

A substantial amount of water is needed to support life, though a few organisms have techniques for living in arid conditions. For the earth as a whole (center to surface), the fraction of water is small. But this is all concentrated at the surface, so that our globe is two-thirds covered by water to an average depth of three miles. The water on Venus and Mars is infinitesimal by contrast.

Earth has the right atmosphere. At a few per cent less oxygen, animals would not have enough to breathe. A few per cent more, and plant life would burn up. Mars and Venus have virtually no free oxygen, so necessary to most kinds of life.

Earth's gravity is just right. If the earth were only one-fourth as massive, the atmospheric pressure would be too small for life. If the earth were twice as massive, its atmosphere would work like a greenhouse in summer, raising the temperature enough to kill us all.

Earth has the right kind of sun. A sun only 20% larger would burn up its fuel in just four billion years. By now, such a sun would have expanded into its "red giant" stage, and the earth would have burned up in the sun's atmosphere. On the other hand, if our sun were only 20% smaller, it would not produce enough blue light for plants to make sugar and oxygen efficiently. Both sugar and oxygen are needed by animals, and they can produce neither themselves.[5]

The sun cannot vary much in brightness or life will not survive. In fact, our sun's luminosity already has varied "too much" over the past four billion years, increasing in brightness by some 25%. But the creation of plant life appears to be timed just right to save the day. As the sun got hotter, plants removed carbon dioxide from the atmosphere, replacing it with oxygen at just the right rate to turn down the greenhouse effect and keep temperatures in the range safe for life.[6]

This performance by the plants only worked because the earth was at the right distance from the sun. If it had been 5% closer, the greenhouse effect would have been too strong early in earth history, the plants would never have gotten started, and earth would now be a furnace like Venus. But if the earth had been only 1% further from the sun, the cooler temperatures about two billion years ago would have produced a runaway ice age, and the earth would now be like Antarctica elsewhere.[7]

**The Right Universe**

Not only do we live in a universe having the right chemistry to support life, and on a planet with the right environment for life, the basic forces in our universe are just right. Without the precise balance which exists among these forces, life would be impossible anywhere in our universe.

There are just four basic forces presently known to mankind: gravity, electromagnetism, and the strong and weak nuclear forces. The balances between these forces are precise, making possible life as we know it. Consider the delicate balance between gravity and the expansion speed of our universe. Since the 1920s it has been known that our universe is expanding, apparently from an event known as the "Big Bang" which occurred some 15 to 20 billion years ago. Whether our universe will expand forever or eventually collapse is still debated among cosmologists. In either case, the actual density of matter in our universe is within a factor of ten of the so-called critical density, the point of exact balance between permanent expansion and eventual contraction. But to be so close to this critical density after some 20 billion years of expansion, there must have been precise tuning in the earliest moments of the Big Bang. At 10 to the minus 43 seconds after the Big Bang, for instance--the so-called Planck time--the density must have been equal to the critical density to one part in 10 to the 60. If it had been ever so slightly higher, the universe would have collapsed quickly and there would have been no opportunity for life to form. On the other hand, had the density been ever so slightly smaller, the universe would have expanded rapidly and no galaxies, stars or planets would have formed. Again, no life. Thus, life is the result of *fine tuning* the density of matter-energy at the Planck time to one part in 10 to the 60![8]

Life depends on a number of the heavier chemical elements, especially carbon, nitrogen and oxygen, but only hydrogen, helium and a few of the very lightest elements are formed in the Big Bang itself. The rest are formed inside stars. The strong and weak nuclear forces control how stars operate. If the strong force were weaker than it is, there would be no life. If it were only 50% weaker, not even iron and carbon would be stable. Even if the strong force were only 5% weaker, the element deuterium would not exist, and stars could not burn as they do. On the other hand, if the strong force were only 5% stronger, the diproton would be stable and stars would burn catastrophically. The strong interaction has to be *just the right amount* to have stable stars and stable elements for life chemistry.

The weak nuclear force is important too. All but the lightest elements are formed inside stars as they grow old. Were it not for the weak force, these elements would remain trapped inside the stars and be of no use for life. But when a star has used up its fuel, it begins to collapse, becoming very hot inside and producing large numbers of neutrinos. The neutrinos cause the star to explode and scatter its heavy elements through space. These elements later become part of the next generation of stars, forming planets which accompany such stars. As a result, the earth has the heavy elements so necessary for life. If the weak force were much smaller than it is, the neutrinos would escape quietly, the star would not explode, and the heavy elements would stay inside. If the weak force were much stronger, the neutrinos themselves would not be able to escape from the star, we would again have no explosion and no heavy elements would escape. So if the weak force were much different than it is, there would be no heavy elements outside the stars.

Consider one more crucial balance. Gravity is much weaker than electromagnetism (by 37 powers of 10), yet gravity dominates in the realm of astronomical distances. Why is this, since both are long-distance forces? The reason is that the positive and negative electromagnetic charges occur in equal numbers, so that at large distances they cancel each other out. But why should they occur in equal numbers? Scientists don't know. The main negative charge is the electron, a very small particle compared to the proton, the main positive charge. In modern cosmological theory, as the universe cooled down from the Big Bang, protons would have "frozen out" much earlier than electrons, and there is no obvious reason why the two should be equal in number.[9] In fact, the numbers of electrons and protons left over must have been the same to within one part in 10 to the 37th power. If this had not happened, our universe would be dominated by electromagnetism instead of gravity, and there would be no life as we know it.

In summary, it appears that very slight changes in the strength or balance of these forces gives a universe which will not support any life we can imagine. What are we to make of this? The simplest explanation is that we live in a *designed universe.*

**Explaining the Design**

Scientists have been discussing the problem for several years now. As Stephen hawking has pointed out:

> The odds against a universe like ours emerging out of something like the Big Bang are enormous<|>---<|>I think there are clearly religious implications whenever you start to discuss the origins of the universe. There must be religious overtones. But I think most scientists prefer to shy away from the religious side of it.[10]

In shying away from religious explanations, some have suggested that this apparent design is merely an *accident of observation*. Admittedly, life would be impossible unless all of the factors come out just right. But if life were impossible, then we wouldn't be here ourselves to observe such a universe! Conversely, there will only be observers in a universe where all these factors work out just right. This explanation, that the order in our universe is just an accident of observation, is called the *anthropic principle* (more precisely, the *weak* anthropic principle).

This is certainly clever, and true in some sense. Yet it postulates that our universe is a fluke of astronomically small probability. As an explanation, it is methodologically much inferior to any other theory in which a universe such as ours would be likely. But if the God of the Bible exists, then a designed universe such as ours would be a *likely* result rather than the surprise we have in an accidental universe scenario.

Not all who favor the anthropic principle are satisfied with the weak form sketched above. Some have moved into Eastern mysticism, pantheism or something equally esoteric to propose a *strong* anthropic principle: man has somehow caused the world to be just right for life and humanity to exist, whether because man is part of God, or because causes can produce effects *backward* in time. Such suggestions attempt to provide some adequate explanation for design, a serious defect in the weak anthropic principle. In evaluating such views, we should look at how evidence for each compares with that for the existence of the God of the Bible. To me, these views pale in comparison.[11]

What to make of all this? I suggest that we have here just one more line of evidence showing that we live in a supernaturally-created universe. Evidence of design, of a universe that had a beginning, of organization in living things far beyond what random processes can produce--these conspire with biblical evidences[12] to indicate that this God is the one revealed in the Bible.

But according to the Bible, God wants us to do more than just understand the world we live in. He wants us to love him with all our being, and to love our neighbor as much as we love ourselves. We all fail these continually. If we must one day stand before God to answer for how we've lived, what will we be able to say?

In his love and mercy, God has provided a solution. Some two thousand years ago, God became man; the author entered his own story. As Jesus of Nazareth, he lived a life of complete obedience such as we never do. If we trust in his representative work done on our behalf, it is considered as though we ourselves had done it. In a few hours on a Roman cross, Jesus suffered such punishment as would take us forever to suffer. By trusting in him, his suffering takes the place of ours.

This is the kind of God that really exists. Each of us--yourself included--is extended this opportunity to turn away from a life of empty self-gratification and find the real joy of personally knowing the God who made the universe. You can choose to enter this relationship right now.

**Notes**

[1]See, for example, Michael Denton, *Evolution: A Theory in Crisis* (Bethesda, MD: Adler and Adler, 1985); Gordon Rattray Taylor, *The Great Evolution Mystery* (New York: Harper and Row, 1983); Charles B. Thaxton, Walter L. Bradley and Roger L. Olson, *The Mystery of Life's Origin* (New York: Philosophical Library, 1984).

[2]Besides the items above, see Fred Hoyle and Chandra Wickramsinghe, *Evolution From Space: A Theory of Cosmic Creationism* (New York: Simon and Schuster, 1981).

[3]Fred Hoyle, *Galaxies, Nuclei and Quasars* (New York: Harper and Row, 1965), 14750.

[4]For further information on these topics, see Allan Hayward, *God Is* (Nashville: Thomas Nelson, 1980).

[5]Michael Hart, "Atmospheric Evolution," in *Extraterrestrials, Where Are They?* ed. Michael H. Hart and Ben Zuckerman (New York: Pergamon, 1982), 156. See also reference 7, below.

[6]Owen Gingerich, "Let There Be Light: Modern Cosmogony and Biblical creation," in *Is God a Creationist?* ed. by Roland Mushat Frye (New York: Charles Scribner's Sons, 1983), 1323.

[7]Michael Hart, "Habitable Zones about Main Sequence Stars," *Icarus* 37 (1979), 3517. For additional evidence of this sort, see Hugh Ross, *The Fingerprint of God* (Orange, CA: Promise, 1989).

[8]Most of the points in this section are discussed in P. C. W. Davies, *The Accidental Universe* (Cambridge: Cambridge University Press, 1982); more briefly in John Boslough, *Stephen Hawking's Universe*, (New York: William Morrow, 1985), chap. 9.

[9]On the formation of the various elementary particles as the universe cools down from the Big Bang, see Steven Weinberg, *The First Three Minutes* (New York: Bantam, 1979).

[10]Boslough, *Hawking's Universe*, 121.

[11]See, for example, Kenny Barfield, *Why the Bible is Number 1: The World's Sacred Writings in the Light of Science* (Grand Rapids: Baker, 1988).

[12]See, for example, John Wenham, *The Easter Enigma*, (Grand Rapids: Zondervan, 1983); Robert C. Newman, ed., *The Evidence of Prophecy* (Hatfield, PA: IBRI, 1988).

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