

Origin of Life

Let's turn first to the question of the origin of life. One of the most fascinating and controversial fields of scientific study is origin of life research. This is a young discipline, having been pursued in earnest only since the early twentieth century, and much remains in dispute. The field was pioneered by the enormously influential Russian biochemist Alexander Oparin, whose ideas about the origin of life set out in his *The Origin of Life* (1936) received dramatic impetus from the famous Miller-Urey experiment in 1952, in which amino acids were synthesized from conditions similar to those that Oparin assumed had prevailed upon pre-biotic Earth. New ideas have challenged those results, and the field is brimming with speculation and diverse research programmes.

Before we begin to explore how the field of origin of life studies might be integrated with Christian theology, it is necessary for us to make certain important distinctions that play no role in scientific discussion. Most fundamentally, we must distinguish between physical life and non-physical life. While scientists are concerned exclusively with the origin of physical, or biological, life, we as Christians cannot ignore the fact that life is not exclusively physical, but also belongs to incorporeal beings like God, angels, and souls. One is tempted to refer to this sort of life as spiritual life; but that would be misleading because spiritual life (*zōē*), scripturally speaking, usually denotes a relationship with God. Those who are spiritually dead in their sins are not soulless objects. They are living souls even if estranged from God. Better, then, to rest content with the label “non-physical life” to characterize the life of God and other immaterial beings, whether or not they are alive in their relationship with God.

The Bible is explicit that God is alive. The Lord is called “the living God” (Dt 5.26; Josh 3.10; Jer 10.10). His most powerful oath is “as I live”, and Israel’s most solemn oath, frequently

repeated, “as the LORD lives” reflects its absoluteness. According to Jesus, God has “life in himself” (Jn 5.26), and according to John this life is in his Son (I Jn 1.1-2; 5.11-12, 20).

In what sense, then, is God alive, if he is not physically alive? Without proffering a definition, I think that we can say confidently that such properties as self-consciousness, a first-person perspective, rationality, and libertarian agency, all of which God exhibits, in short, personhood, are sufficient, if not necessary, conditions for being alive. Given that God is incorporeal, it follows that God is non-physically alive.

The Scriptures are also clear that God is the source of physical life (*bios*, from which we obviously derive our word “biology”) on Earth. Gen 1.2 describes the condition of early Earth as an uninhabitable waste (*tohu wa bohu*), a primordial ocean covering the Earth. Over the next four days God then gradually creates living organisms. He successively commands the earth to bring forth vegetation, the waters to bring forth swarms of living creatures (*nepeš hāyâ*), and the earth to bring forth living creatures (*nepeš hāyâ*). Unlike the vegetation, these living creatures have within them “the breath of life” (1.30), presumably from God, just as man received the breath of life from God (2.7). So in the biblical view God is not only the fount of non-physical life but also of physical life on Earth.

The question of the origin of physical life (hereafter, simply life) studied by origin of life researchers is the question of abiogenesis. That term signifies the origin of life from non-life. It may well be the case that many researchers give the impression that they are defining “abiogenesis” in such a way as to entail a natural origin of life because of their tacit commitment to methodological naturalism. In order to highlight my rejection of methodological naturalism in doing theology, I shall use the term “abiogenesis” in a neutral sense to mean merely the origin of life from non-life,

with the reminder that we are talking only about physical life. So understood, the Scriptures teach abiogenesis, as we have seen.

With respect to explaining abiogenesis naturalistically, there are two broad camps within the origin of life community which we may call Necessitism and Contingentism. Necessitists hold that the origin of life is causally determined by the laws of physics and chemistry and therefore happens necessarily. Contingentists hold that the origin of life is due to the interplay of many independent causal factors and therefore a highly improbable event.

These contrasting perspectives have important implications for the frequency of life's origin. Since necessitists say that life has a very high probability of arising, there is no reason to think that it has originated only once. For contingentists, on the other hand, it would be almost impossible to have the highly improbable conditions requisite for life's origin obtain repeatedly.

Although necessitism was a popular view during 1960s-70s, the failure of the prediction of finding life, or at least significant precursors to life, on Mars, along with the failure of the scientific community to make substantial advances on the laboratory synthesis of life following the Miller-Urey experiment, led to significant disillusionment with necessitism. Today the large majority of scientists are probably on the side of contingency.

It is intriguing that each of these camps accuses the other of harboring surreptitious theological motivations or presuppositions. For example, necessitists accuse contingentists of postulating a miracle to account for the origin of life. The requisite conditions sufficient for the origin of life on Earth are, according to contingentists, so fantastically improbable that one is, in effect, if not in fact, postulating a miracle. Necessitists are thus apt to think of contingentists as closet creationists.

Similarly, contingentists claim that necessitists, in making life built into the very structure of universe, are in effect postulating divine design of an anthropocentric universe. For example, one origin of life researcher muses, “I can only explain it by assuming that these people hold in their heart – not necessarily at a conscious level – that life is a gift given by some transcendent divinity.”¹ He therefore regards necessitists as “crypto-creationists,” even if they be so only unconsciously.

The Christian theologian, who explicitly adopts a theological perspective on creation as part and parcel of a synoptic Christian worldview, is apt to be rather bemused by such internecine accusations. But, in fact, the dispute serves helpfully to highlight the different perspectives on the origin of life which might be advocated by the Christian theologian.

Theistic Necessitism

On the one hand, the Christian theologian might maintain, along the lines of necessitism, that God has created an anthropocentric universe. No miraculous interventions are required to explain the origin of life on Earth because God has chosen laws of nature and cosmological boundary conditions that make the origin of life on this planet inevitable. This would be fine-tuning with a vengeance: God has chosen natural laws, along with the requisite constants and quantities, that do not merely permit, but guarantee, the origin of life. Such a view can aptly be called “theistic necessitism.”

Theistic Contingentism

On the other hand, the Christian theologian might maintain, along the lines of contingentism, that the origin of life is fantastically

¹ Luisi, *Emergence of Life*, p. 18.

improbable relative to naturalism, but that God has providentially acted in such a way that life arises contingently. Here two models present themselves for consideration.

Creationism

First is the traditional creationist model, which postulates miraculous interventions of God in the natural order of secondary causes so as to bring about life's origin on Earth. On this model the origin of life is, indeed, as the necessitist complains, a miracle. Such a model would be most plausibly a version of progressive creationism, according to which God periodically acts miraculously over the course of geological history to advance the natural processes leading to and beyond the origin of life toward ends that natural causes acting alone would not have achieved.

Supervisionism

Second is a supervisionist view of life's origin as a non-miraculous, special providence of God, brought about most plausibly on the basis of his middle knowledge of various counterfactual conditionals concerning events leading up to and beyond life's origin. Given divine middle knowledge, such events could include even genuinely indeterministic quantum events, for God knew that if he were to establish certain specified conditions, then the relevant events, no matter how fantastically improbable, would ensue. Such a model leaves the natural order of secondary causes leading to life's origin uninterrupted and so scientifically indistinguishable from the series of events postulated by naturalistic theories but sees them as under the providential supervision of God.

It is fascinating that the rejection of theistic models of abiogenesis has led some naturalistic origin of life researchers, both necessitists and contingentists, to turn to outer space in order to support their

account of life on Earth. Astrobiology is a fascinating new discipline spurred by the discovery during the 1990s of exoplanets, that is, planets outside our solar system. As it turns out, both necessitists and contingentists have a vested interest in the success of astrobiology's search for life abroad.

Necessitists reason that if life is determined by nature's laws apart from any very special conditions, then it ought to arise easily and widely throughout the universe. They are therefore motivated to find traces of life elsewhere in our solar system, for example, in meteorites or on other planets and moons. Unfortunately for the necessitist, no extra-terrestrial traces of life have yet been detected.

For the contingentist who is a naturalist the enormous improbability of the origin of life on his own account prompts him to turn to outer space in an effort to make the odds of life's arising naturally on Earth more tractable. For example, Edward Steele, along with 32 colleagues, argues vigorously that "the most plausible valid option for the origin of terrestrial life" is that life originated abiogenically somewhere in our cosmos and was "seeded here on Earth by life-bearing comets as soon as conditions on Earth allowed it to flourish."² On the basis of evidence for terrestrial life before 4.1 Gya, they maintain that the window of time available for life's originating in some primordial soup "has been effectively closed."³ They conclude, "The transformation of an ensemble of appropriately chosen biological monomers (e.g. amino acids, nucleotides) into a primitive living cell capable of further evolution appears to require overcoming an information hurdle of supraastronomical proportions, an event that could not

² Edward J. Steele *et al.*, "Cause of Cambrian Explosion - Terrestrial or Cosmic?" *Progress in Biophysics and Molecular Biology* 136 (2018): 4-5.

³ Steele *et al.*, "Cause of Cambrian Explosion," p. 7.

have happened within the time frame of the Earth except, we believe, as a miracle.”⁴ Claiming that life came to Earth from extra-terrestrial sources does not of course, explain the origin of life, but, by multiplying the sites where life might originate by chance, it increases the odds of its doing so.

Indeed, given the incomprehensible improbability of the origin of life anywhere in the cosmos by purely natural causes, some contingentists have gone so far as to adopt multiverse scenarios in order to explain the origin of life on Earth. For example, Eugene Koonin, claiming that the origin of a coupled system of replication and translation involving RNA or DNA is arguably “the hardest problem in all of biology,” contends that “the emergence of a coupled replication-translation system is unlikely to the extent of being, effectively, impossible.”⁵ In order to solve this problem Koonin adopts the multiverse hypothesis. In an infinite multiverse, anything which can happen physically does happen; indeed, it happens infinitely many times over. Thus, he says, “spontaneous emergence of complex systems that would have to be considered virtually impossible in a finite universe becomes not only possible but inevitable.”

Now Koonin realizes that “A corollary of this hypothesis is that an RNA world, as a diverse population of replicating RNA molecules, might have never existed.”⁶ For given the multiverse Hypothesis, the RNA world turns out to be dispensable. But this realization

⁴ Steele *et al.*, “Cause of Cambrian Explosion,” p. 7.

⁵ Eugene V. Koonin, “The cosmological model of eternal inflation and the transition from chance to biological evolution in the history of life,” *Biology Direct* 2/15 (2007), doi:10.1186/1745-6150-2-15.

⁶ Koonin, “Eternal inflation and the transition from chance to biological evolution.”

leads to an almost nightmarish scenario: “A crucial aspect of the framework developed here is brought about by a disturbing (almost nightmarish) but inevitable question: in the infinitely redundant world of [the multiverse], why is biological evolution, and in particular, Darwinian selection relevant at all? Is it not possible for any, even the highest degree of complexity to emerge by chance?”⁷ Given the multiverse, biological evolution is as dispensable as the RNA World. Fully “evolved” organisms just came into being by chance. No objection to such a scenario can be raised on the basis of its improbability, for in an infinite multiverse anything that can happen will happen and does happen an infinite number of times.

Need I add that these proponents of life from outer space are not scientific cranks but sober scientists driven by the daunting odds against the special conditions for life required by contingentism to appeal to the resources of outer space for relief? These problems for contingentism arise, however, from its conjunction with naturalism, for on a theistic worldview God decrees which universe (or universes) exist and by his providential control directs it towards its ends. The question for us will be whether some version of theistic contingentism is superior to theistic necessitism.

⁷ Koonin, “Eternal inflation and the transition from chance to biological evolution.”