



Modern Scientific Theories of the Future and Christian Eschatology*

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IN HIS FAMOUS ESSAY ON DEMYTHOLOGIZATION RUDOLF BULTMANN CLAIMED: “*The mythical eschatology is untenable for the simple reason that the parousia of Christ never took place as the New Testament expected. History did not come to an end, and, as every schoolboy knows, it will continue to run its course.*”¹ This sentiment reflects the mood of most people, Christian and non-Christian alike. We are used to history’s ongoing process, to the continuity of space and time, and therefore we crowd our calendars with projects for next year and the following. Especially those in high ecclesial offices, bishops and presidents and moderators, those most visible representatives of the Christian message who daily pray, “Thy

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¹Rudolf Bultmann, “New Testament and Mythology,” in *Kerygma and Myth: A Theological Debate*, ed. Hans Werner Bartsch (London: SPCK, 1953) 5.

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Various scientific theories of history and the future present a challenge to Christian eschatology – including those that attempt to provide a testable physical theory of the existence of God, the resurrection of the dead, and eternal life, as does Frank Tipler’s.

kingdom come," are solidly booked for years in advance. They have no date available if Christ were to come indeed. The concept of the *parousia* is virtually abandoned for the simple reason that it does not fit into our this-worldly plans.

Here the mood of the reformation period was quite different. Martin Luther was fervently looking forward to the day of Christ's coming, since he did not perceive it as a day of wrath but as a day of salvation. Since the reformation, however, life on earth has been radically transformed, at least for most middle-class people—and who in America does not think they belong to the middle class? Life on earth has become attractive enough to cause us to forget life in heaven. H. Richard Niebuhr has aptly reminded us that humanity itself feels it is on its way to bring about the kingdom on earth.² Even most present-day liberation groups are still convinced that they could bring about heavenly bliss if they could just successfully inaugurate their concepts on a universal scale. They reiterate millennialist thought or dream of the integrity of creation, deliberately denying the corrupt and fallen state of this world. Humanity's scientific advancements have also helped to affirm a this-worldly orientation.

I. THE OPTION OF SCIENTIFIC MATERIALISM

Scientific materialism, especially of the nineteenth century, convinced people that the ironclad laws of nature do not allow for heavenly interruption, whether by divine miracles or by a divinely decreed end of the world. This view was substantiated through the law of the conservation of energy which was first introduced by J. Robert Mayer in 1842. He asserted that in a closed system the quantity of energy contained remains constant, while its form is changeable. Energy can only disappear to re-enter the scene in a different garb. Electrical energy, for instance, can be transformed into light and heat. Or the kinetic energy of flowing water can be changed into electrical energy. Energy can also be released by incinerating materials which disintegrate into oxidized substance and thereby produce light and heat, or by nuclear fusion through which part of the mass is converted into energy according to the famous Einstein equation $E = mc^2$. The decisive question is whether our universe is such a closed system that it can neither lose energy nor gain it from the outside. Scientific investigation has shown that it is unlikely that our universe is subjected to outside forces. This would mean that our universe will always remain the same; it has no beginning and no end and the future is only a modification of the past.

The law of the conservation of energy, however, was soon supplemented by the law of entropy. The German physicist Rudolf Julius Emanuel Clausius in 1850, and the British scientist William Thomson (the later Lord Kelvin) in 1851, discovered independently that though the quantity of energy in a closed system always remains the same, this cannot lead to perpetual motion. The entropy or non-convertibility of energy never decreases; it either remains constant or most likely increases. For instance, if we place a pot with boiling water in a cold room, the

²H. Richard Niebuhr, *The Kingdom of God in America* (New York: Harper Torchbook, 1959) 150ff.

energy of the water disperses into the room and heats up the room a little, while the water cools down. Though it is theoretically feasible that the room could cool down again and the water be heated up by the energy retrieved from the room, the law of entropy tells us that this is impossible. Although not lost, the energy is in some way used up and is no longer convertible. Similarly, we can run a movie backwards and get the effect of water being swallowed up by the faucet, or of a diver leaping back from the pool onto the platform, but the amusement of the viewers already tells us that in reality these reversals do not occur. Every process in our universe is singular and not repetitive. The available energy is used up bit by bit. All processes will slow down and eventually come to a standstill.

Of course, we can tell ourselves that this will not happen to us or to our children, since the state of heat-death at which everything is leveled out to a state of an energetic equilibrium is still billions of years away. Yet the report to the Club of Rome and other projections have made us aware that our resources on this earth are finite too. While some may last a few hundred years, others will already get scarce within our lifetime. Furthermore, scientists have discovered that another fate is threatening our earthly existence. Within the next two to five billion years the surface temperature of our sun will increase by one hundredfold.³ Through nuclear fusion, hydrogen is constantly being transformed into helium in the interior of the sun. Helium, being less heat-permeable than hydrogen, encloses the sun like an insulating envelope. The more helium is produced the more the sun will heat up, until the heat pressure is high enough to counterbalance the helium pressure on the surface so as to establish a new equilibrium. Yet during the whole process the temperature on the sun will increase and eventually will cause all water on our earth to evaporate. The surface of our planet will become like that of Venus. Needless to say, this will make life on our planet impossible.

In the near future, life on earth will be threatened through an increasing scarcity of resources. In the long run, however, even with the best human care, our planet will become uninhabitable. Finally, there will be a heat-death when the total amount of energy within our universe will no longer be convertible. At this point one might be tempted to follow Pierre Teilhard de Chardin, who claimed that while entropy is perhaps a sufficient theory for inanimate nature, it does not pertain to life.⁴ Life, he asserted, shows at every moment that it is progressing toward a greater complexity and diversity; by its very success it clearly counteracts physical entropy. There cannot be a total extinction of the animate world, because in all adversity the stream of life is irreversible. This is certainly a persuasive argument against the final and total equilibrium of all energy levels. But we must remember from where the building blocks of life are derived. Only through exploitation of the inanimate world can life be sustained. But what happens when the natural resources are exhausted and the sun stops giving its life-nourishing light?

³George Gamow, *The Birth and Death of the Sun: Stellar Evolution and Subatomic Energy* (New York: Viking, 1946) 116-120.

⁴Pierre Teilhard de Chardin, *The Vision of the Past* (New York: Harper, 1966) 168ff.

We cannot exempt life from its context within nature. It may be uncomfortable or even offensive for us to face, but there is no eternal force within our world.

Nevertheless, we have become aware that our universe is billions of years old and has a diameter of billions of light-years. Can we still as scientifically knowledgeable Christians envision for this immensely old and immensely huge structure a new heaven and a new earth as Christian eschatology would suggest? Karl Peters seems to speak for many others when he claims that the original Christian universal future eschatology has been invalidated by the view of the cosmos as presented in twentieth-century science. He writes:

A universe in which the overcoming of evil by good, in which justice is finally served, is vastly different from the current scientific picture of an expanding universe with billions of galaxies each with billions of stars. It is so different that it is difficult to see how the details of biblical eschatology can be translated into the current scientific view of a future, universal eschatology. This applies...even to the notion of the creation of a new heaven and a new earth. If the expanding universe is indeed open, expanding forever, then how can one speak of God recreating the universe? If the universe is closed, then it is likely to end in a "big crunch" of mammoth black-hole proportions. Again, it is difficult to see how a new creation can take place.⁵

As a solution to this dilemma Peters suggests two possible options. "Two types of eschatology consistent with the scientific picture of creation are... 'realized interpersonal eschatology,' and 'local, future societal or planetary eschatologies.'" ⁶ Concerning the possibility of a local eschatology within a universe headed, as a whole, toward thermal equilibrium, Peters writes: "The potential energy of the universe is sufficient...when coupled with fundamental laws and forces of nature, to create a series of increasingly complex structures in some local regions of the universe."⁷ By "realized interpersonal eschatology" Peters means small communities which realize the overcoming of evil within themselves and serve as "the catalyst towards the future, societal and planetary eschatological communities...in which...the gradual emergence of a Teilhardian *omega point* is realized: The reduction of evil to a minimum, the gradual conquering by science of disease and hunger, the eclipsing of hatred and war."⁸

The difficulty with Peters' proposal, however, is that it leaves little room for genuine Christian eschatology. By his own admission even localized eschatologies cannot hold out indefinitely against the march of entropy and are only temporary "islands of matter, life, and intelligence."⁹ And Peters' realized eschatology sounds like a humanly initiated post-millennialism which takes place quite apart from the eschatological activity of God, a post-millennialism in which science and "humans taking responsibility" usher in the Omega Point. It is a subjective experience of the

⁵Karl Peters, "Eschatology in Light of Contemporary Science," unpublished paper presented to the Theology and Science Group of the American Academy of Religion (November, 1988) 9f.

⁶Ibid., 13.

⁷Ibid., 11.

⁸Ibid., 14.

⁹Ibid., 11.

overcoming of evil in small communities and bears little if any resemblance to the truly universal and eschatological vision of the Bible. We notice that in this approach science sets the tone and theology has to find out where there is still a niche for it. Science writes the eschatological script and then Peters attempts to redefine the term eschatology in a way that would not bring it into conflict with modern cosmology. Yet in the end, by Peters' own admission, entropy looms in the background. Even a realized interpersonal eschatology or a localized eschatology cannot extricate itself from the strictures of the run-down of the universe in general. Here perhaps the evolutionary option seems to contain more promise.

II. THE OPTION OF EVOLUTION

Whether we look at evolution from a cosmic angle and envision how the present universe unfolded in its magnificence and manifoldness from a primordial fireball, or whether we look at evolution from the angle of the biosphere and see the diversity of emerging life, or whether we look at the homosphere and notice the astounding unfolding of human culture and technology, there seems to be no end to this overwhelming picture. First, the inanimate world unfolded, then the world of life arrived with its myriads of utterly diverse creatures and finally, somehow like the crowning achievement of nature, humanity appeared, dazzling the world with its discoveries and artifacts. Small wonder that evolution is seen as a virtually unceasing process, upward-slanting and continuously unfolding.

While Charles Darwin rejected the notion of divine teleology, since this would lead to an unscientific description of evolution, we cannot but be struck with the very success of life. For nearly four billion years, that is, soon after earth came into existence seen from a geological timescale, life unfolded from most humble beginnings. It has spread to every nook and cranny, from the polar zones to the Sahara desert, and from the Himalayas to the deep sea trenches. Once humanity emerged, there began the gradual domination and domestication of this planet by one species. At the expense of virtually everything else humanity has conquered this planet and made it its own. While we should not overlook the evident dangers of environmental neglect, at the same time it is amazing how humanity has unraveled the secrets of the universe and put them into use for its own advancement, from microsurgery to lunar landings, from teflon pans to electronic mail. It is no surprise that people from every political and religious persuasion are convinced that the right appropriation of human insight—whatever right appropriation may mean to the individual—will lead us from our self-inflicted ills to new heights of social harmony and prosperity. Humanity will propel itself onward and therefore Christian eschatology is no longer needed to bring humanity out of its misery or to lead to a final positive conclusion.

The late French Jesuit paleontologist Pierre Teilhard de Chardin picked up on this evolutionary consciousness and attempted to integrate it into a human eschatological perspective. According to him humanity is indeed part of a universal evolutionary process. This process moves from alpha to omega, beginning with the cosmosphere, via biosphere and noosphere, to the Christosphere. Through

hominization humanity became human and emerged from the animal world to the noosphere. Through Christification the evolutionary process will come to its fulfillment and everything will be received into Christ. Teilhard does not conceive evolution as an infinite process but as having its definite goal in the paroxysm under the intense psycho-social pressure that will unify humanity, its society and culture, and will eventually lead to Christification. Everything will be received and end in Christ. This excludes any final catastrophe as the end of our present world, since such a sidereal disaster could only lead to an extinction of part of our universe rather than to a fulfilling of the universe as a whole.

Teilhard cautions that “worldly faith is not enough in itself to move the earth forward.”¹⁰ He sees humanity’s evolutionary progress and Christ’s second coming in analogy with the conditions of Christ’s first appearance on earth: “The mystery of the first Christmas which (as everyone agrees) could only have happened between Heaven and Earth which was *prepared*, socially, politically, and psychologically, to receive Jesus.”¹¹ Why, Teilhard asked, should we not also assume “that the parousiac spark can, of physical and organic necessity, only be kindled between Heaven and Mankind which has biologically reached a certain critical evolutionary point of collective maturity?”¹² In other words, as Christ first came to us when the time was fulfilled, so he will come again when the conditions for the *parousia* are ripe. While humanity must reach maximum maturation, this alone is not a sufficient condition for Christ’s second coming. Moreover, the evolutionary climax as a necessary precondition for Christ’s return is assisted by his presence which is presently veiled in all things. The Christogenesis, when everything will be received and end in Christ, is not a natural phenomenon or product of evolution. There is an ascending anthropogenesis and a descending permeation of Christogenesis. In Christianity alone the faith in a personal and personalizing center of the universe is alive and has a chance of surviving today. There the hope is kept alive, growing, and set to work that one day

the tension gradually accumulating between humanity and God will touch the limits prescribed by the possibilities of the world. And then will come the end. Then the presence of Christ, which has been silently accruing in things, will suddenly be revealed – like a flash of light from pole to pole. Breaking through all the barriers within which the veil of matter and the water-tightness of souls have seemingly kept it confined, it will invade the face of the earth. And, under the finally liberated action of the true affinities of being, the spiritual atoms of the world will be borne along by a force generated by the powers of cohesion proper to the universe itself and will occupy, whether within Christ or without Christ (but always under the influence of Christ), the place of happiness or pain designated for them by the living structure of the Pleroma.¹³

The whole evolutionary process is directed toward and finds its fulfillment in the

¹⁰Pierre Teilhard de Chardin, *The Future of Man* (New York: Harper, 1964) 265.

¹¹*Ibid.*, 267.

¹²*Ibid.*

¹³Pierre Teilhard de Chardin, *The Divine Milieu: An Essay on the Interior Life* (New York: Harper, 1960) 133f.

parousia of Christ, in the creation of a new heaven and a new earth. While for Teilhard God in Christ as the all-enveloping force creates the conditions for the ultimate *parousia* and transformation of the world, lately there have been attempts to dispense with such an enveloping panentheistic vision of God, and to describe this force as emanating from within the created and self-creating order.

III. THE CHALLENGE OF COMPUTER SCIENCE

In 1986 the physicist Frank J. Tipler, together with John D. Barrow, wrote *The Anthropic Cosmological Principle*. This principle deals with the noteworthy fact that, from the beginning, the universal constants within the universe have been so arranged that intelligent human life is a possibility. Even minimal deviations in the values of these constants would have ruled out the emergence of such life. Tipler believes that if the emergence of intelligent life is of the essence of the universe as a whole, then the disappearance of the same life from the universe could not be without consequence. In a more recent publication with the telling title *The Physics of Immortality: Modern Cosmology, God, and the Resurrection of the Dead*, Tipler now deals extensively with the future of that life. In the preface to this book Tipler tells us that in this book “theology is a branch of physics, that physicists can infer by calculation the existence of God and the likelihood of the resurrection of the dead to eternal life in exactly the same way as physicists calculate the properties of the electron.”¹⁴ He also assumes that all forms of life, including human life, are subject to the same physical laws as electrons and atoms. A human being is nothing but a particular type of machine, the human brain only an information processing device, and the human soul a program being run on a computer called the brain.¹⁵ Frank Tipler asserts that in this book he wants to describe the Omega Point Theory, which he calls a testable physical theory entailing that one day in the distant future an all-present, all-knowing, and all-powerful God will resurrect each of us to an eternal life which in all its essential features will correspond to the Judeo-Christian heaven.¹⁶ This God will exist primarily at the end of time.

Tipler knows that the future course of the universe is such that life as an information process cannot continue forever in its present form, that is, as carbon-based organisms. If life as an information process that can sustain communication is to continue at all, it must continue to exist on some other basis. Tipler is convinced that in the not too distant future computers will possess the capability for autonomous information processing and communication and finally they will even reproduce themselves. Since Tipler understands a person as an entity capable of autonomous information processing and communication, and since computers will be able to assume these functions, he sees the only possibility of future “life” on the basis of computers.

¹⁴Frank J. Tipler, *The Physics of Immortality: Modern Cosmology, God, and the Resurrection of the Dead* (New York: Doubleday, 1994) ix.

¹⁵Cf. *ibid.*, xi.

¹⁶*Ibid.*, 1.

Under this premise the physical mechanism of the individual resurrection is the emulation of all persons who have long since died, including their worlds, in computers of the distant future. These computer emulations are identical with the persons who have actually lived.¹⁷ Tipler is convinced that within thirty years we will be capable of building a machine which is at least as intelligent as we are. The reason for developing intelligent machines lies in the fact that without them we are prone to end in extinction. In the long run life has no other choice but to move beyond this earth in order to survive. As Tipler shows, life can continue only by reproducing itself through artificial intelligence mechanisms.

Tipler tells us that the extinction of humanity is the logically necessary consequence of eternal progress.¹⁸ Since we are finite beings, we have definite limits. Our brains can contain only a limited amount of information. Since the advance of life to the Omega Point is a fact, the furthest developed consciousness must one day be a non-human one. But everything that we as individual beings contribute to culture will survive our individual death. The next step of intelligent life will be information-processing machines. The closer we move to the Omega Point the more computer capacity there is available to store our present world and to simulate it exactly. Finally there will also be the possibility of simulating all possible visible universes, of simulating "virtual" universes. At the end not only the dead will be raised but also people who have never lived. All people and all histories which could have existed do then indeed exist.¹⁹

The dead will be resurrected as soon as the capacity of all computers in the universe is so large that the capacity required for the storage of all possible human simulations is only an insignificant fraction of the total capacity. According to Tipler the "resurrection will occur between 10^{-10} seconds and $10^{-10^{123}}$ seconds before the Omega Point is reached."²⁰ He claims: "The Omega Point Theory has the first physical resurrection theory to be fully consistent with the Christian resurrection theory. It is also the first redemption theory justified by reason, not faith."²¹

Wolfhart Pannenberg points out that "Tipler's exposition of a future resurrection of the dead is particularly worthy of note in a time when the Christian expectations concerning the future are most often judged to be irreconcilable with the modern scientific worldview."²² Yet we should also listen to Donald G. York who cautions:

There is abundant material here for intellectual offense. Many readers will find it hard to accept a thesis that what we mean by *life* includes computer-based copies of ourselves. Some will think it absurd to believe that our biosphere will expand, through information technology, to include the entire universe and that intelligence will be able to continue existence by organizing the gravitational

¹⁷Ibid., 14.

¹⁸For the following cf. *ibid.*, 218.

¹⁹Ibid., 223.

²⁰Ibid., 225.

²¹Ibid., 247.

²²Wolfhart Pannenberg, "Breaking a Taboo: Frank Tipler's *The Physics of Immortality*," *Zygon* 30 (June 1995) 312.

energy freed by the collapse of the universe. Tipler's view that there is no life other than our own in the universe will seem offensively narrow-minded to some. Christians of various persuasions will find the resurrection of which Tipler speaks to have only an incomplete relationship to mainstream ideas of Resurrection and will be insulted at what seems like an assault on, not an explanation of, faith. Theologians and physicists alike will ponder deeply the prime conclusion of the book that theology is now a branch of physics.²³

This strong caveat goes together with Hans-Dieter Mutschler's charge that "Tipler commits himself to physical reductionism."²⁴ This physical reductionism reduces human beings to information-processing entities. Unlike Teilhard, Tipler no longer talks about alpha and omega, since God is not the enveloping higher dimension but the endpoint, the Omega Point of our processes. Since this physicalism is unaware of its own limitations, it can propound eternal progress which means, according to Tipler, that "knowledge will grow without bound, per capita wealth will increase to infinity."²⁵ Small wonder that Tipler has no use for entropy.

Even Tipler is aware that the world he portrays must finally turn in on itself, it must collapse through its gravitational pull. One wonders whether the facts that Tipler extrapolates are more credible than the trust which Jesus evokes through his message and destiny. If theology is subsumed under physics and eschatology under cosmology, what avenues are there to counterbalance that which the Swiss philosopher Karl Jaspers called *Wissenschaftsaber Glaube*, the superstitious use of science? Once the scientific theories of the future are no longer mindful of the finitude of space, time, and matter, they are prone to replace Christian eschatology in the same manner as the latter will lead to religious superstition if it is oblivious of the earthly conditions to which it adds its ultimate evaluations. ⊕

²³Donald G. York, "Something to Offend Everyone: Tipler's Vision of Immortality," *Zygon* 30 (September 1995) 477f.

²⁴Hans-Dieter Mutschler, "Frank Tipler's Physical Eschatology," *Zygon* (September 1995) 483.

²⁵Frank J. Tipler, *The Physics of Immortality*, 104.