
Book Reviews

The Physics of Immortality: Cosmology, God, and the Resurrection of the Dead. By Frank J. Tipler. New York: Doubleday, 1994. ISBN 0-385-46798-2. Pp. xxvi+517.

On occasion a book is published which bears such a provocative title that scholars in its field cannot help but devote some attention to it. One volume in recent memory which had this effect is Charles Hartshorne's *Omnipotence and Other Theological Mistakes* (1984). Regardless of our response to this work, the least we can say is that it did not go unnoticed. While it is inappropriate to judge a book by its cover, a work may not infrequently be prejudged by its title, perhaps out of fear that its contents may threaten to disrupt one's particular categories or even serve to revolutionize one's general way of thinking. As Thomas Kuhn has shown, revolutions can be messy, hence our inclination is to avoid them whenever we can.

Frank J. Tipler's offering is another in a series of bold and potentially revolutionary titles. He suggests that theology is a natural subset of physics and that the long-standing endeavour to divide the two has been misguided and actually militates against their inherent commonality. Based on his title, I anticipated an argument for immortality grounded in an oscillating universe which has its religious counterpart in the Myth of the Eternal Return. Here the universe would expand and contract from Big Bang to Big Crunch in endless succession. This would allow for an infinite number of universes, some of which would contain histories similar to our own. Allowing for a never-ending number of combinations, in which all possibilities would eventually be exhausted countless times, we would also reappear on the scene every so often. In the minds of some this constitutes a type of immortality, though a periodic or spotty one. Yet such a discontinuous picture of immortality is not what Tipler defends at all; in fact he argues against the eternal return view (83). His scheme is of a different calibre, meaning my initial expectations were misconceived.

Our entrance into Tipler's volume is through his acknowledged operational presuppositions. Consistent with his title he aims at "the unification of science and religion" and declares that "theology is a branch of physics" (ix). He unabashedly announces the omniscience of physics: "I am an uncompromising reductionist: everything including human beings can be completely described by physics" (352, n.16). He identifies himself as both an ontological and methodological, but not epistemological, reductionist (294-7). For Tipler the constituents of reality are "at the most basic level, nothing but the forces and particles

studied by physics" (294); and this is where science should "look for explanations [namely] the lowest levels of theoretical description" (294, 297). Employing this technique Tipler believes he captures the essence of a person as "a quantum mechanical object which can be *exactly* described by a computer program coding 10^{45} bits of information" (295, Tipler's emphasis). Yet *epistemological* reductionism, where "theories and experimental laws in one field" are "special cases of laws formulated in other areas of science" (295), is for Tipler overruled. These types of assertions concern "the way human beings see the world, not...nature itself" (295). Since the world for Tipler is as physics describes it, this allows him to regard his own field of physics as preeminent.

Tipler further adopts an ontological as opposed to an epistemological determinism in that determinism is not located in our knowledge but objectively in the way the world functions (189). In order to accomplish his task Tipler must reduce or "translate basic biological concepts into physics language" (xi). Humans cannot escape this program and as such are described in computer terms where analogously the brain is the hardware and the soul its software (xi). Holding the assumption "that the firmly established laws of physics are true in all circumstances" (73), Tipler correspondingly applies this to the human domain.

As Tipler broaches the concept of time he finds that modern physics discloses "that there is no fundamental distinction between past, present, and future. Hence, the future is just as real as the past" and can effectively act on it (xii, 188). The universe has existed for fifteen to twenty billion years and is expected to remain for another one hundred or more. If this is the case, then "almost *all of space and time lies in the future*. By focusing attention only on the past, science has ignored almost all of reality" (2, Tipler's emphasis)—an alarming oversight in Tipler's assessment. There are three possible scenarios drafted by contemporary cosmologists for the history of the universe: closed, open and flat. A closed universe "will start from an initial singularity [the center of a black hole], expand to a maximum size, and recontract to a final singularity" (116). An open universe will expand forever since there is not enough matter to force a contraction. A flat universe will also expand forever although there is sufficient matter for gravitation to retard the expansion. In both of the latter cases, the universe will eventually run down, the temperature will become uniform, and entropy (the measure of disorder) will maximize, leaving no free energy available for work. The universe would thus suffer a Heat Death in its final state. Not wanting to entertain this alternative, Tipler opts for the first model.

Tipler understands the universe as the totality of reality, implying that if God exists then God "is either [equivalent to] the universe or part of it" (3). Since it is the goal of physics to investigate "the ultimate nature of reality," then God, if real, will be uncovered in the process (3). For this reason Tipler calls upon scientists to "absorb theology into physics" (xv), and to this end he introduces his "Omega Point Theory" (OPT) which proposes the existence of a God who will resurrect humans to eternal life in Heaven (1). Tipler boasts that his theory is a "purely scientific" one, relying on reason alone (without revelation) (88). Physics for him is "universal, not culturally or even species-based" (88, his emphasis), and a worthy object in which to place our trust (89).

Tipler draws upon the work of Paul Tillich and Wolfhart Pannenberg for his view of God. Tipler describes God as Being itself, yet modifies the image from a pantheistic position by making God personal (3, 12). In addition, the OP idea is taken from the work of the paleontologist-priest Pierre Teilhard de Chardin (110). Tipler also champions the notion of infinite progress, carrying with it the connotation that “information stored in the biosphere increases with time, at least on the average” (120). Having discarded the eternal return model, Tipler then circumvents the Heat Death peril by his faith in progress, precluding either an open or flat universe (104). Progress is both possible and essential since the fate of the earth is to be engulfed by the ever-expanding sun. If humans are to survive this eventuality, they will need to colonize another planet or other regions of the galaxy. Tipler’s hope is that if humans can convert the earth into materials for escape from the earth, they can ultimately inhabit the entire universe (57). Humans, or more accurately the information-processing machines that will succeed them, will need to engulf before they are engulfed.

Tipler maintains that infinite progress is still probable even in a closed universe (68). This is because in its collapsing phase the universe will supply a “free energy source...which will allow the entropy and information processed and stored to diverge to plus infinity as the final state of the universe, the Omega Point, is approached” (71). And to process information—to code it and preserve it—for Tipler is to qualify as a living being (124); intelligent robots are therefore eligible to be “people” (86). Since both the earth and sun are doomed, these robots are the only way for us to survive, and the form we will assume is mechanically produced simulations or “emulations in the computers of the far future” (87). Emulations are simulations which are precise in every detail. Perfection would be reached if a computer could pass the Turing test, which means a person interacting with a computer could not distinguish between it or another human if both were hidden from view. Tipler favors the creation and reproduction of these machines even if they will dominate civilization and become more intelligent than people, for to do otherwise in his estimation is to become “human supremacists” (87).

Tipler outlines a strategy as to how robots could be sent out eventually to colonize the entire universe. By the time the collapsing stage of the universe is reached, however, information will need to “be transferred to another substrate before [the] binding energy of molecules” has been exceeded (149). While information is stored in its current molecular state, left to itself it will disintegrate in the distant future. Thus “[t]he only substrate that seems to be available at the low temperature at which the transfer must be made is the universe itself” (149–50). During this period then, information must be coded in “either travelling waves or standing waves, using the universe itself as a box to enclose the waves” (*ibid.*).

In Tipler’s appraisal, another term for ‘information’ is ‘pattern’ (125). Life may endure indefinitely “if machines of some sort can continue to exist forever. The pattern is what is important, not the substrate” (127). Tipler concludes that life near the OP will become: i) omnipresent; ii) omnipotent, having control “of all matter and energy sources available”; and iii) omniscient—as stored information becomes infinite the OP will know “whatever it is possible to know about the

physical universe (and hence about itself)" (154). The OP could then pass the Turing test and qualify as a person. Tipler refers to this person as God or the "universal mind" (156).

The OP "experiences" the whole of universal history "all at once" (157). This is because rays (particle-waves) of light and the information they carry "converge upon the Omega Point" (*ibid.*); that is, they will all intersect there, including those rays from all the people who have ever lived. They "are not lost forever; rather these rays will be intercepted by the Omega Point" (*ibid.*). The OP will extract all the possible information from these rays in an instant and "will therefore experience the whole of time simultaneously" (158). This drives Tipler to declare the OP 'eternal' (*ibid.*).

Tipler further takes the above to imply that life "leads naturally to a model of a God Who is evolving in His/Her immanent aspect (the events in spacetime) and yet is eternally complete in His/Her transcendent aspect (the Omega Point, which is neither space nor time nor matter, but is beyond all of these)" (*ibid.*). Tipler identifies the creative "life-giving power" of the OP with the Holy Spirit (185), though he amends his description by submitting that God the OP "is definitely a God Who exists mainly at the end of time" (5).

Since humans have definite limitations in terms of intelligence, eternal progress will require the extinction of our species (218). Tipler anticipates the time when we will be superseded by an advanced mind, namely computers that will store the contributions humans have made to civilization (*ibid.*). If computer memory can approach a limitless capacity they could manufacture identical human emulations, which in Tipler's assessment would seem so real that they would fail to recognize that they themselves were but computer programs (207). This is because for Tipler an emulated person is equivalent to that person: "The emulation and the original *are* the same" (223, his emphasis). In fact, "two humans in the same quantum state *are* the same person" (*ibid.*). Replicas are not duplicates but actually "the original" (*ibid.*).

Nor need this end with previously existing individuals but could extend to potential combinations of those who have never lived (223–4). And for reproductions to be faithful down to the exact quantum state, the entity's environment must also be replicated (225). Such emulation for Tipler constitutes "the physical mechanism of individual resurrection," which "is just what a sufficiently close scrutiny of our present lives by the Omega Point would amount to" (219). Hence our fate is to inhabit "'virtual reality' or 'cyberspace'" (220) and to "live again in the mind of God" (219).

Additionally, if emulations need not merely repeat the past but can restructure it, computers could improve the original from physical and even moral defects (241). Personalities could thus be uploaded into the OP and subsequently perfected. Tipler evaluates this as a "resurrection of the flesh" since the emulation would feel itself to be real. The one thing it would lack is the ability to discriminate between itself and its "original" (214). Tipler understands the apostle Paul's description of a "spiritual body" and the accounts of the appearances of the risen Christ as analogous to these emulations, which he claims will share similar characteristics (242–4). He also believes this reinforces the theological component of his theory.

Resurrection, however, will not be open to everyone. The computer beings of the far future who will carry out the resurrecting “will be making decisions about whom to give eternal life” (250). Humans in principle are included for “we are potential self-programming universal Turing machines” (250). Alternatively, the OP may choose not to resurrect certain persons into emulations if ‘It’ were convinced that they would continue to perpetrate evil. Death in this instance “would be permanent” (251). Although for cases in which “personal improvement” is likely, the OP may elect to assign the “flawed individual” to an abode resembling a ‘Purgatory’ for refinements “before the natural human memory store is filled” (*ibid.*). Those who reject this grooming would eternally reside in Purgatory resulting in a “hellish” situation (253). Nor can “rebirth...into Heaven...be achieved by any human effort: Heaven must be given to us by the Person that brought Heaven into existence in the first place” (278).

An afterlife can therefore be predicted by physics, according to Tipler, who considers his OPT as generally consistent “with the core beliefs of all the great world religions” (337). At least at present, the OP “cannot...select one of the human religions as more accurate than the others”; instead, it can “act as a firm foundation for all of them” (*ibid.*). Tipler suspects that the conception of an immortal soul was injected into theology so as to ensure a continuity of identity between a living and a resurrected person. This is overcome by quantum mechanics which for Tipler yields the conclusion that “an immortal soul is no longer necessary for individual immortality” (233). There is only one quantum state for any entity at a given time, and if this can be fabricated at a later date then one is left with the same entity.

Noteworthy is the fact that, by Tipler’s own admission, he does not subscribe to his own theory—he is not as yet convinced of the reality of an OP based only on theoretical elegance (305). Instead he considers himself an atheist until such time as the OPT can be experimentally corroborated.

Tipler’s volume includes fourteen appendices for scientists (the first is simply an introduction for those that follow) where he engages in the mathematical demonstration of his various hypotheses. He attempts to write the main body of his text for a popular audience (xxv), but those not conversant in the physical sciences will find his central chapters difficult to manage. He does not provide a survey of modern physics as background material but assumes his readers come with some awareness of it. His work is technical despite confining mathematical rigor to the appendices. He also states that such technicalities are indicative of a trend, for he predicts that “theological research in the twenty-first century will require a Ph.D. in particle physics” (329), now that the two have become remarried.

The reader may not readily be persuaded by Tipler’s argumentation, however. Despite being a work of great acumen, his conclusions appear fanciful. Even those from within the scientific community may have misgivings about his central claims, given the fact that Tipler himself has cautiously suspended judgement about them.

One aspect of his theory which fails to be convincing is the identical nature of emulations to their originals, regardless of the degree of precision. Technological advances may supply the possibility for fashioning an exact replica in terms of

external features, but how does one code for, say, subjectivity or self-determination? What does it mean for a personality to be “uploaded” into the OP except the storage of data about patterns of behavior? Such a record of traits, though, may not capture a personality. No amount of statistics-keeping is sufficient if human complexity can elude this reduction. The question seems to turn on the following: Tipler believes one’s essential personality can be coded “down to the exact quantum state” (226), but this presupposes that human characteristics of interiority can carry out transactions using quantum currency. The language of physics may be inappropriate to describe behavior, although Tipler and others would dispute this. The quantum world may not be the place to locate the foundations of humanness, in which case Tipler may be in danger of committing a category mistake. Even granting that two entities “in the same quantum state cannot be distinguished” (230), the issue persists that one is left with two entities—the number is not reduced to, or even by, one.

What is more, it would be insufficient for the computers of the far future to code even for the DNA together with the quantum state and environment of an individual in the attempt to manufacture an emulation. In opposition to the mechanistic view of science, a whole—in this case a person—is more than the sum of his or her parts. We are also our choices, not all of which can be predicted in a straightforward manner. We inherit a past but we may also creatively respond to it and anticipate as well as work toward a novel outcome in ways that are not reducible to mainstream physics. Nor does a computer’s capacity to pass the Turing test based on the detection of an outside examiner entail a person’s inability to recognize what constitutes his or her self. An individual may not be so convinced that his or her own identity could be so uploaded.

A second misgiving revolves around the notion of immortality itself, which appears to be a quantitative exercise. Providing that enough information can be coded and stored, immortality through emulations can effectively be secured. This implies that immortality is merely a technical problem—technology facilitates immortality. For Tipler “a person is not resurrected until he or she is emulated,” (225) and resurrection will occur when technology furnishes the possibility, specifically a vanishingly small fraction of a second (less than the Planck time of 10^{-43} seconds) “before the Omega Point is reached” (*ibid.*). One must inquire, though, as to what reassurance Tipler’s endtime scenario will afford for its hearers. Is this to instill in us a sense of expectation? Are we to hope for the prospect of becoming forever perpetuated as software images? Is our eschatology somehow strengthened by mathematical demonstration? Aside from whether or not Tipler’s proposal becomes realized, some may be concerned that it fails to inspire a passion for our ultimate end.

Compounding this difficulty is the assertion that our imperfections can be erased by altering the stored information. One wonders what accountability there may be if the afterlife is mainly a matter of editing. We need then have no fear of reprisals for our actions, although Tipler broaches a posture of “cheap altruism” to counter this charge (246–7). Moreover, why would an OP bother with working from an original if computer graphics could design perfections from scratch?

One could also question whether the future is as real as Tipler expects, for the

future is not something which can be inspected through conventional scientific means. Tipler here leaves the realm of scientific competence and engages in speculation—speculation being no more empirical for having alleged mathematical support. Still, Tipler supplements his theory, which he believes to be rational and consistent with Christian teaching (247), with faith in mathematical rigor. Doctrine is thus replaced by mathematical demonstration. This allows Tipler to declare that his depiction of God has not been imported into his system but rather is an outworking of it. Yet this outworking remains a mathematical one, which interestingly, despite its assumed power, even fails to generate confidence for its author. Tipler seems also to lack sufficient appreciation for the extra-scientific nature of his own theoretical approach. When he employs terms such as ‘mind’, ‘personal’ and ‘eternal’ as descriptions of the OP, he is no longer speaking *ex officio*. Physics, strictly speaking, cannot justifiably comment on categories such as these and remain physics. They are more properly metaphysical and hence the province of philosophy and religion, implying that Tipler’s insistence upon subsuming theology into physics is as unwarranted as the reverse. In virtue of attempts on the part of some authors to combine the two—such as in Alfred North Whitehead’s cosmology—physics and theology are no longer separated but they are still intact. Advancements in one field are not made in the name of the other. Better perhaps then not to foster the swallowing of one discipline by another, where the borders of that field may ultimately become dissolved and its uniqueness and integrity lost. In place of this, each area of study has a message to offer—a perspective on reality—and this voice should not be silenced.

Overall, Tipler’s principal objective is to demonstrate “that modern physics requires the God principle” (261), yet he himself evades this requirement and remains an atheist. In spite of his reaction he believes that citing such easily-misinterpreted, and sometimes even disputed, biblical passages as Exodus 3:14 and Romans 1:20 supports his ideas about nature and the divine. In the concluding chapters of his treatise, Tipler discusses several traditionally Christian theological themes with a level of sophistication that reveals his strengths lie in the physical sciences.

He enjoys a considerable command of physics as well as worldwide renown and acclaim, yet even there he is not without his gainsayers. This is largely due to his theory hinging on three crucial points: a closed universe; the ability and efficiency of life engulfing it; and the final singularity. It is by no means certain, however, that the OP singularity will effectively retain, let alone resurrect, the events leading up to it. If our present universe is to culminate in a Big Crunch, then there is no guarantee that this will catapult any emulations into a state of unending existence. Instead, a Big Crunch may wipe the slate clean and erase all previous content. While the first and third points in particular are not automatically problematic as viable cosmological alternatives, Tipler pins his hopes upon the final singularity as being truly final, which will not in turn yield an oscillating universe nor give way to the destruction of life but rather its preservation. In Tipler’s system God can only exist if the universe is closed. These are far-reaching claims which do not lack those who would contest them.

Aside from these provisos the work is a compelling read—well worth the effort. And I underscore the fact that it will require effort.

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Dilemmas of Life and Death: Hindu Ethics in a North American Context. By S. Cromwell Crawford. Albany: SUNY Press, 1995. ISBN 0-7914-2166-X. Pp. xi+233.

Crawford's book is an innovative comparative study of such contemporary ethical issues as abortion, suicide, euthanasia and the environment, from the perspectives of religion, morality and law. For each issue, Crawford provides a general and informative historical overview of the development of ethical ideals and beliefs in both the Western world (the Judeo-Christian tradition and secular modernity) and in the Hindu tradition. He gives both theological/philosophical and scientific interpretations of the various ethical dilemmas of life and death, and provides current case studies, particularly from North America.

Well-structured and smoothly flowing, this book makes accessible an important debate to those who are neither experts in ethics nor in Hinduism. In his courageous attempt to open an explicit dialogue, Crawford demonstrates how in issues of life and death one can benefit from moving away from the more absolutist ethical ideals found in North America. He finds that Hinduism has a more tolerant and understanding attitude towards relevant ethical issues, and shows how Hindu thought allows some leeway where there is a conflict between beliefs and interests. For example, in tracing the pro-life, pro-choice and constitutional debates on abortion in the United States, he discerns that, while Hindus believe life begins at conception, they allow room for abortion under certain circumstances such as rape.

There is considerable value in looking at other traditions for insights on contemporary ethical dilemmas in North America. However, one may question the plausibility of grafting ethical ideals from one world-view onto a radically different one. The Hindu ethical system is founded on the one unifying Hindu religious belief: the cycle of birth, death, and rebirth (*samsāra*). How can one then superimpose ethical ideals about life and death that flow from the Hindu religious world-view onto the Judeo-Christian world-view: one life with judgement after death? It is understandable that North Americans could gain insights from other traditions; yet Hindu ethical ideals are grounded on the extremely distinct world-view of *samsāra*.

In an attempt to demonstrate the ethical freedom provided in the Hindu tradition, Crawford gives examples of the accepted forms of suicide which he qualifies as "religious acts." However, these "religious acts" of self-mortification unto death and *sati*, which arise within the context of transmigration of the soul, differ fundamentally from the Western notion of suicide. There is thus an ethical hazard in superimposing a Western psychological category (i.e., suicide) onto Eastern practices of religious self-willed deaths, for they are different in nature and