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Will the Stars Sing on the Last Day? Cosmology and Eschatology†

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Abstract: Changes in the scientific picture of the origin and destiny of the physical universe present particular challenges to Christian eschatology. Both the great expansion of our picture of the size and age of the universe and the recent perception of an inexorable progression of the universe toward heat death in the far future alter the secular understanding of the universe with which Christian theology engages. In this essay, these challenges are considered in relation to how the theologian is to understand the eschatological role of physical objects far removed from interaction with humanity, for example, distant stars. Anthropocentric understandings of their role become implausible in light of recent changes in cosmology. This essay explores the traditional doctrine of bodily resurrection as a potential key to understanding the eschatological significance of stars. The insistence that the risen body is both radically transformed and yet numerically identical with the present body provides some parameters for understanding the nature of an eschatologically transformed universe and how its flourishing might be a witness to the glory of God.

In Chapter 38 of the Book of Job, after 35 chapters of arguments among Job and his friends, the Lord intervenes and speaks directly to Job 'out of the whirlwind'. He asks Job: 'Who is this that darkens counsel by words without knowledge? … Where were you when I laid the foundation of the Earth, …

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when the morning stars sang together, and all the sons of God shouted for joy?' (Job 38:3–7). God's peremptory confrontation with Job raises a question: Do stars sing? Aristotle thought of the stars as intelligent beings,[1] though I do not remember his saying anything about them singing, and Johannes Kepler thought the harmony of the spheres was embodied in the harmonic relationships among the ratios of the elliptical orbits of the planets.[2] But if stars are inanimate things, must we then conclude that the Lord's reference to singing morning stars is only poetry? St. Augustine did not quite think so. Commenting on Psalm 148:1, 'Praise the Lord from the heavens', he grants that there are inanimate things in the heavens, 'yet, because [these things] also are good, and duly arranged in their proper order, and form part of the beauty of the universe, which God created, though they themselves with voice and heart praise not God, yet … God is praised in them; and, as God is praised in them, they themselves too in a manner praise God'.[3]

If the morning stars sing at the foundation of all things, will, so to speak, the evening stars sing at their consummation? That is, properly speaking, a theological question, not a scientific or even a philosophical one. But can the theologian learn something from physics or astronomy or cosmology or from philosophical reflection on these sciences so that the theological question can be asked and discussed with greater accuracy and precision? Eschatology is a particularly significant focus for the interrelation of science and theology. Over the last century, physics and astronomers have sketched a probable future for the universe both radically different from earlier scientific assumptions and at radical odds with traditional Christian belief. How does the Christian believer, and especially the Christian theologian, respond?

Some, but surprisingly little, attention has been given over the last century to the relation between science and Christian eschatology. Early twentieth century Protestant theology, especially in Germany under the influence of Johannes Weiss' *Jesus' Proclamation of the Kingdom of God*[4] and in a changed cultural situation following World War I, made eschatology central. Karl Barth famously remarked: 'If Christianity be not altogether thoroughgoing eschatology, there remains in it no relationship whatever with Christ'.[5] Nevertheless, Protestant eschatology in the years between the world wars usually viewed the lasts things through an individualizing, vaguely or precisely

1 For example, in *De Caelo*, II,12, 292[a]19–21.
2 Johannes Kepler, *The Harmony of the World*, trans. E. J. Aiton, A. M. Duncan, and J. V. Field (Philadelphia: American Philosophical Society, 1997).
3 *Enarrationes in Psalmos*, 148, §3. English translation from Augustine, *Expositions on the Book of Psalms, Vol. 6* (Oxford: John Henry Parker, 1857), p. 418.
4 Johannes Weiss, *Jesus' Proclamation of the Kingdom of God*, trans. Richard Hyde Hiers (Philadelphia: Fortress Press, 1971). The German original was published in 1892.
5 Karl Barth, *The Epistle to the Romans*, trans. Edwyn C. Hoskyns [of the sixth German edition] (London: Oxford University Press, 1933), p. 314.

existential lens. In the midst of the theological ferment following the Second Vatican Council, various Catholic theologians, again particularly in Germany, floated new interpretations of death, of the basis of individual immortality, and of the resurrection. In the last third of the century, liberation theologians Protestant and Catholic used eschatological categories to interpret and advocate for particular understanding of history and God's present role in it.

These approaches represented a new ferment in eschatology, but they also all framed the eschatological issues in terms that made the new scientific developments of the time irrelevant to their discussions. The questions were existential, metaphysical, or about the nature and theological significance of intraworldly political action. For these questions, Martin Heidegger and Karl Marx were far more significant than Albert Einstein or Edwin Hubble. On occasion, a theologian would explicitly express a disinterest in critically engaging a modern scientific picture of reality as a physical, causally closed total system. A motive for Rudolf Bultmann's program of demythologizing eschatology was a certain kind of respect for science: 'We cannot use electric lights and radios and, in the event of illness, avail ourselves of modern medical and clinical means and at the same time believe in the spirit and wonder world of the New Testament',[6] a world New Testament eschatology presupposes. This self-restriction eliminated the possibility of any war between science and religion, but also blocked fruitful interaction.

More recently, the tide has begun to turn. Theologians such as John Polkinghorne[7] and Robert John Russell[8] have written extensively on eschatology and contemporary science. The following essay will explore the particular question raised at the outset: how does the theologian understand the ultimate destiny of the material universe, taking into account shifts in recent physics and astronomy. The exploration is explicitly theological. Biblical and doctrinal norms, often grounded in divine revelation, will guide the discussion. Such norms do not imply that science, a form of natural knowledge, is irrelevant, but they determine the ways in which science is relevant to theology. The doctrinal norms appealed to in this essay are those of the Catholic Church. The more particularly Catholic eschatological doctrines—for example, purgatory or the Queenship in heaven of the Blessed Virgin—will play no role. In relation to some eschatological beliefs historically shared by most Christians—for example,

[6] Rudolf Bultmann, 'New Testament and Mythology', in *Kerygma and Myth: A Theological Debate*, ed. Hans Werner Bartsch (New York: Harper & Row, 1953), p. 5.

[7] John Polkinghorne, *The God of Hope and the End of the World* (New Haven: Yale University Press, 2002). See also the essays by various authors co-edited by Polkinghorne, John Polkinghorne and Michael Welker, eds., *The End of the World and the Ends of God: Science and Theology on Eschatology* (Harrisburg: Trinity Press International, 2000).

[8] Robert John Russell, *Cosmology: From Alpha to Omega* (Minneapolis: Fortress Press, 2008).

the resurrection of the body—Catholic doctrine is rather fully developed and the scholastic elaboration of that doctrine often highly detailed.[9]

Christian eschatology and two changes in the scientific understanding of the universe

The size and age of the universe

In the end, when the sky has 'vanished like a scroll that is being rolled up' (Rev 6:14) and the Son 'delivers the kingdom to God the Father' so that 'God may be all in all' (1 Cor 15:24, 28), will there be stars? If so, why so? What would be the point of the stars continued existence? What will they do? The question is that of the eschatological fate of the material universe.

When we say 'material universe', however, just what are we talking about? Our understanding of the material universe has changed over the last century in two ways decisive for our question. First, we now see the universe as far larger and older than was assumed by most of our patristic, medieval, and early modern forebears. The universe is not just a few days older than humanity and is not limited to the seven celestial spheres of the sun, the moon and the five planets earlier known, plus a sphere of the fixed stars. The universe is billions of years old and includes many billions of stars stretching across billions of light years.

This fact presents a problem for the way the fate of the stars was handled in much traditional theology. The most common traditional view was fundamentally anthropocentric in its understanding of the function the material world plays in the divine economy. For example, Thomas Aquinas, in his early Sentences commentary, the *Scriptum*, says: 'We believe all corporeal things to have been made for man's sake, and thus all things are said to be subject to him [Psalm 8:5ff]. Now they [all material things] serve man in two ways: first, as sustenance to his bodily life; secondly, as helping him to know God, inasmuch as man sees the invisible things of God by the things that are made, as is said in Romans 1[:20]'. Neither separated souls nor resurrected bodies will need bodily sustenance and the redeemed, once beyond a possible purgation, will know God directly through the beatific vision. Aquinas continues: 'The carnal eye, however, will be unable to attain to this vision of the [divine] essence; and therefore, that it may be fittingly comforted in the vision of the Godhead [*visione divinitatis*], it will see the Godhead in its corporeal effects, in which manifest proofs of the Divine majesty will appear'. The material universe will still have an eschatological role to play as a physical witness to the glory of God, even for the blessed who see God face to face, though for material things to play this role they will need 'to receive a greater influx from the divine goodness, not so as to

[9] See, e.g., Francis A. P. Solá and Joseph F. Sagüés, *Sacrae Theologiae Summa: IVB: On Holy Orders and Matrimony, On the Last Things*, trans. Kenneth Baker (Keep the Faith, 2016), pp. 272–495.

change their species, but so as to add a certain perfection of glory: and that will be the renewal of the world' in the resurrection.[10]

Our present picture of the universe is not logically incompatible with what Aquinas says, but is it plausible that billions and billions of stars, most of which will not and some perhaps cannot be known by humanity in history,[11] exist only for the sake of being a witness to the glory of God to humanity's sensory knowledge in the resurrected state? The mind boggles here a bit. Perhaps the anthropocentric argument can be extended to argue that as embodied beings, as we are now and will be in the resurrection, we require a material world as our context.[12] Even then, the size and age of the universe does seem excessive, though perhaps there is an anthropocentric function even in the excessiveness, to inspire our humility.

Perhaps, but my discomfort remains. Rather than take the traditional anthropocentric view, does it make more sense to say that, in light of what we now know about the universe, much of it exists to give glory to God more directly, with only an oblique reference to humanity? A suggestion of a better approach might lie in scholastic discussions of angels. It is often forgotten that traditional theology did, in fact, assume the existence of extraterrestrial beings, namely, angels. In most scholastic discussions I know, angels are not said to exist for the sake of humanity in the way non-rational creatures do, even if angels have functions in relation to humanity. They glorify God directly. Nevertheless, angels have a relation to humanity through the incarnate man, Jesus Christ. Christ is not their redeemer; the faithful angels do not need a redeemer and the fallen angels are beyond redemption. But Christ is the angels' Lord, as he is the Lord of all creatures, and he is the head of that community made of humans and angels which is his body.[13] Thus, some extraterrestrial beings will sing on the last day.

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[10] All quotations in this paragraph are from Thomas Aquinas, *Scriptum super IV Sententiarum Petri Lombardi* d. 48, q. 2, a. 1 c; cited from Thomas Aquinas, *Commentary on the Sentences, Book IV, Distinctions 43–50* (Green Bay, Wisconsin: Aquinas Institute, 2018), p. 336; translation altered. That the resurrected will see God not only directly, face to face, but also see God in all created things, heavenly bodies included, is affirmed by Augustine in the last paragraph of *The City of God*, XXII, c. 29.

[11] A star beyond the cosmological horizon, that is, beyond the point at which, due to the accelerating expansion of the universe, everything is receding from us at more than the speed of light, can never be known within history. Whether it could be known eschatologically depends on how one thinks the blessed know things, a complex and speculative question.

[12] For an example of such an argument, see Paul J. Griffiths, *Decreation: The Last Things of All Creatures* (Waco, TX: Baylor University Press, 2014), pp. 309–11.

[13] See, for example, Thomas Aquinas, *Summa theologiae*, III, q. 8, a. 4. Complex questions can be asked about the relation between Christ and the elevating (rather than healing) grace the angels must receive. See the discussion in Serge-Thomas Bonino, *Angels and Demons: A Catholic Introduction*, trans. Michael J. Miller (Washington, DC: The Catholic University of America Press, 2016), pp. 221–30.

Can the example of the angels be extended to the stars? To a degree, an answer depends on how one understands the motive of the incarnation, the divine intention behind the incarnation.[14] If one holds (as I would) to a broadly Scotist understanding of that intention—that first and foremost the incarnation of the Word in an individual creature is about God giving the greatest possible gift to creation, that is, union with himself—then it becomes easier, I believe, to think of all reality, stars included, as having an eschatological destiny realized *through* Christ. All things are related to Christ, for, as Paul says, 'all things were created through him and *for* him. … In him all things hold together' (Col 1:16–17). The inclusion of the material universe in the eschaton would then be mediated through Jesus as the incarnation of the Logos of all created things. Christ's incarnate humanity is the eschatological link between all created things and God. All things are created for inclusion in the transformation of the universe in and through Christ.

The analogy with angels has a limitation, however. Angels are rational beings and so imagining what it means for them to praise God is not so difficult. What might it mean for a star to praise God without mediation through a rational being of the sort Aquinas postulates? I will come back to that question at the end of this essay.

The trajectory from Big Bang to Big Chill

There is also a second development in cosmology that alters the questions theology must ask about the destiny of the universe: the shift away from the "steady-state" universe of Aristotle and of Western secular wisdom until the modern period toward a scientific picture of a universe with a history. The changes in cosmology were preceded by similar shifts in geology and biology (most notably, of course, the theory of evolution). The shift in cosmology came with the move toward some sort of Big-Bang origin theory. In the past, the secular alternative to the Christian picture of creation and consummation had been an eternal universe and theological questions centered on engagement with that alternative. For example, Aquinas discussed whether there are sufficient grounds, apart from revelation, to reject the eternity of the universe.[15]

The contemporary cosmological picture seems to present challenges less in its depiction of the origin of the universe in a single event 13.7 billion years ago—some account still must be given for the conditions that gave rise to that

[14] For a thoroughgoing and subtle discussion of the issues involved, see Justus H. Hunter, *If Adam Had Not Sinned: The Reason for the Incarnation from Anselm to Scotus* (Washington, DC: The Catholic University of America Press, 2020). The alternative is to assert that the motive for the incarnation (or, at least, all that we can say about that motive) is redemption from sin. This latter view is usually identified with Aquinas; see *Summa theologiae*, III, q. 1, a. 3 c.

[15] See Thomas Aquinas, *Summa theologiae*, I, q. 46.

event—than in the depiction of the future of the universe as an endless and accelerating expansion toward eventual heat death, in which matter and energy become endlessly attenuated.[16] I have run across widely variant responses to this picture among scientists. Katie Mack, in her recent *The End of Everything: (Astrophysically Speaking)*, concludes 'At some point, in a cosmic sense, it will not have mattered that we ever lived. The universe will, more likely than not, fade into a cold, dark, empty cosmos, and all that we have done will be utterly forgotten'.[17] Writing in 1988, Freeman Dyson thought 'there were good scientific reasons for taking seriously the possibility that life and intelligence can succeed in molding this universe of ours to their own purposes'.[18] In 2004, after the discovery of the acceleration of the universe's expansion, he was less upbeat: 'If it turns out that we live in a constantly accelerating universe, we may complain that God designed it badly as a home for intelligent creatures, but we can be thankful that he gave us at least a few trillion years to enjoy it before the final darkness falls'.[19]

How does the theologian respond? One option is simply to accept that heat death does seem to be the fate of the universe and rethink Christian eschatology on that basis. That option is taken up by Kathryn Tanner. In themselves, she argues, human persons and the total universe are mortal, period, full stop. She is explicit that we should modify 'the usual New Testament understanding of eternal life to bring it into conformity with an Old Testament recognition of death as the end—not just for individual persons, but for humanity and the cosmos'. Each human individual and the universe itself will, as a result of God uniting himself with created reality in the incarnation, exist within the life of God, but not as distinct beings.[20]

Tanner's view flows, at least in part, from her particular vision of the nature of Christian faith. Why should anyone else take up such an option and simply accept that the final destiny of the material universe is exhaustively to be understood along the lines of the present picture of heat death? An alternative argument is given by Gerhard Lohfink. For Lohfink, divine causality is strictly and always a matter of divine immanence within natural causes: 'God acts,

16 For a readable account of prognosis, see Katie Mack, *The End of Everything: (Astrophysically Speaking)* (New York: Scribner, 2020), pp. 71–104.

17 Mack, *End of Everything*, p. 206.

18 Freeman J. Dyson, *Infinite in All Directions: Gifford Lectures Given at Aberdeen, Scotland, April–November 1985* (New York: Harper & Row, 2004), p. 117.

19 Dyson, *Infinite in All Directions*, p. xv. This edition reprints the original 1988 text, with the addition of a new introduction, written in 2004.

20 Kathryn Tanner, 'Eschatology Without a Future?' in *The End of the World and the Ends of God: Science and Theology on Eschatology*, eds. John Polkinghorne and Michael Welker (Harrisburg, PA: Trinity Press International, 2000), p. 231. In this essay, Tanner presents such an 'eschatology without a future' as a thought-experiment, but it is clear both within the essay and in her other writings that this is the version of eschatology to which she is committed. See Chapter 4, 'The End', in Kathryn Tanner, *Jesus, Humanity and the Trinity: A Brief Systematic Theology* (Minneapolis: Fortress Press, 2001).

always, and without exception, through secondary causes'.[21] He applies this rule even to the resurrection of Jesus,[22] but in the process necessarily must rethink what is meant by the resurrection of Jesus and the resurrection of all other persons. Resurrection becomes a lifting of the history of creation into an essentially eternal state. Resurrection is not an 'apocalyptic spectacle' that will occur at the end of history. It occurs 'in' death, in which each person encounters Christ.[23] For Lohfink, the material world in itself has little eschatological significance. He presents a radicalized version of the anthropocentric picture of the material world in the eschaton we found in Aquinas. The material world will not exist in the eschaton as a distinct witness to humanity of God's glory; rather the material world will continue only as it has been taken into human life. 'The pre-human world *participates* in the resurrection of the human because humans have internalized it.'[24] Lohfink's eschatology is more detailed than Tanner's, but he also does not explicitly question of the scientific picture of the end of the universe. He does not need to, not because he offers an alternative future for the stars, but because the material universe is irrelevant to his eschatology.

This option seems to me deeply problematic. As I have noted, the sheer excessiveness of the universe in relation to such an eschatology raises questions. And while Lohfink criticizes any idea of a separated soul existing between death and resurrection as devaluing the body,[25] his own scheme, in which things are taken up into an eternity that exists simultaneously with history,[26] seems to me far more problematic in its devaluation of the entire material universe. More significantly, basic questions of biblical interpretation are involved. The Bible does, in both the Old and New Testaments, use language of the material universe passing away.[27] Nevertheless, the biblical picture of eschatological reality is

[21] Gerhard Lohfink, *Is This All There Is?: On Resurrection and Eternal Life*, trans. Linda M. Maloney (Collegeville, Minnesota: Liturgical Press Academic, 2018), p. 115.

[22] For an argument that Jesus' resurrection can be understood as the result of created secondary causes, Lohfink cites Béla Weissmahr, 'Kann Gott die Auferstehung Jesu durch innerweltliche Kräfte bewirkt haben?' *Zeitschrift für katholische Theologie* 100 (1978): pp. 441–69. Weissmahr here elaborates a metaphysics in which only *Geist* is truly subsistent (p. 461).

[23] Lohfink, *Is This All?*, p. 211.

[24] Lohfink, *Is This All?*, p. 193.

[25] Lohfink, *Is This All?*, pp. 180–1.

[26] Lohfink, *Is This All?*, pp. 203–12.

[27] For example, Isaiah 51.6 and 2 Peter 3:10, which speaks of the heavens vanishing and the elements being consumed by fire. Since there are also various biblical references to a new heaven, the burning referred to in 2 Peter 3 was consistently interpreted as a purification by fire of the sublunary elements. This fire does not reach to the stars. For such an interpretation, see Augustine, *City of God*, Bk. XX, c. 16; Peter Lombard, *Sentences*, IV, d. 47, 4.2; Thomas Aquinas, *Scriptum* IV, d. 47, q. 2, a. 2, qc. 2; John Duns Scotus, *Ordinatio*, IV, d. 47, q. 2.

consistently embodied, from the vision of the reconciled world in Isaiah 65 and 66 to the New Jerusalem of Revelation 21 and 22.

The resurrection of the body as example for the future of the material universe

What resources do we have to think theologically about the universe and the eschaton, if we are not going to simply affirm the universe as a ladder to eternal blessedness we kick away when we have ascended? A potential resource is the long history of reflection, beginning in the New Testament itself, on the nature of the resurrected body. In discussing the resurrection body, theology had to take up the eschatological significance of materiality and often did so in detail and, in the work of the great scholastics, with precision. As we will see, there may be good reasons for not extending a univocal concept of resurrection to cover both human beings and stars, but resurrected bodies can still give us some guidelines for thinking about the destiny of the material universe.

At risk of over simplification, let me stress three relevant aspects of resurrected bodies that I think were generally shared by most late antique, medieval, and early modern theologians (though, of course, there were exceptions). These aspects will be presented in broad strokes and simply as assertions, though I think they are justifiable assertions; detailed argument would explode the limits of this essay.[28]

First, resurrection, either of Jesus or of all persons eschatologically, has been consistently presented in both Scripture and tradition as the result of a decisive break with the normal course of history and the usual operation of intraworldly forces. Resurrection is one aspect, even if a focal aspect, of the transformation of all things, including time, when Christ returns. In the New Testament, the resurrection is always tied to Christ's return and he is himself said to be the cause of our resurrection (e.g., Phil. 3:20–21). Resurrected bodies are the product of a break, a divine intervention, into the usual course of things.

Second, resurrected bodies will be radically transformed bodies. Some of the usual characteristics of bodies, in fact of all matter, will cease to exist. For the New Testament and for most of the theological tradition,[29] all resurrected

[28] Any discussion of eschatology generally or resurrection more particularly faces difficult interpretive questions when dealing with the biblical imagery of the End. I take a broadly realist approach to such imagery, at least to its most important elements. Eschatological imagery, for all of its poetic and metaphorical character, must not be interpreted in a way that simply dismisses the concrete image by making it a symbol of something radically different from the image itself.

[29] See Paul O'Callaghan, *Christ Our Hope: An Introduction to Eschatology* (Washington, DC: Catholic University of America Press, 2011), pp. 102–5.

bodies, of the redeemed and of the lost, will be incorruptible; they will not be subject to destructive physical changes to which matter is now inevitably subject. All resurrected bodies are thus immortal. (Interestingly, one of the reasons Aquinas gives for the incorruptibility of even the bodies of the damned is that all physical change derives from the movement of the celestial bodies, which movement ceases in the eschaton).[30] The bodies of the redeemed receive further gifts that affect the body, such as subtlety, which allows a body to penetrate or pass through another body without harm to either, and agility, by which a body can move from one place to another with 'incomprehensible swiftness', as one source puts it.[31]

Third, despite such a transformation, the body that rises is the same body we now have. This is a matter of Catholic dogma, affirmed in the Creed of the Fourth Lateran Council of 1215.[32] This identity is not only an identity in kind or species. The body that rises is numerically identical with the body that now lives and dies. While that principle is, as far as I know, unchallenged in Western theology at least from Augustine on, just what such a numerical identity of the earthy and risen body required was a matter of continuous debate.[33] What sort of continuity of matter was required for such identity? Was a continuity of form alone sufficient to constitute numerical identity? These debates are not surprising; contemporary philosophy continues to lack consensus on just what constitutes the identity of the human self over time, or even whether any such identity exists except as a socially useful convention.

Can we extend these principles found in a Christian understanding of resurrection to a Christian understanding of the eschatological destiny of the universe?

The first principle, that the resurrection (and the eschaton as a whole) is radical break and intervention, is applicable and, I believe, rules out one approach present in some treatments of eschatology and cosmology. The eschatological future of the universe is not the end result of natural processes. Thus, I do not think that the link between cosmology and Christian eschatology is to be found in something like the process metaphysics of Alfred North Whitehead or Charles Hartshorne or in the more idealist understanding of Pierre Teilhard de Chardin, for whom a long historical growth in the spiritualization of humanity and matter means that 'when Christ appears in

30 *Scriptum*, IV, d. 44, q. 3, a. 1, q. 2; also IV, d.44, q 3, a. 2, qc. 2, ad 3.

31 Solá and Sagüés, *Sacrae Theologiae Summa: IVB: On Holy Orders and Matrimony, On the Last Things*, 474; Tome VI, §298.

32 Heinrich Denzinger and Peter Hünermann, eds., *Enchiridion Symbolorum Definitionum et Declarationum de Rebus Fidei et Morum*, 43rd ed. (San Francisco: Ignatius Press, 2012), para. 801.

33 For two contrasting discussions of how to maintain the numerical unity of the present and the risen body, see Thomas Aquinas, *Summa contra gentiles*, IV, ch. 81, and John Duns Scotus, *Ordinatio*, IV, d. 43, q. 1, §§41–43.

the clouds he will simply be manifesting a metamorphosis that has been slowly accomplished under his influence in the heart of the mass of mankind'.[34] The conclusion that the expansion of the universe is accelerating toward a heat death poses particular challenges to an adoption of process metaphysics as a framework for Christian eschatology. It was just this scientific discernment of an accelerating expansion of the universe that produced the shift noted above in the outlook of Freeman Dyson, who had earlier confessed a certain sympathy for Hartshorne's philosophy,[35] toward a more pessimistic attitude to the final future of the universe.

The second principle, the radical transformation of physicality, also has implications for our picture of the fate of the universe. Will the incorruptibility of resurrected bodies be an isolated phenomenon, or will corruptibility be eliminated in all reality? Paul does say in Romans 8:21 that 'creation itself will be set free from its bondage to corruption and will obtain the freedom of the glory of the children of God', which seems to indicate that all reality will be set free from corruption. But, as the physicist and theologian Stephen Barr notes, that would seem to imply that entropy itself would cease, that is, that the Second Law of Thermodynamics would eschatologically cease to apply, something deeply incompatible with present physical reality. 'The Second Law of Thermodynamics is a rather general consequence of the laws of probability and depends very little upon the details of the laws of physics. The idea that a physical realm continuous with and strongly resembling this universe could be immune to corruptibility, death, and decay, is problematic.'[36] Barr concludes that a biblical eschatology thus requires a radical transformation of physicality itself. As Paul said, 'flesh and blood cannot inherit the Kingdom of God' (1 Cor 15:50).

But we also must apply to the universe, at least in part, the third principle I mentioned: the resurrected body must be the same body we now have. At this point, the analogy between the resurrection of our bodies and the fate of the material universe does become difficult in various ways. The idea of the numerical identity of a human person is tied up with thinking of the human being as an integral substance and not as a mere aggregate, such as a pile of sand. Is a star or, even more, a galaxy a substance in the same sense? We may speak of a star being born or dying, but do we mean the same thing that we mean when we speak of a human or a cat being born or dying? How we think about the identity of something over time is bound up with our metaphysical understanding of what that something is. Unfortunately, the contemporary philosophical discussion of the metaphysics of material objects is exceedingly complicated and, as far as I can tell, manifests

[34] Pierre Teilhard de Chardin, *The Divine Milieu* (New York: Harper & Row, 1960), 128.
[35] Dyson, *Infinite in All Directions*, 119.
[36] Stephen M. Barr, "Science and Heaven," p. 2 of printout. https://catholicscientists.org/articles/science-heaven/.

little consensus.[37] Perhaps the concern for the numerical identity of the resurrected body does not apply to material objects. Material objects may be present eschatologically, but not resurrected in the strict sense.

Let me thus pass to a more general application of this third principle. A conceptual reason for the insistence that the Christian hope is not merely for the immortality of the soul, but also for the resurrection of the body is that God wishes to bring to perfection and elevate the human being in its integrity, body and soul. Our bodies are essential aspects of who and what we are. Our redemption must include the perfection and elevation of who we are as integral intellectual/spiritual and physical beings.

We can similarly ask what would it mean for the material universe to be perfectly fulfilled in its integral being, which means fulfilled and perfected in what it is as a material universe. The general theological principle that grace perfects rather than destroys nature here applies.[38] But what can we say about the nature of a star, about what makes a star a star, or, a far more difficult question, about what constitutes the flourishing, the natural end, of a star as a star? What is the good that the star embodies? All that God creates is inherently good simply as being and as being what it specifically is. Its goodness is a gift from God and, more, a kind of participation in the Good itself which is God. That the material universe in itself embodies inherent goods is an essential part of the reason why the material universe must itself find a place in the eschaton.

Whatever constitutes the flourishing of a star, the good which the star embodies, it must be preserved and elevated eschatologically if it is included in the new heaven and the new earth. But what is the flourishing, the natural end, of a star? The primarily anthropocentric understanding of the eschatological role of the material universe that I noted in Aquinas is founded on an understanding of the natural end of the material universe in terms of its role as context of and support for human existence, but, as I have said, that anthropocentric understanding seems to me less plausible in light of the massively altered view of the universe that results from modern science. We need to ask anew about how we understand philosophically and theologically the nature and significance of the material universe. What constitutes the flourishing, the natural end, of material things is a question of metaphysics, not physics, but can science at least inform the discussion of that question? I would think a knowledge of the basics of contemporary physics and astrophysics might contribute to that discussion.

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[37] See the survey of contemporary options in Ryan Wasserman, 'Material Constitution', in *The Stanford Encyclopedia of Philosophy (Fall 2021 Edition)*, ed. Edward N. Zalta (2021), at https://plato.stanford.edu/archives/fall2021/entries/material-constitution/.

[38] The precise relation between nature and grace has been a point of contention in Catholic theology over the last century. The details of this argument are not relevant here, however.

Unfortunately, I would not myself claim to adequately possess that knowledge and will here raise only metaphysical issues.

I would note two lines upon which, given the time and leisure, I would explore this metaphysical question. One would be along the lines suggested by the American philosopher Thomas Nagel in his *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False*.[39] Nagel finds inadequate any explanation of the appearance of life and of the evolution of intelligent life, such as human beings, within the time frame of earth's history that relies entirely on reductive mechanistic causes. Such explanations cannot plausibly account for the emergence of life, consciousness, or cognition. He finds a reductive mechanistic understanding of nature 'a heroic triumph of ideological theory over common sense'.[40] What is needed are 'principles of the growth of order that are in their logical form teleological rather than mechanistic'.[41] In other words, Nagel thinks an adequate explanation of the world as we know it, which includes life, consciousness, and thought, requires something like final causes. Is one aspect of the good of the material universe its inherent teleological openness to and natural potency for the emergence of life, consciousness, and knowledge? What constitutes the flourishing of a creature and that creature's natural end are intrinsically interrelated. Matter's potency for life is an inherent aspect of what makes it good, whether or not that potency is realized in particular cases. That aspect of the inherent good of the material universe is a good taken into the eschaton.

An argument such as Nagel's only takes us so far, however. While it is not anthropocentric in precisely the sense the traditional scholastic understanding is, Nagel's understanding (which, it should be noted, is explicitly non-theistic) is still, one might say, biocentric. Nagel is a self-avowed realist about value; value exists objectively. But value is bound up with living things. 'The actual history of value in the world … seems to coincide with the history of life. … Even a bacterium has a good in this sense, in virtue of its proper functioning, whereas a rock does not.'[42] Nagel's view is complex and I am only touching its surface, but he does appear to say that merely physical things, for example, rocks and stars, only have value, embody a good, when their potency for life is actualized. Is that, however, all the theologian wishes to say?

I, at any rate, wish to say more and thus at least would want to explore a second line of thought. One aspect of the attraction of the process metaphysics of Hartshorne or Whitehead is its blurring of the sharp line between animate

39 Thomas Nagel, *Mind and Cosmos: Why the Materialist Neo-Darwinian Conception of Nature is Almost Certainly False* (New York: Oxford University Press, 2012).
40 Nagel, *Mind and Cosmos*, p. 128.
41 Nagel, *Mind and Cosmos*, p. 7.
42 Nagel, *Mind and Cosmos*, p. 117.

and non-animate beings by adopting a kind of panpsychism, 'the view that mentality is fundamental and ubiquitous in the natural world'.[43] Rather than thinking of the material universe as simply dead, which then leads to the problems Nagel notes of how to account for the emergence of life and, even more problematically, the emergence of consciousness and cognition, forms of panpsychism see a continuum, from the cosmic dust to complex chemicals to simple life to whatever conscious life is to be ascribed to a cockroach to self-reflective human consciousness. The elimination of sharp breaks along this continuum has made the idea of some form of panpsychism interesting to some prominent participants in contemporary philosophy of mind.[44] Earlier in this presentation, I was critical of process metaphysics as implying an unacceptable causal role of natural process in the arrival at the eschaton. But these problems are not to be found in other, in some ways similar, metaphysical schemes. I would particularly note the work of the sadly neglected mid-twentieth century Anglican Thomist philosopher and theologian Austin Farrer, in particular his major work *Finite and Infinite*,[45] in which a panpsychist outlook related to Whitehead is developed, but thought through in close conversation with scholastic philosophy and in accord with traditional Christian theology.

An advantage for our topic is that such a panpsychist understanding of the universe preserves the idea of the potency in matter for life, consciousness, and thought, but does not reduce the good realized in matter to that potency alone. The material universe does not just possess a potency for life and consciousness; in perhaps an extremely attenuated way, all things realize that potency. Everything, from cosmic dust to humans to angels, realizes a good; there is a flourishing which is its being, which is its participation in being and good. The good of cosmic dust is less than the good of a dog, but it is still an intrinsic good that can be taken up, perfected and in some way elevated, in the eschaton.

As I have said, these are lines I would wish to explore, not conclusions I have reached. I am, choose your metaphor, skating on thin ice or leaning out over my skis. If our Lord returns in the next five minutes, he may well ask me: 'Who is this that darkens counsel by words without knowledge?' I have briefly noted some highly speculative approaches to our question. I am not sure how science can contribute to further explorations of such concepts or how they might sound to the scientist. I present them as possible paths of, I hope, orthodox theological

[43] Philip Goff, William Seager, and Sean Allen-Hermanson, 'Panpsychism', in *The Stanford Encyclopedia of Philosophy (Summer 2022 Edition)*, ed. Edward N. Zalta (2022), p. 1, at https://plato.stanford.edu/archives/sum2022/entries/panpsychism/.

[44] See, for example, David J. Chalmers, *The Character of Consciousness* (New York: Oxford University Press, 2010), pp. 133–7.

[45] Austin Farrer, *Finite and Infinite: A Philosophical Essay*, 2nd ed. (Westminster: Dacre Press, 1959).

and philosophical reflection on the challenge of contemporary cosmology for eschatology. What I am convinced of is that the evening stars will sing at the consummation of all things. Their song may not be as complex as the song of the angels or of the saints, but it will make its own contribution to the chorus gathered around the throne of God.