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## The Spirit and the Glory's Banishment from the Material World: Reimagining Divine Immanence in the Light of Later Modern Science

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*This article first recounts the mechanisation of the world picture in early modern science and the elimination of secondary qualities in material objects that made it more difficult for Christian faith to imagine the presence of the Holy Spirit – and the glory and beauty of God – in the material world. It is then argued that developments in later modern science such as electromagnetic field theory can provide conceptual analogies for retrieving a vision of the real presence of the Spirit in nature, without falling into pantheism.*

**Keywords:** Spirit, Holy Spirit, divine presence, glory, beauty, immanence of God, secondary qualities, Galileo, Maxwell, electromagnetism, electromagnetic field theory

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The Anglican physicist and theologian John Polkinghorne has observed that 'by the middle of the eighteenth century science appeared to have banished all notions of spirit from a world whose true character seemed to be that of a clockwork mechanism'.<sup>1</sup> While Immanuel Kant in 1788, in the *Critique of Practical Reason*, could still express a sense of wonder pondering the 'starry heavens above', it was becoming increasingly difficult for educated Christians, influenced by the mechanical and mathematical scientific imaginaries<sup>2</sup> of Galileo and Descartes, to share the sensibility of the biblical writers for whom the heavens were 'telling the glory of God' (Ps. 19:1). The 'true' description of the material world was that of inert material particles in motion, described by mathematical equations, devoid of secondary qualities such as colour or taste.

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1 Polkinghorne, J. 'The hidden work of the Spirit in creation', in Welker, M. (ed.) *The Spirit in Creation and New Creation: Science and Theology in Western and Orthodox Realms*, Grand Rapids, Mich.: Eerdmans (2012), pp. 3-10, p.4. I would like to thank my colleague at Gordon-Conwell, Kirsten Sanders, whose paper 'Why matter matters: transcendence and Christian practice' was a catalyst for some of the reflections presented in this paper. I would also like to thank my colleagues Adonis Vidu, Patrick Smith, Richard Lints and Thomas Pfizenmaier for their helpful comments on the paper.

2 The notion of an 'imaginary' is borrowed from Charles Taylor and his analysis of the 'immanent frame' of the secular world-view of modern science. Taylor argues that the metaphysical assumptions of modern science crowd and cramp the modern mind 'by a powerful picture which prevents one from seeing important aspects of reality ... our modern man-made world declares the absence of God': Taylor, C. *A Secular Age*, Cambridge, Mass.: Harvard University Press (2007), p. 551.

The world picture and imagination of early modern science seemed to leave no room for theological notions such as the beauty and glory of the Creator Spirit immanent in the material world. For a modern interpreter such as Rudolf Bultmann, such biblical notions and images could only be considered as 'mythological' in the light of modern science.<sup>3</sup>

It is an underlying premise of this paper that in any given historical era, the theological understanding of divine immanence and of God's relationship to the world more generally will be informed by a given metaphysical framework and that, in turn, this metaphysics will be informed by the received physics of that period. For example, Thomistic theology was informed by Aristotelian metaphysics, and this metaphysics was in turn informed by Aristotle's premodern physics. Or to consider an example from a later period, the metaphysical and theological assumptions of eighteenth century Deism were influenced by the 'clockwork' image supposedly derived from Newtonian physics,<sup>4</sup> a picture in which the Creator 'designed the clock, wound it up, and then left it to run without any further interventions', so to speak. The premise of this paper is that theological understandings of divine immanence today should be informed *not only* by 'common sense' or Aristotelian or early modern scientific pictures, but by the findings of later modern science as well.

It is the purpose of this article to argue that while the world picture and 'imaginary' of early modern science made it more difficult to imagine and visualise the presence of the divine Spirit – and the beauty and the glory of the Spirit<sup>5</sup> – in the material world, certain developments in later modern science can provide conceptual resources and analogies that can help believers in the modern world to once again appreciate the sensibilities of the biblical writers, and to do so without falling into pantheism.<sup>6</sup>

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3 As Bultmann famously declared, 'Now that all our thinking is irrevocably formed by science ... We cannot use electric lights and radios ... and at the same time believe in the spirit and wonder world of the New Testament': *New Testament and Mythology and Other Basic Writings*, Ogden, S. (trans.), Minneapolis, Minn.: Fortress Press (1984), pp. 3, 4.

4 However, Newton did not personally subscribe theologically to a 'clockwork' view of divine providence, although the Deists seem to have read him this way. In the *Principia* Newton speaks of final causes, a God of providence rather than of 'Fate and Nature', and even of a 'most subtle spirit which pervades and lies hid in all gross bodies', perhaps accounting for the force of gravitational attraction: Cajori, F. (trans.), rev., *Sir Isaac Newton's Mathematical Principles of Natural Philosophy and His System of the World*, Berkeley, Calif.: University of California Press (1946), pp. 544, 545. I would like to thank my colleague Thomas Pfizenmaier for drawing my attention to these references in Newton's *Principia*.

5 On the relationship of the Spirit and the glory of God in biblical theology, and for a review of the biblical data indicating that the glory of God (e.g. the 'Shekinah' and the wilderness fiery pillar and cloud) is a visible manifestation of the Spirit and presence of God, see Kline, M.G. *Images of the Spirit*, Grand Rapids, Mich.: Baker (1980), esp. chap. 1, pp. 13-34, 'The Glory-Spirit and his human image'.

6 It is not the purpose of this paper to discuss the topic of pantheism and its understanding of

The argument will proceed first by reviewing the mathematisation and mechanisation of the material world in the conceptual frameworks of Galileo and Descartes. Secondly, there will be a discussion of the consequences of this conceptuality for the 'disenchantment' of nature, the 'dis-spiriting' of the human body, the 'problematizing' of the mystical union of Christ and the believer, and the marginalisation of the category of glorification in Protestant theology. Thirdly, a brief survey of biblical imagery of the Spirit's presence in the material world will be followed, fourthly, by discussion of concepts in later modern science (electromagnetic energy; mass-energy equivalence; the Pauli Exclusion Principle) that can, by way of analogy, reopen conceptual space in the contemporary theological imagination for once again 'seeing' the glory of God and the presence of the Spirit in the material creation.

### **Galileo and Descartes: early modern science**

In the historical trajectory of early modern science from Galileo to Descartes and beyond, the older Aristotelian and 'common sense' view of nature as having final causes and secondary qualities was replaced by an abstract, mathematical and 'clockwork' world picture in which human subjectivity had no standing as a 'true' description of the material universe. The older atomistic concepts of Democritus and Leucippus were revived and given a rigorous mathematical formulation.<sup>7</sup>

For Galileo, who could be recognised as one of the great founders of modern science, and whose professional training was in mathematics, the physical universe was geometrical and the only ultimately true description of the material world was a mathematical description of material bodies in motion. A crucial consequence of this privileging of the colourless, abstract language of numbers and mathematical formulae over the common-sense language of ordinary experience was to remove secondary qualities as real properties of the material world. Material bodies such as rocks or grass or planets did not really have colours or tastes; much less the 'glory' or beauty of divinely created objects. These secondary qualities existed only subjectively in the mind, as effects on

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the nature of divine immanence; the standpoint adopted here is that of classical theism. On the topic of pantheism, see Cooper, J.W. *Pantheism: The Other God of the Philosophers from Plato to the Present*, Grand Rapids, Mich.: Baker Academic (2006). I am in general agreement with Cooper's assessments of the various versions of that perspective on God's relation to creation.

<sup>7</sup> On ancient Greek atomism, see Taylor, C.C.W. *The Atomists Leucippus and Democritus*, Toronto: University of Toronto Press (1999) and Graham, D.W. *The Texts of Early Greek Philosophy, Part I*, Cambridge: Cambridge University Press (2010), pp. 516-629, 'The Atomists: Leucippus and Democritus'; see also Sorabji, R. *Matter, Space and Motion: Theories in Antiquity and Their Sequel*, Ithaca, New York: Cornell University Press (1988); also Graham, D.W. *Explaining the Cosmos: The Ionian Tradition of Scientific Philosophy*, Princeton, New Jersey: Princeton University Press (2006), pp. 250-276, 'The Atomist Reform'. In this paper, the loss of secondary qualities, rather than *final* causes, under the influence of early modern science, is the major focus of concern.

the human senses of the primary qualities which are alone real in nature. As Galileo asserted in his landmark work *Il Saggiatore* ('The Assayer', 1623): 'I think that these tastes, odours, colours, etc., on the side of the object in which they seem to exist, are nothing else than mere names, but hold their residence solely in the sensitive body; so that if the animal were removed, every such quality would be abolished and annihilated.'<sup>8</sup> This move constituted a radical break with Aristotle (and 'common sense'), for whom secondary qualities really inhered in individual objects and the substances that constituted them.<sup>9</sup>

This exclusion of secondary qualities from the 'real' external world was shared by Descartes, another founder of the early modern scientific method and who, like Galileo, was an accomplished mathematician. In his dualistic metaphysics in which the world was divided between the objective world of material bodies (*res extensa*) and the subjective world of the mind (*res cogitans*), the entire spatial world becomes a vast machine that functions independently of human thought and final causes. Secondary qualities are only subjective; 'In truth they can be representative of nothing that exists outside our mind.'<sup>10</sup>

This mathematisation of the world picture in early modern science, begun by Galileo and Descartes, was popularised by later Deists in the images of a 'clockwork' universe. The premodern world picture of common-sense experience and Aristotelian metaphysics was overthrown and replaced by one in which final causes, conscious purposes and secondary qualities were superfluous as essential explanations of the 'real' external world. This functional, mathematical way of thinking about the world has continued to dominate scientific practices (including modern neuroscience) down to the present day,<sup>11</sup>

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8 Cited in Burtt, E.A. *The Metaphysical Foundations of Modern Science*, Garden City, New Jersey: Doubleday Anchor (1954), p. 85. Galileo, as a Catholic Christian, did not intend to deny the reality of God or the truth of the Scriptures, but as a consequence of his belief that the *truest* description of the material world was a mathematical one, there was little conceptual space left for concepts such as *spirit/Spirit* and *glory* – which are not material realities reducible to mathematical descriptions – to be imagined as properties truly immanent in the material world.

9 Lloyd, G.E.R. *Aristotle: The Growth and Structure of His Thought*, Cambridge: Cambridge University Press (1968), p. 115, citing *Categories* 2b15ff., 37ff. For the continuing relevance of the categories of modern neo-Aristotelian philosophy for the understanding of nature, see Simpson, W.M.R., Torrance, A.B. & McCall, T.H. (eds.), *Neo-Aristotelian Perspectives on Contemporary Science*, New York: Routledge (2018).

10 *Principles of Philosophy*, Part I, Principles 70, 71; cited in Burtt *op. cit.*, (8), p. 119. Michael Buckley has observed that for Descartes, 'the world did not bear witness to God ... His world was as godless as his physics was autonomous ... *the world gave no convincing evidence of his presence* [emphasis added] or even of his existence': Buckley, M. *At the Origins of Modern Atheism*, New Haven, Conn.: Yale University Press (1987), p. 350.

11 On this point, see the fine study of Dijksterhuis, E.J. *The Mechanization of the World Picture*, London: Oxford University Press (1961), esp. pp. 500-501: Mathematisation is the typical feature of modern science; 'the treatment of natural phenomena in words had to be abandoned in favour of a mathematical formulation of the relations observed between them'. This conclusion holds as much for current quantum physics as it did for the earlier Newtonian science. Numbers and equations have

and continues to challenge Christian theology to explain how biblical notions of Spirit and *glory* as being truly immanent within the world can be reconciled with the dominant scientific view of the properties of matter.

**Consequences: nature; the body; mystical union; glorification**

The mechanistic and mathematical world picture of early modern science had significant unintended consequences for how educated people could imagine – or not imagine – the Spirit’s presence in matter and the natural world. It might be said that nature was ‘disenchanted’; that the human body was ‘dis-spirited’; that the mystical union of the believer with Christ was ‘problema-tised’; and that the doctrine of glorification was in practice marginalised in Protestant theology and piety.

In the new mechanistic and mathematised conceptuality of Galileo, Descartes (and of other French mechanistic thinkers such as Marin Mersenne and Pierre Gassendi) all ‘spirits’ were effectively removed from nature; material bodies consisted only of quantities such as extension, magnitude, and motion. Under the influence of rationalising tendencies in the ascendancy in emerging nation-states such as France and England, nature was coming to be viewed as an economic resource to be controlled and managed for human benefit.<sup>12</sup> The powerful image of the world as a machine restructured the perception of ‘reality’ in a new way and functioned as a justification of man’s dominion over nature.<sup>13</sup>

This new mechanical and utilitarian view of nature was expressed by Francis Bacon in the preface to his *Great Instauration* (1620), in which he stated that he was ‘labouring to lay the foundations not of any sect or doctrine, but of human utility and power’.<sup>14</sup> For Bacon, the purpose of science was to gain power over nature; only by observation could knowledge of nature be gained, and it was only knowledge that led to power and mastery over nature.

The new scientific world picture left little room for a biblical and Christian imagination that could see the glory of God and the Spirit present in the material objects of the creation. The lenses of classical economics and scientific method effectively filtered out such realities.

Romantic poets such as Gerard Manley Hopkins, however, pushed back against the mechanistic world picture of the scientific and industrial revolu-

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no secondary qualities such as colour or taste and are not imagined to be suffused with ‘glory’ or ‘spirit’. On the impact of the new science on Christian theology after the seventeenth century, see Placher, W. *The Domestication of Transcendence*, Louisville, Kentucky: Westminster John Knox (1996), pp. 128-135. I wish to thank Kirsten Sanders for drawing my attention to this reference.

12 Merchant, C. *The Death of Nature: Women, Ecology, and the Scientific Revolution*, San Francisco: HarperSanFrancisco (1990), pp. 194-95, 205.

13 *ibid.*, p. 215.

14 Cited in Crombie, A.C. *Medieval and Early Modern Science*, v. 2, Garden City, New York: Doubleday Anchor (1959), p. 286.

tions in works such as *God's Grandeur* (1877):

The world is charged with the grandeur of God.

It will flame out, like shining from shook foil;

It gathers to a greatness, like the ooze of oil ...

Generations have trod, have trod, have trod;

And all is seared with trade; bleared, smeared with toil;

And wears man's smudge and shares man's smell ...

And for all this, nature is never spent;

There lives the dearest freshness deep down things ...

Because the Holy Ghost over the bent

World broods with warm breast and with ah! bright wings.

Hopkins refused to cede to modern science hegemony over a Christian vision of nature and continued to affirm that for those who had eyes to see, the grandeur and light of the Spirit of God could still be seen in the material creation.

The mechanical world picture of early modern science also impacted the way in which many modern people have come to view the human body.<sup>15</sup> It is well known, for example, that for Descartes there was a sharp dualism between the human body (*res extensa*) and the human mind (*res cogitans*). The human mind and its reasoning power were the core of human identity; the body was not. In *Meditations* Descartes stated that 'it is certain that this I [that is to say, my soul by which I am what I am] is entirely and absolutely distinct from my body and can exist without it'.<sup>16</sup> Descartes viewed the human body as a machine whose operations could be described in mathematical formulae. The human body was, in effect, 'dis-spirited'. Emotion and imagination – and, by extension, human experience of the Spirit and spiritual realities – were disconnected from the body.<sup>17</sup> Such Cartesian dualisms are still powerful influences in modern neuroscience and medicine, in which the human mind can be viewed as a computer and the emotional and spiritual dimensions of human life undervalued in medical care.<sup>18</sup>

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15 It is beyond the scope of this paper to discuss other ways in which the human body was devalued in early Christianity, under the influence of Gnosticism and other factors; on these matters, see the classic study by Brown, P. *The Body and Society: Men, Women, and Sexual Renunciation in Early Christianity*, New York: Columbia University Press (1988, new edn 2008).

16 *Meditations* 190, cited in Lakoff, G & Johnson, M. *Philosophy in the Flesh: The Embodied Mind and Its Challenges to Western Thought*, New York: Basic Books (1999), p. 402.

17 Lakoff & Johnson *op. cit.*, (16), pp. 400-401, have observed that for Descartes, the essence of human nature, 'has nothing to do with our bodies ... These beliefs ... have led to the dissociation of reason from emotion and thus to the downplaying of emotional and aesthetic life in our culture.'

18 As the physician Atul Gawande has observed in *Being Mortal: Medicine and What Matters in the End*, New York: Picador (2017), p. 243, modern medicine's 'most cruel failure in how we treat the sick and the aged is the failure to recognize that they have priorities beyond merely being safe



The world picture of early modern science – a world of solid, impenetrable atoms and the solid objects made of them – has made it difficult for some modern interpreters of scripture to conceptualise the biblical doctrine of union with Christ, where Christ is ‘in’ the believer and the believer is ‘in’ Christ. For example, E.P. Sanders recognises the participationist and ‘mystical’ nature of Pauline theology at this point, but struggles to understand it. His comments are worth quoting at some length:

It seems to me best to understand Paul as saying what he meant and meaning what he said: Christians really are one body and Spirit with Christ, the form of the present really is passing away, Christians really are being changed from one stage of glory to another, the end really will come and those who are in Christ will really be transformed.

But then Sanders goes on to ask:

But what does this mean? How are we to understand it? We seem to lack a concept of ‘reality’ – a real participation in Christ, real possession of the Spirit – which lies between naïve cosmological speculation and belief in magical transference on the one hand [e.g. Gnosticism or Hellenistic mystery religions] and a revised self-understanding [e.g. Bultmann] on the other. *I confess that I do not have a new category of perception to propose here.*<sup>19</sup> [emphasis added]

Not only the world picture of early modern science, but also that of Aristotelian metaphysics and the ‘common-sense’ assumptions of everyday experience make it obvious that one solid, material object – such as a rock or a bowling ball – cannot occupy the same space and be inside one another.<sup>20</sup> Since both the believer and the risen Christ, even in his glorified state, both have material bodies, how can they literally be ‘in’ one another? Is the biblical language of union with Christ only a metaphor or a way of referring to the rule of Christ over the believer – or is there some ‘real’, ontological state to which this language refers? It will be suggested below that certain aspects of later modern physics provide some analogical resources that allow a better grasp of the biblical

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and living longer; that the chance to shape one’s story is essential to sustaining meaning in life’. In recent decades there has been increasing recognition in mainstream medicine of the need for a more holistic paradigm of medical care that recognises the emotional and spiritual dimensions of patient care.

19 Sanders, E.P. *Paul and Palestinian Judaism*, cited in Ashton, J. *The Religion of Paul the Apostle*, New Haven: Yale University Press (2000), p. 150. More recent New Testament scholarship has continued to more fully integrate this concept into biblical interpretation. See the literature reviewed by Brown, S. ‘The challenge of 2 Peter and the call to theosis’, *Expository Times* (2017) v 128 12, 583-592, 586, n. 9, 10; and esp. Macaskill, G. *Union with Christ in the New Testament*, Oxford: Oxford University Press (2013).

20 For a discussion of Aristotle’s views on the impossibility of two solid objects occupying the same space, see Sorabji, R. *op. cit.*, (7), pp. 72-73, ‘Aristotle on bodies in the same place’, with references to passages in the *Physics*, *On the Soul*, and *On the Heavens*.

language, without rejecting a scientific world-view as such.

With respect to the important biblical doctrine of *glorification*, the question could be raised as to why this theme has suffered significant neglect in Western theology and spirituality in the modern period,<sup>21</sup> in comparison to its prominence in the Eastern Orthodox churches, where *theosis* has been prominent since the patristic era. Is it due, at least in part, to the Platonic sensibilities of the eastern fathers, with more openness to the invisible realities of the heavenly and spiritual worlds? To the more empirical bent of the Aristotelian epistemology that informed Aquinas and his scholastic successors? To the diminished lived experience of the charismata of the Holy Spirit in the post-Constantinian era?<sup>22</sup> To the turn in the Renaissance toward greater interest in the earthly and the natural? To the Reformation's focus on the doctrine of justification at the expense of other topics in soteriology? To the Reformers' emphasis on the literal and historical sense of scripture, rather than the allegorical or anagogical ('heavenly') sense? To Luther's reaction against theologies of 'glory'? To the Reformers' iconoclastic reactions against Catholic statuary with haloed saints as embodiments of divine glory?

These questions are only raised as possibilities; no definitive answers to them are being offered here. At this juncture it will only be suggested that *one* possible contributing factor could plausibly be the world picture of early modern science,<sup>23</sup> in which the 'true' (atomistic, mathematical) description of physical objects and human bodies left no conceptual and imaginative space for spirit/Spirit or 'glory' as real properties present and inherent in matter. In this modern outlook, the presence of the divine glory and Spirit in the material world (e.g. 'the heavens are telling the glory of God') could at best be only understood as religious poetry or metaphor and not as ontologically grounded

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21 e.g. the work by Bernard Ramm, *Them He Glorified* (1963) is one of the very few book-length treatments of this doctrine by a Protestant theologian in the twentieth century. Since the fall of Communism in 1989 Western theologians have had fresh encounters with Orthodox theology and its doctrine of theosis. For a review of this recent scholarly interaction, see my discussion in *Practicing Ministry in the Presence of God*, Eugene, Ore.: Cascade Books (2015), 137-139, 'Salvation reconceptualized: is our western gospel big enough?'

22 On the lived, conscious experience of the charismata in the New Testament and early church, see McDonnell, K. & Montague, G.T. *Christian Initiation and Baptism in the Holy Spirit: Evidence from the First Eight Centuries*, Collegeville, Minn.: Liturgical Press (1991). The authors demonstrate that while conscious reception of the charismata diminished after the fourth century, such experiences were still in evidence in some Eastern churches, especially in Syria, well into the eighth century.

23 It may also be observed that Kant, deeply influenced by Newtonian science, concluded that God was not the object of possible human experience, but only a necessary postulate of human sense of unconditional moral obligation. In Kant's epistemology, there was no conceptual space for the immediate, conscious experience of the Holy Spirit or for the immediate experience of glorification in the human subject. I have discussed the limitations of Kant's epistemology in my essay, 'Kant and the problem of religious knowledge' in Kantzer, K.S. & Gundry, S.N. (eds.) *Perspectives on Evangelical Theology*, Grand Rapids, Mich.: Baker, (1979), pp. 231-250.



in the referent.

## **By way of contrast: the Spirit and the Glory's presence in the world of the Bible**

A brief survey of biblical texts will remind us that in the minds and imaginations of the biblical writers the material world and the human body, far from being alienated from and opaque to the Spirit and the divine Glory, could in fact be 'friendly' and 'transparent' to them. In the very opening words of Genesis, and in the first canonical reference to the Holy Spirit, we are told that the Spirit of God was 'hovering' over the primeval waters of creation (Gen. 1:2). The verb used here – *rahap* – and evokes the imagery of a mother bird hovering protectively over her young. The Spirit, who brings light into the darkness and life into a yet-lifeless world, cares tenderly for a material creation that is affirmed to be intrinsically *good* (Gen. 1:31).

When God creates man, he breathes the breath (*ruach*) of life into the dust of the earth from which man's body was formed (Gen. 2:7). There is no Cartesian dualism here between *res extensa* and *res cogitans*. 'Dust' is receptive to spirit; Spirit/spirit is immanent in man's body in a psychosomatic whole that constitutes the human person.

In a most remarkable passage, God appears to Moses, speaking to him from within the burning bush on Horeb, the mountain of God. The bush was on fire and yet *was not consumed* (Exod. 3:2). In her insightful comments on this text Katherine Sonderegger sees here a striking example of what she terms 'theological compatibilism' – the notion that God can be truly and really present to and within his creation without overwhelming or destroying it:

The Lord God can *Himself* dwell with creatures, and the creatures, endure, abide, speak ... God's presence – His omnipresence – is compatible with nature ... with human flesh, with bread and wine and water and oil ... with the saints ... Exodus makes plain that the Reality of God is *present* in the fiery bush, not simply a divine effect or sign or 'energy'.<sup>24</sup>

The fire of God's actual, personal presence – a visible manifestation of the God who is Spirit – does not destroy his good creation the bush, but is pleased to dwell within it.

In Psalm 104, the 'nature psalm' that can be read as a later reflection and commentary upon the creation days of Genesis 1, the Spirit of God is seen to be actively involved in the creation of and the giving of life to animals both in

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24 Sonderegger, K. *Systematic Theology: Volume I, The Doctrine of God*, Minneapolis: Fortress Press (2015), p. 81. In stating that God is 'really' present in the bush, not simply as an 'effect' or 'energy', is Sonderegger attempting to distinguish her view of God's immanence from Thomistic and Palamite understandings? If so, I agree with Sonderegger on this point.

the sea and on the land (Ps. 104:24-30). When God sends forth his Spirit the whales and dolphins and plankton and sheep and cattle and all the rest are created, and the face of the earth is renewed (v. 30). The material world, in both its animate and inanimate creatures, reflects the divine wisdom (v. 24) and has an inherent capacity to be indwelt by the Spirit of God. God's *good* material world was, in the wisdom of God, designed to be hospitable to and inhabitable by Spirit, and designed to be *transparent* to the glory of God (Ps. 19:1; cf. Ps. 33:6b, the stars made by the 'breath of his mouth'), not opaque to it. There is no place in God's universe – whether in the heavens above, in distant galaxies, or in the depths of the deepest ocean trenches in the Pacific – where the Spirit of God is not present (Ps. 139:7-10). God is nowhere distant from his *material* world; it is only the spiritual reality of sin that alienates God from man and man's world.

In the New Testament, the transfiguration of Jesus (Matt. 17:1-13; Mk 9:2-13; Lk. 9:28-36) – in which not only his body but his very clothing are transformed gloriously by the Spirit of God, and by the radiance of his divine nature – presents a striking picture, by way of anticipation, of the final end intended by God for his people and the material creation (Rom. 8:21): *glorification* by the Spirit of God, to reflect the beauty and splendour of the being of God and the Holy Trinity. This eschatological splendour – also depicted in John's vision of the New Jerusalem (Rev. 21 – 22) – is also anticipated in the early church's reception on the day of Pentecost (Acts 2) when the holy fire of God descends not on Mount Horeb and a bush, but upon Mount Zion and the chosen people of God. The whole church becomes a 'burning bush', anointed by and indwelt by the Spirit of God – not destroyed, but filled with the joy of God and the praises of God, the end for which they were designed from eternity.<sup>25</sup>

### **A solution proposed: reimagining divine immanence with the help of later modern science**

In this concluding section it will be suggested that while early modern science made the material creation 'inhospitable' and 'opaque' to the divine Spirit and Glory, certain features of later modern science can provide analogical resources for reimagining the immanence of God in ways more compatible with the biblical vision – without falling into pantheism. In particular, it will be argued that the recognition of the fundamental role of *energy* in later modern science – especially the properties of electromagnetic radiation in the epochal work of James Clerk Maxwell in the nineteenth century, subsequently the rec-

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25 A text such as Eph 1:4 ('He chose us *in Him* before the creation of the world') suggests that if God a) intended the believer's union with Christ from eternity, and b) the incarnation of Christ from eternity, then c) the laws of physics, chemistry and biology instrumental to the creation of the human body, were likewise foreseen and intended from eternity. Consequently, the inference would then follow that matter and the human body were designed *from eternity* to be compatible with, and both hospitable to and transparent to the divine Spirit and Glory.

ognition of *mass-energy equivalence* by Einstein and later still the formulation of the *Pauli Exclusion Principle* in the twentieth century, together provide helpful resources, by way of analogy, for informing the theological imagination in regard to the immanence of the divine Spirit in the material creation. Before discussing these developments in later modern physics, however, some more general considerations from recent philosophy and the philosophy of science will be noted.

The publication in 1962 of the seminal work of Thomas Kuhn, *The Structure of Scientific Revolutions*,<sup>26</sup> subsequently led to a now widely held consensus among philosophers that all truth claims and conceptual frameworks – including scientific ones – are not purely objective and value free, but are in fact embedded in particular historical and social contexts that reflect the interests and purposes of those making truth claims. The claim by Galileo that secondary qualities such as colour and taste are *only* subjective and have no inherence in the external material objects themselves should no longer be taken as an ‘absolute’ and most-privileged account of the ‘true’ state of affairs, but rather as one descriptive framework that is useful – indeed, quite successful – in the scientific and technological contexts in which such frameworks are used for the *quantitative* description and *control* of the natural environment.

This recognition of the framework of modern science as one valid description of the natural world, for certain purposes and in certain contexts, but not the *only* valid ‘take’ on the world, has been helpfully stated by Hubert Dreyfus and Charles Taylor in their comments on how ‘gold’ or an artifact made of gold could be perceived from a variety of valid perspectives:

Our science, if true, tells us of the property of gold that accounts for its other physical properties, but this needn’t be the whole story. As Heidegger puts it, ‘The statements of physics are correct ... But what science always encounters are only what *its* kind of representations has admitted beforehand as an object possible for science.’ ... Scientists and philosophers have, after all, so far failed to reconcile mechanical theories of physical reality with the seemingly undeniable facts of free will, consciousness, and meaning ... we have to leave open the possibility that there is no single privileged way nature works.<sup>27</sup>

And, it should be added, we should be open to the possibility that there is *no single privileged perspective for describing objects in the natural world*.

Consider for example Monet’s famous painting of two haystacks in a sunlit field in southern France (‘Haystack. End of Summer. 1891’). One could provide

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26 Kuhn, T.H. *The Structure of Scientific Revolutions*, Chicago: University of Chicago Press (1962).

27 Dreyfus, H. & Taylor, C. *Retrieving Realism*, Cambridge, Mass.: Harvard University Press (2015), pp. 152-153. Dreyfus and Taylor propose an epistemology of *pluralistic robust realism* which recognises *many* languages that can each correctly describe different aspects of reality: p. 154.

a scientific description of the haystacks in terms of the action of sunlight on grass, turning it into hay; the weight of the haystacks, and their physical dimensions, and so forth; or one could view the haystacks through an *economic* lens, and describe them as worth X dollars in a local market at a given time; or one could choose to see the haystacks through Monet's artistic lens, seeing the beautiful colours and luminous sunlight that are really 'there' and which produce pleasing emotions in the viewer. All three 'lenses' can be seen as valid in their own contexts and in the light of different purposes of the human agents who adopt such perspectives.

The epistemic hegemony of early modern science and its world picture has also been challenged by new discoveries in cognitive science that have given empirical evidence of the *embodied* and inherently *metaphorical* basis of human thought.<sup>28</sup> It is no longer plausible to operate with a Cartesian epistemology in which knowledge is primarily focused on the relations between mental representations 'inside the head', apart from the body and its contact with the external world, and in which secondary qualities are purely 'subjective', instead of arising from *real* connections and interactions linking the environment, the human body, the sensory organs, the brain and the mind.

Likewise, 'metaphor' should no longer be consigned to the 'subjective' regions of poetry, art – and religion – but recognised as fundamental for all fields of human knowledge, including science.<sup>29</sup> The orientation of the human body and its movements through space and contacts ('grasping') with objects in the physical environment are the bases from which human thought and language arise.

New understandings of *energy* in physics since the nineteenth century have opened up, by way of analogy, new ways for imagining the immanence of Spirit in the material world. The epoch-making work of the Scottish physicist James Clerk Maxwell (1831- 1879), and his formulation of the celebrated 'Maxwell's Equations', showed that visible light, magnetism and electricity were all aspects of a unified reality: the electromagnetic spectrum. Maxwell's equations describing the properties and operations of electricity, magnetism and light, provided the fundamental scientific basis for radio, television, electrical generation and transmission, radar, radio telescopes, the internet, computers, smartphones and social media – for most of the devices that drive our lives and the modern economy.<sup>30</sup>

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28 On this, note the groundbreaking work of Lakoff, G. & Johnson, M. *Philosophy in the Flesh: The Embodied Mind and Its Challenge to Western Thought*, New York: Basic Books (1999).

29 See Lakoff & Johnson *op. cit.*, (28), esp. chaps. 3, 4, 6 & 8: 'The embodied mind'; 'Primary metaphor and subjective experience'; 'Embodied realism'; and 'Metaphor and truth'.

30 For a discussion of Maxwell's Equations and electromagnetism, see Griffiths, D. *Introduction to Electrodynamics*, 4<sup>th</sup> edn, Cambridge, U.K.: Cambridge University Press (2017), pp. 332-355, 'Maxwell's equations'. Alan Lightman has observed, 'Maxwell's electromagnetic field theory

In 1905 Albert Einstein published a landmark paper that demonstrated the equivalence of matter and energy, formulating this principle in one of the most famous equations in the history of science:  $E = mc^2$ . This equation, considered one of the pillars of modern physics, states that a given amount of matter can, in principle, be converted to an enormous amount of energy.<sup>31</sup> This mass-energy equivalence principle is the basis for both the destructive releases of energy in atomic and hydrogen bombs and the constructive releases of energy in nuclear power plants and the thermonuclear reactions in the sun's core, producing the heat and light upon which our human life on earth depends.

Both Maxwell's and Einstein's new understandings of the nature of energy have significant implications for how we can picture the world – both in physics, and by way of analogy, in theology. Both Maxwell and Einstein recognised that *energy* was as fundamental as *matter* for understanding the 'real world'. This represents a momentous shift from the 'common sense' and Aristotelian physics in which *solid, material objects* (e.g. a stone, a horse, a man) *apparent to the senses* are the basic paradigms or typical instances of what is considered 'real'.

It is quite understandable that for much of human history, these common-sense notions of the real have prevailed, given the primacy of *eyesight* among the human senses for the formation of our beliefs about the world. However, if *energy* is as real as matter and just as important for understanding the 'real' material world, imagination needs to be enlarged both in the realms of science and faith. Later modern physics has shown us that most of the energy in the world, in fact, in the universe, is not 'apparent to the senses'.<sup>32</sup>

Most of the electromagnetic spectrum is invisible, only detectable through

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marks a fundamental shift in how physics represents the physical world. Classical physics emphasized *separate objects and their motions* (emphasis added) ... Field theory introduced a picture of the world emphasizing the continuous range of physical quantities ... in the spaces surrounding objects': Lightman, A. (ed.) *What's the Matter? Readings in Physics*, Chicago: Great Books Foundation (2002), p.203. The popular metaphysical imagination is still 'stuck' in a Newtonian, pre-Maxwell picture of the world in which billiard balls, bowling balls, and 'atoms moving in the void' still form the basic image of the 'real' – not realising that electromagnetic waves and the digital information that it carries, spread out over space, are just as real as the solid, molecular objects that are apparent to the senses. See further, Frisch, M. *A Philosophical Investigation of Classical Electrodynamics*, New York: Oxford University Press (2005).

31 Einstein, A. & Infeld, L. *The Evolution of Physics*, New York: Simon and Schuster (1938). The philosophical implications of Einstein's discovery are explored in 'The equivalence of mass and energy', *Stanford Encyclopedia of Philosophy*, accessed at ref <https://plato.stanford.edu/entries/equivME/>.

32 Many physicists now believe that as much as 96% of all the matter and energy in our universe consists of *dark matter* and *dark energy* that is not 'apparent to the senses' –that is invisible, and only detectable by its effects on the 4% of the visible matter that is apparent to our senses. For a review of recent research on dark matter, see Bucklin, S.M. 'A History of Dark Matter', *Ars Technica*, at <https://arstechnica.com/science/2017/02/a-history-of-dark-matter/>.

special electronic devices (radios, television, smart phones, radio telescopes, Geiger counters, etc.) that extend our awareness into the invisible. Electromagnetic energy is just as real as a rock or a horse or a human body but, unlike these material objects, is not confined to one circumscribed location in space, nor is it (except for the narrow *visible* light portion of the spectrum) apparent to our senses. Solid material objects such as stones generally have the properties of impenetrability (i.e. two rocks cannot occupy the same location in space), 'opaqueness' (not transparent to visible light) and bounded locations in space (i.e. the rock is 'here' and not 'there'; the cat is *on* the mat, not outside in the yard).

However, electromagnetic energy and the fields from which it arises do not have these limitations: two wavelengths in the spectrum can be present in the same region of space; such radiation is quite real, but not apparent to the senses; electromagnetic energy is located *repletively* ('spread out') rather than *circumscriptively* ('here – and *only* here') in space.<sup>33</sup> Electromagnetic energy can penetrate a material object (e.g. as in an X-ray or MRI imaging device; cell phone reception inside a building), such that the material object becomes 'transparent' to an observer. From these considerations, it should become apparent that some properties of the Holy Spirit – omnipresence, invisibility, energy, reality, penetration into the material – are more analogous to energy than to the properties of rocks or horses or human bodies. Our religious imaginations need to be shaped by the best insights of later modern science and not limited to the common-sense world picture apparent to the senses, or to the assumptions of Aristotelian metaphysics.<sup>34</sup>

The analogical transference from physics to the theological imagination would seem to follow rather straightforwardly. The Spirit of God (and the Glory of God as the visible manifestation of the Spirit) is more analogous to electromagnetic energy or an energy field than to a solid, molecular object such as a stone, apparent to the senses. The Spirit of God can be truly present within a material object (e.g. the burning bush) without destroying it. The *Spirit* of Christ and his divine nature can be truly *in* the human body and mind of the

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33 The distinction between an entity being located *repletively* in space (e.g., the sounds in a room) vs. being located *circumscriptively* (e.g., the cat is in its cage) was developed in medieval scholastic theology; see Osborne, T.M. 'Faith, Philosophy, and the Nominalist Background of Luther's Defense of the Real Presence', *Journal of the History of Ideas* (2002) 63:1, 63-82, in the context of debates of how the body of Christ was or was not present in the bread and wine of the Eucharist.

34 The suggestion that the concept of an energy field in modern physics suggests some analogies to the nature and properties of the Holy Spirit are not original to this writer; such analogies have been explored in some detail by Wolfhart Pannenberg, both in his *Systematic Theology* and other publications. For a helpful review of Pannenberg's thought on this topic, and the variety of reactions to it, see Whapham, T.J. 'Spirit as field of force', *Scottish Journal of Theology*(2014) 67:1, 15-32. See also the important work of the Orthodox theologian Tanev, S. *Energy in Orthodox Theology and Physics: From Controversy to Encounter*, Eugene, Oregon: Pickwick (2017), who likewise argues that the concept of energy in physics can provide useful analogies for God's immanence in nature.



believer, communicating the interior experience of Christ to us, while the glorified *physical* body of Christ and our bodies remain distinct from and exterior to one another.

Spirit can be immanent within matter without confusing or subverting the distinctive properties or essences of either Spirit or matter.<sup>35</sup> The material, molecular human body of Jesus can become 'transparent' to the divine, non-material divine nature immanent in his body, manifesting in his transfiguration the divine glory – yet without destroying or subverting the properties of that human body.

## **A brief, concluding scientific and theological postscript**

'A Picture Held Us Captive': Wittgenstein, *Philosophical Investigations*, par.115.<sup>36</sup>

In conclusion, then, this paper has argued that while early modern science created problems for imagining the immanence of the divine Spirit and Glory in the material world, some features of later modern physics – especially Maxwell's understanding of electromagnetic fields – suggest analogical resources for reimagining divine immanence, without either lapsing into pantheism, or abandoning modern science as valid in its own proper sphere.

The newer 'picture' of later modern science, which envisions the immanence of electromagnetic energy in matter, with an ontological reality equal to that of solid material objects apparent to the senses, makes it easier to recapture the Bible's imaginative vision, seeing, with the 'eyes of our hearts' (Eph. 1:18), the Spirit's immanence in the material world. We can indeed see that the heavens – the stars, the multitude of galaxies revealed by the Hubble Deep Field telescope – are 'telling the glory of God' (Ps. 19:1).

We need not continue to be held captive by a picture painted by Galileo and Descartes that 'dis-spirits' the material world. We can imagine again, perhaps in a newer and deeper way, a redeemed creation that is destined to enjoy the

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35 Such an understanding of the immanence of Spirit in matter avoids *pantheism*. For a physical analogy, consider the magnetic field that exists outside the bar magnet, and in the interior of the bar magnet itself. The magnetic lines of force extending from the magnet are as ontologically real as the solid molecules of the iron bar of the magnet; the magnetic field ('invisible') is not *separate* from the magnet, but is at the same time *distinct* from the iron molecules of the magnet: 'distinction without separation'. Such language is reminiscent of Chalcedonian christological language in which the divine nature of Christ (the invisible; the non-material) is distinct from but not separated from the human nature (visible; material); the divine nature is truly present within the physical body of Jesus, without destroying it or subverting its essential, created properties.

36 Cited in Taylor, C. *op. cit.*, (2), p. 549. For Wittgenstein, a 'picture' is a background to our thinking, often not consciously formulated, but which makes it difficult even to imagine what an alternative would look like.

glorious freedom, in the Spirit, of the children of God (Rom. 8:21), an earth that will be filled with the glory of God as the waters cover the sea (Hab. 2:14).

We can imagine the Spirit of God dwelling in the human body – the body imagined not as a machine or a computer – but as a living temple of the Spirit, connected in a real union with the risen Christ, a body destined from eternity to share the glory of the transfigured Christ (Rom. 8:30).

Such a renewed Christian imagination is not merely a matter of ‘metaphor and poetry’, or some arbitrary decision to see ‘X’ *as if* it were ‘Y’. With the arrival of the age to come and the outpouring of the Spirit, the enlightened eyes of the believer (Eph. 1:18) and the renewed epistemic capacities of the regenerated human spirit can *really* have a conscious awareness of those invisible things communicated by the Spirit.<sup>37</sup> The Spirit is truly and ontologically present in the creation, the church and the human body – immediately and immanently, not merely by created secondary effects. The promised age to come has dawned and a conscious awareness through the Spirit of the glory of God in the face of Christ (2 Cor. 3:18; 4:6) and in the creation is a real possibility, not merely for the apostles and the great mystics of the church, but for every regenerate child of God.

*My eyes have seen the glory of the coming of the Lord: He who has eyes to see,  
let him see!*

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<sup>37</sup> The ‘pneumatic’ epistemology posited here needs, of course, much greater development and argumentation, but such a development is the task of a later day. I have discussed such an enhanced epistemology in my earlier book, *Meditation and Communion with God*, Downers Grove: IVP Academic (2012), pp. 90-99, with a review of recent literature in religious epistemology, and with some discussion of the doctrine of *illumination* in Augustine, Bonaventure, Aquinas and Calvin.