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God and the Scientist

Exploring the Work of John Polkinghorne

Edited by

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International Society for Science and Religion, UK

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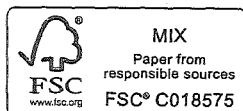
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is demanding. It does not undercut religion, as the New Atheists think, but actually strengthens it.

Finally, this partnership between the religions with their vastly different theologies, in dialogue with the whole range of sciences, is indispensable. It is indispensable not only for the integration of fact and value, of knowledge and understanding, of science and wisdom, of heart and heart. It may also be indispensable for the survival of our species and our planet.

Chapter 15

Processes of Discovery in Science and Theology: Bottom-up Approach, Critical Realism and Interdisciplinary Inspiration

Michael Welker

In his illuminating books on quantum theory, John Polkinghorne reconstructs the complex process of discoveries that led to this scientific revolution in modern physics. Brilliant scientists from various countries had paved the way for the new theory. The sequence of discoveries is marked by physicists such as James Clerk Maxwell, Max Planck, Albert Einstein, Ernest Rutherford, Niels Bohr, Arthur Compton, Werner Heisenberg, Louis de Broglie, Erwin Schrödinger, Max Born, Paul Dirac and Richard Feynman – to name only the most glorious dozen!¹

In his book *Quantum Physics and Theology: An Unexpected Kinship*,² John Polkinghorne proposes that we see structural similarities between this scientific revolution and the great doctrinal achievements in the early church, particularly with respect to Trinitarian theology and Christology. It will be a future task for scholars in church history and patristics to reconstruct a similar process and to come up with a glorious dozen too. In both the sciences and theology, John Polkinghorne sees the search for truth progress through similar phases. Each goes through ‘moments of enforced radical revision’, ‘a period of unresolved confusion’, ‘new synthesis and understanding’ and a ‘continued wrestling with unsolved problems’, before finally attaining an awareness of ‘deeper implications’ – implications that challenge scientists and theologians alike to reformulate their theoretical frameworks in order to reach a new plateau of discovery.³

In his writings, John Polkinghorne not only describes and compares research processes in the search for truthful understanding. He has also been personally engaged in this search in several topical areas. According to the title of his 1993–94 Gifford Lectures, he regards himself as a ‘Bottom-up Thinker’.⁴ In other contexts

¹ John Polkinghorne, *Quantum Theory: A Very Short Introduction*, Oxford University Press: Oxford, 2002.

² Yale University Press and SPCK: New Haven, CT and London, 2007.

³ Cf. *Quantum Physics and Theology*, 15, 17, 18, 19 and 21; see also John Polkinghorne, *Theology in the Context of Science*, SPCK: London, 2008.

⁴ John Polkinghorne, *The Faith of a Physicist: Reflections of a Bottom-Up Thinker*, Princeton University Press: Princeton, NJ, 1994.

he describes himself as a 'critical and self-critical realist', who does not avoid 'top-down speculation', but who looks for experiential, empirical and even historical validation of truth claims. This is why he has always welcomed a strictly topical concentration in the science-and-theology discourse and has remained sceptical of merely methodological and meta-theoretical approaches.

This attitude, together with his insistence on 'cousinly relations' between science and theology, reminds me of an observation made by Alfred North Whitehead in his book *Science and the Modern World*. Whitehead saw the Reformation and the modern scientific movement as:

two aspects of the historical revolt which was the dominant intellectual movement of the later Renaissance. The appeal to the origins of Christianity, and Francis Bacon's appeal to efficient causes over against final causes, were two sides of one movement of thought [...] It is a great mistake to conceive this historical revolt as an appeal to reason. On the contrary, it was through and through an anti-intellectualist movement. It was the return to the contemplation of brute fact; and it was based on a recoil from the inflexible rationality of medieval thought.⁵

This statement fits very well with Luther's repeated insistence that we cannot reach God through metaphysical speculation, but rather only by focussing on the incarnation and the kenosis of Jesus Christ. It fits with the attempts of the Reformers to concentrate their theology on historical and philological studies in order to take seriously God's revelation in human history.

It is characteristic of John Polkinghorne's work that he connects his passion for the science-and-theology discourse with a deep interest in the topics of Christology, pneumatology and eschatology. He shows, in this way, that we do not have to limit the dialogue between science and theology merely to the doctrine of creation or anthropology. Nor must we shy away from historical and biblical studies. In this interdisciplinary discourse, Polkinghorne, as a critical realist, seeks to strengthen common sense and its appeal to experience. Yet he also wants to heighten and sensitise common sense, to sharpen it in its confrontation with scientific and theological facts and discoveries.

It was this style of research and interdisciplinary cooperation that convinced me to invest time and energy in the dialogue at a point in my life when I had more or less given up on the science-and-theology discourse. During the 1980s, I had taken part in several consultations on science and theology, mostly within church-related academies in Germany. Yet in my experience, it was almost impossible to introduce the rich complexity of theological topics and forms of thought into this discourse. Science came in with all its glory; theology contributed only some poor metaphysical, transcendental or moral ideas. Most of the seminars and

⁵ Alfred North Whitehead, *Science and the Modern World*, The Free Press: New York, 1925, 1997, 8.

consultations focussed merely on historical questions of the relation between science and theology, or concentrated on general methodical reflections and general ethical concerns. In some cases it tried to test philosophy as a potential interface for the dialogue, yet as a rule it remained at the level of religiously or rather metaphysically interested and sometimes morally engaged common sense.

The more interesting German science-and-theology discourses, which began before my time, became mired in discussions about open and closed systems, or got lost in experiments with multiple modalised time systems. In the 1970s, the physicist A.M. Klaus Müller stimulated a theology-and-science discourse on time with his book *Die präparierte Zeit [Dissected Time]*.⁶ However, brilliant historians such as Reinhard Koselleck, with his book *Futures Past: On the Semantics of Historical Time*,⁷ and interdisciplinary geniuses such as the sociologist Niklas Luhmann would soon take over, and the topical discourse moved out of the domain of science and theology. Yet neither was the discourse able to provide leadership on issues of systems theory. After its engagement with biology and neuroscience, the academically sophisticated and creative discourse on systems theory moved into sociology. The names of Niklas Luhmann, Humberto Maturana and Francisco Varela mark this phase of the discourse.⁸ We related to it in research and publications, but only in connection with legal studies and sociology and not in the framework of a theology-and-science discourse.⁹

Over against such unsatisfying developments, the new style favoured by Polkinghorne and others proved to be fruitful for academic cooperation – so much so in fact that by now I and many colleagues across the globe have gratefully participated in more than 10 international and interdisciplinary projects together with John Polkinghorne, most of them multiyear consultations, the results of which have been or will be published in several books. In the following I will attempt to offer an impression of John Polkinghorne's many seminal contributions to structuring international and interdisciplinary cooperation and some of his specific contributions to topic-oriented searches for insight and truth as I have experienced them over the years. Of course, this only covers a segment of his thought and publications over the last two decades. It will be limited to questions

⁶ A.M. Klaus Müller, *Die präparierte Zeit*, Stuttgart, Radius Verlag, 1972; Jürgen Moltmann, *Gott in der Schöpfung. Ökologische Schöpfungslehre*, Kaiser: München, 1985, 135ff.

⁷ Reinhard Koselleck, *Vergangene Zukunft: Zur Semantik geschichtlicher Zeiten*, Frankfurt, Suhrkamp Verlag, 1979 (*Futures Past: On the Semantics of Historical Time*, MIT Press: Cambridge, MA, 1985 [NY 2004]).

⁸ N. Luhmann, *Soziale Systeme. Grundriss einer allgemeinen Theorie*, Suhrkamp: Frankfurt, 1984; H. Maturana and F. Varela, *Autopoiesis and Cognition: The Realization of the Living*, Springer: Heidelberg, 1991.

⁹ Werner Krawietz and Michael Welker (eds), *Kritik der Theorie sozialer Systeme. Auseinandersetzungen mit Luhmanns Hauptwerk*, stw 996, Suhrkamp: Frankfurt, 1992, 2nd edn 1998.

regarding the way in which the theology-and-science discourse is organised, and how we might gain crucial topical insights in some areas of theology.

I first met John Polkinghorne in 1993 in a consultation organised by Dan Hardy at the Center of Theological Inquiry (CTI) in Princeton. The theologians were a minority among colleagues from the fields of cosmology, physics, chemistry, biology, environmental studies and philosophy – such as Owen Gingerich, William Stoeger, Robert Russell, Holmes Rolston and Ernan McMullin.

For about half a day the scientists talked about the spatio-temporal dimensions of the universe. Did we really need 13.7 billion years in order to bring forth the stellar constellations that then needed to turn to dust in order to provide the carbon material for our physical life? One of them concluded with the remark: 'Our life on earth should be compared with the survival of a person condemned to death. Twelve well-trained sharpshooters shoot at him and he survives. He might say: This was just good luck. But he also might want to find out what really went on.' The scientists then addressed us theologians with burning questions that challenged us to deal with biblical notions about creation and salvation. Several of them said: 'You should take your traditions and texts as seriously as we take our materials.' 'We do not just want reductionistic ideas like the "unmoved mover" and the "ultimate point of reference".' Given my previous experiences, I was astonished to find scientists interested in systematic theological and even biblical thought. Although curiosity and excitement were building up on both sides, we saw that our areas of knowledge and modes of thought were too far apart to generate serious cooperation.

So we asked each other for very short papers on a specific topic that would allow us to relate our thoughts and insights from different disciplinary perspectives. For the second year we selected the notion of 'divine agency' and then found, after another lively discussion one year later, that this was still too broad. In the third year we discussed 'the temporality of God's acting in the world', and in the fourth year 'eternity and temporality in God's acting'. I found this process of narrowing down the focus in order to increase consistency and coherence in the interdisciplinary discourse extremely helpful. Sadly, when Dan Hardy was replaced at the CTI, the project came to a sudden end.¹⁰

The new director of the CTI, Wallace Alston, agreed to organise another multiyear international discourse on science and theology. John Polkinghorne and I proposed the topic of eschatology and were asked to develop a research programme. We started with sobering scientific insights into the finitude not only of individual but also of cosmic life. In this round, we also involved biblical scholars who confronted us with complex eschatological symbol systems. We thus experimented with a delicate balance of a topic-centred reduction of complexity on the one hand with complexity-enhancing symbolic potential on the other.

¹⁰ Some of the contributions were published in *Theology Today* 55 (1998), No. 3; cf. Patrick D. Miller, 'Theology and Science in Conversation', *ibid.*, 301–304.

It was John Polkinghorne who offered the most helpful duality of 'continuity and discontinuity' in order to deal with complex eschatological thought and reality. This duality of continuity and discontinuity proved to offer much better orientation than the 'dialectic of unity and difference' proposed by most classical philosophical and theological modes of thought. The biblical emphasis on *new creation*, *new heaven* and *new earth* stressed discontinuity, whereas talk about *creation*, *heaven and earth* stressed continuity. On the one hand, 'Flesh and blood will *not* inherit the reign of God!' – yet on the other, 'We believe in the resurrection of the body!' We also saw that the classical opposition of 'future eschatology' and 'present eschatology' was of no help in understanding the emergent reality of the reign of God. We tried to explain the texture of emergent realities with the help of scientifically trained modes of thought. The many fruitful results of this project were published in the book entitled *The End of the World and the Ends of God: Science and Theology on Eschatology*,¹¹ which found strong resonance, and has since been translated into Korean and Chinese.

This work in the area of eschatology stimulated our interest in the topic of the resurrection. If resurrection is not some form of resuscitation, then what kind of reality is it? Together with Ted Peters, Robert Russell and several New Testament scholars, we explored the continuity and discontinuity between the bodily and the spiritual presence of the resurrected and exalted Jesus Christ. We also began discussing the correlation between present and future eschatology in the emerging reign of God in connection with the strange inner logics of so-called 'end-time eschatology'. End-time eschatology is an area that is heavily polluted by all sorts of speculation, and still requires a great deal of interdisciplinary work to achieve further clarification.¹² Some of our insights from our project on 'Divine Agency, Temporality and Eternity' helped us to avoid often-made eschatological mistakes, such as the abstract opposition of time and eternity or the confusion of end-time eschatology with an abstract synthesis of all times. John Polkinghorne contributed reflections on 'Eschatological Credibility: Emergent and Teleological Processes', attempting to discern eschatological speculations and expressions of 'evolutionary optimism' from an eschatological discourse that 'is reasonable and [with] its hopes well motivated'.¹³ This was an example of how, even when dealing with the most complicated topics of the faith – ones which really challenge common-sense thought – the 'bottom-up approach' and 'critical realism' must not be given up in favour of lofty speculation.

¹¹ John Polkinghorne and Michael Welker (eds), *The End of the World and the Ends of God: Science and Theology on Eschatology*, Trinity: Harrisburg, PA, 2000, Korean 2002, Chinese 2010; see also John Polkinghorne, *The God of Hope and the End of the World*, Yale University Press: New Haven, CT, 2002.

¹² Ted Peters, Robert Russell and Michael Welker (eds), *Resurrection: Theological and Scientific Assessments*, Eerdmans: Grand Rapids, MI, 2002.

¹³ *Ibid.*, 43–55, 55.

John Polkinghorne and I then moved on to examine the methodological insights that resulted from this work on eschatology. Some years before, we had already engaged with colleagues from around the world in a consultation at the *Internationales Wissenschaftsforum* in Heidelberg on more or less successful 'Models of Dialogue in Science and Theology'. We had also worked with students and doctoral students on theory issues such as symbolism in Cassirer, Whitehead, Susanne Langer and others. Now we reflected on methodological issues based on specific experiences from our interdisciplinary cooperation on topics in eschatology. Furthermore, we had also been active in the 'Pastor-Theologian Project' launched by Wallace Alston, in which 60 American pastors dealt with our contributions on eschatology over the course of one year – and confronted us with many helpful questions and comments. We published our findings in two contributions: *Opening Windows onto Reality* and *Springing Cultural Traps*. They highlighted the great potential of the science-and-theology discourse, but also a set of systemic distortions that block fruitful insights and discoveries. *Opening Windows onto Reality* and *Springing Cultural Traps* first appeared in the journal *Theology Today*¹⁴ and then in a book jointly written by John Polkinghorne and myself: *Faith in the Living God*.¹⁵

Over the years John Polkinghorne had argued that the academy and the church should be seen, and should regard themselves, as 'truth-seeking communities'. We had a wonderful chance to reflect on this idea and the methodological procedures connected with it when John Polkinghorne visited Heidelberg for longer periods after he had been awarded the prestigious Von Humboldt Prize. We saw that correspondence-, coherence- and consensus-theories of truth must be combined in order to gain an adequate picture of truth-seeking communities. Truth-seeking communities are communities that do not claim to possess the truth, but rather raise truth-claims and develop agreed modes to test these claims. On the one hand, truth-seeking communities seek to enhance certainties, convictions and consensus, which must not be confused with truth. On the other hand, they also seek to enhance topical insight and the coherence of knowledge. This dual interest challenges the search for correspondence and serves to question and test those certainties, convictions and consensus that have already been reached, and to transcend the levels of topical insight in the search for truth.

We also used the Heidelberg times for discussions on issues of Trinitarian theology. John Polkinghorne's work on the topic resulted in his book *Science and the Trinity: The Christian Encounter with Reality*.¹⁶ We both sought to explore the reality of the resurrected and exalted Christ and the work of the triune God by referring to the experiential basis of the sacraments, in particular Holy Communion. John Polkinghorne spoke of a 'liturgy-assisted logic', which can

¹⁴ *Theology Today* 58 (2001), 145–54 and 165–76.

¹⁵ John Polkinghorne and Michael Welker, *Faith in the Living God. A Dialogue*, SPCK: London, 2001; German 2005, Chinese 2006.

¹⁶ SPCK: London, 2004.

help in making modest steps in areas that many regard as totally inaccessible.¹⁷ We were also increasingly drawn to issues in pneumatology, the doctrine of the Holy Spirit. The resurrected Christ is present in the power of the Spirit. In a context that thinks primarily naturalistically, this is hard to grasp. It raises the suspicion that this 'reality' of the Spirit is simply wishful thinking or an illusion, and it invites fundamentalism and agnosticism into agonising debates on the pros and cons of the idea of resuscitation, which completely misses both the central theological points and the substantial weight of the topic. Yet the mind-body dualism that dominates modern thought also needed to be overcome in order to be able to approach the reality of the resurrection.

In another attempt to explore so-called bridges between natural and spiritual realities, John Polkinghorne focussed on the topic of love. In 1998, with the assistance of Mary Ann Meyers from the Templeton Foundation, John initiated an interdisciplinary research project on the topic: 'The Work of Love: Creation as Kenosis'.¹⁸ Several contributions were concerned with the question of how we understand the work of love beyond the boundaries of intimate I-Thou relations. How can we comprehend God's creative power as love? Can we see kenotic love already at work in the act of God's creation? Can these perspectives open up further insights into the reality of the exalted Christ and the working of the Holy Spirit?¹⁹

Again with the help of Mary Ann Meyers and the Templeton Foundation, we organised a consultation with the first generation of academically interested theologians from Pentecostal and charismatic backgrounds.²⁰ John Polkinghorne's insistence on understanding the work of the Spirit also with respect to creation has been extremely helpful in bringing critical realism into the pneumatological discourse and in overcoming a merely mentalist understanding of the Spirit. John Polkinghorne also helped me to answer a question that had plagued me for years. In my work on pneumatology I had come to realise that the self-referential spirit of Aristotle and Hegel must not be confused with the Holy Spirit of the biblical traditions.²¹ The Holy Spirit is not self-referential and does not witness to itself.

¹⁷ Polkinghorne, *Science and the Trinity*, 118–42; Michael Welker, *What Happens in Holy Communion?*, translated by John Hoffmeyer, Eerdmans and SPCK: Grand Rapids, MI and London, 2000; second printing 2004.

¹⁸ John Polkinghorne (ed.), *The Work of Love: Creation as Kenosis*, Eerdmans and SPCK: Grand Rapids, MI and London, 2001.

¹⁹ Cf. John Polkinghorne, 'The Corporate Christ', in Andreas Schuele and Günter Thomas (eds), *Who is Jesus Christ for us Today? Pathways to Contemporary Christology*, Westminster John Knox: Louisville, KY, 2009, 103–111.

²⁰ Michael Welker (ed.), *The Work of the Spirit: Pneumatology and Pentecostalism*, Eerdmans: Grand Rapids, MI, 2006.

²¹ Michael Welker, *God the Spirit*, translated by John Hoffmeyer, Fortress: Philadelphia, PA, 1994, esp. 279–302; see also 'The Holy Spirit', in J. Webster, K. Tanner and I. Torrance (eds), *The Oxford Handbook of Systematic Theology*, Oxford University Press: Oxford, 2007, 236–48.

Yet how then are we to understand the personhood of the Holy Spirit when it lacks basic self-referentiality? His helpful answer to this question came by suggesting that the personhood of the Holy Spirit is grounded in its context-sensitivity.²² This insight opens up new perspectives on the power and subtlety of the emergent working of the Spirit in creation in general, but also in the human mind and body in particular.

These insights are also sorely needed in the areas of anthropological research. John Polkinghorne and I participated in two multiyear theology-and-science discourses on anthropology. Our shared interest was to overcome reductionistic and dualistic anthropological frameworks. Would it be possible to develop a theoretical and theological framework that allows us to develop a multidimensional anthropology that can host interdisciplinary approaches from the sciences and from the humanities?²³ The anthropology of Paul – with his ingenious differentiation of flesh, body, heart, soul, reason, conscience and spirit – proved to be extremely helpful for a multidisciplinary discourse. John Polkinghorne and I also became interested in the theories and practices of shared memory – communal, collective, cultural and canonical memories – which could offer further topics in future interdisciplinary cooperations.²⁴

In recent years we have tried to connect this work on specific topics with our attempts to extend the science-and-theology discourse into those regions of the world where it is not yet maturely established. Together with John Zizioulas, John Polkinghorne developed a project on 'Relational Ontology', which reached out to Greek Orthodox contexts and traditions. I organised a project on the topic 'The Spirit in Creation and New Creation: Science and Theology in the Orthodox and Western Realms', which primarily engaged colleagues from the Russian Orthodox traditions. Under the topic 'Love and Law: The Science and Theology Discourse in China and the West', we dealt with love and law as key concepts of the Confucian and neo-Confucian traditions. We did this in order to gain new perspectives on concepts that are also central in Jewish and Christian thought.

Finally, over recent years we have cooperated in an international and interdisciplinary project entitled: 'Concepts of Law in Science, Legal Studies and

²² John Polkinghorne, 'The Hidden Spirit and the Cosmos', in *The Work of the Spirit*, 169–82.

²³ John Polkinghorne, 'Anthropology in an Evolutionary Context', and Michael Welker, 'Theological Anthropology Versus Anthropological Reductionism', in E.K. Soulen and L. Woodhead (eds), *God and Human Dignity*, Eerdmans: Grand Rapids, MI, 2006, 89–103 and 317–42; John Polkinghorne, 'An Integrated Anthropology', and Michael Welker, 'Flesh–Body–Heart–Soul–Spirit: Paul's Anthropology as an Interdisciplinary Theory', in M. Welker (ed.), *The Depth of the Human Person*, Eerdmans, MI: Grand Rapids, forthcoming.

²⁴ Michael Welker, 'Kommunikatives, kollektives, kulturelles und kanonisches Gedächtnis', in *Jahrbuch für Biblische Theologie*, Bd. 22: *Die Macht der Erinnerung*, Neukirchener: Neukirchen-Vluyn, 2008, 321–31.

Theology'. It was not at all easy to relate the science-and-theology discourse to the well-established law-and-religion research and to the historians connected with it. We were also faced with philosophical positions that questioned whether there were indeed 'laws' in the natural and social realms – in other words, whether 'law' is a concept realistically applicable within those areas. John Polkinghorne concluded his contribution on 'The Character of the Laws of Nature' as follows:

Science is more than a Baconian accumulation and classification of particular instances. It involves creative imagination leading to overarching schemes of understanding within which regularities of behaviour may be interpreted as consequences of intrinsic properties, rather than their being mere constant conjunctions. The concept of laws of nature provides a fitting metaphysical foundation for the scientific enterprise. However, our knowledge of these natural laws is fragmentary and the connection between different physical regimes (such as between quantum theory and classical mechanics) is often problematic.

This tension between deep intellectual satisfaction and the experience of the fragmented character of our knowledge creates spaces for truth-seeking communities both in science and theology, but also in the church.

The results of the last projects I mentioned will be published in the course of the next year. The relations between Spirit, love and law will most likely remain foci of common interest in the science-and-theology discourse, and will hopefully be the basis of further cooperation. Different international configurations, and different interdisciplinary constellations, will offer new challenges to the search for truth, but they will also shed new light on topics and issues worth the effort of intensive reflection. Let me conclude by summing up just some of the strategic, methodological and particularly topical insights that developed out of these discourses, and were greatly stimulated not only by John Polkinghorne's thoughts and writings but also by his unique ability to help his colleagues with catalytic insights during complicated phases of the science-and-theology discourse.

'Topicality is crucial!' Twenty years ago this was not a guiding principle in the discourse. Instead, we saw rather a lot of engagements driven primarily by metaphysical, transcendental, existentialist, methodological and metatheoretical concerns. In contrast, our cooperation over recent years has been accompanied and shaped by a concentration on topicality together with a process of reducing theoretical and topical complexity in order to find convergences or helpful contrasts in areas of discovery and modes of thought. A second step focussed on delicately balancing the topic-centred reduction of complexity on the one hand with the enhancement of complexity by the inclusion of symbol systems from biblical studies on the other. The participation of biblical scholars, together with a few contributions from literary studies, as well as the more recent attempt to connect with the 'law-and-religion discourse' and with the Chinese and Orthodox thought worlds presented us with such challenges.

On the basis of some projects that we felt had been successful in their topicality, John Polkinghorne encouraged us to question not only naturalistic and scientific reductionisms but also popular religious, philosophical and common-sense modes of thought that have blocked the interaction between scientific and theological areas of thought and discovery. He offered a typology, imagined as 'Opening (specific) Windows onto Reality', and supported many attempts to clarify and describe the epistemological processes characteristic of 'truth-seeking communities'.

In terms of topical insights, John Polkinghorne really caused a breakthrough in the exploration of topics in eschatology. Old styles of dichotomised thinking – such as 'immanence and transcendence', 'present and future' – had mostly navigated these issues using the 'dialectic of unity and difference'. By replacing this mode of thought with the figure of 'continuity and discontinuity', we were able to invite realism into the eschatological discourse and to reflect with critical realism on topics such as 'the coming realm of God' and 'the presence of the Resurrected in the Spirit', and to do so in terms of processes of emergence.

John Polkinghorne helped us to gain insights into the nature and the working of the Holy Spirit by his exploration of the hidden and emergent working of the Spirit in natural creation. He helped us with his proposal to understand the personhood of the Spirit with respect to its context-sensitivity. We reinvested some of these observations and insights into the areas of anthropology, with well-supported proposals to replace naturalistic, mentalistic and dualistic approaches with more sophisticated frameworks.²⁵ There are many good reasons for the academic community in general and the theological community in particular to be deeply grateful for John Polkinghorne's continuous challenge to engage in the science-and-theology discourse, to engage in bottom-up approaches of thought, and to embrace a critical and self-critical realism in order to provide interdisciplinary inspiration in our common search for truth.

²⁵ Cf. note 23 and Michael Welker, 'Science and Theology: Their Relation at the Beginning of the Third Millennium', in P. Clayton and Z. Simpson (eds), *The Oxford Handbook of Religion and Science*, Oxford University Press: Oxford, 2006, 551–61.

Chapter 16

Some Responses

John Polkinghorne

I was touched by, and grateful for, the degree of interest and generosity shown in relation to my work by speakers at the Conference at Oxford in 2010, which was associated with my 80th birthday. At the time I was only able to make some brief comments at the end of each lecture and I welcome this opportunity to expand my responses a little, although inevitably there will remain points of detail for which there is not space to address here.

The first serious book on theology and science that I ever read was Ian Barbour's *Issues in Science and Religion*, and I was very glad that he was willing to make a long journey to speak at the Conference. In his contribution, Ian surveys, in the clear and fair-minded way that has consistently characterised his writing, the work of three scientist-theologians, Arthur Peacocke, Ian Barbour himself and myself. One of the most important commonalities between us is our endorsement of the concept of critical realism in both science and theology, a stance that Barbour pioneered. The quest for truthful understanding attained through motivated belief has been central to my own intellectual life. A key theological concept for me has been the idea of a divine kenosis in the act of creation in bringing into being a world in which creatures are allowed to be themselves and 'to make themselves' through the evolutionary exploration of potentiality. Like Peacocke, I see this divine self-limitation as a voluntary act of love, rather than the metaphysical necessity that Barbour's adherence to process theology leads him to suppose. Barbour has always been willing to revise the thought of A.N. Whitehead where he deems it necessary, and I was interested to read that he now thinks that there is 'considerable validity' in my criticism that process theology offers an account of divine power that falls short of an adequate basis for ultimate hope.

Another important commonality among the three of us is belief in a dipolarity of eternity/time in the divine nature, although we understand the details of this in somewhat different ways. Dipolarity is certainly a concept that has been strongly asserted in process thinking, but I do not think it requires commitment to other aspects of the process metaphysical account.

A critical difference between the three of us lies in our attitudes to inherited theological tradition, which I sought to indicate in the characterisations labelled 'theistic', 'revisionary' and 'developmental' that are referred to by Barbour. I do not doubt that there is a continuing need for interaction between theology and contemporary thinking, not least in the case of scientific insight, but I believe that the scheme set out in the terse phrases of the Nicene Creed still provides the