

ARTHUR PEACOCKE

A Response to Polkinghorne

Response by Arthur Peacocke to John Polkinghorne's article on 'Creatio Continua and Divine Action'.

It is always gratifying to have one's ideas taken sufficiently seriously that distinguished contributors to the same field undertake the task of sifting them and comparing and contrasting them with their own. In the preceding article, John Polkinghorne pays me this compliment and I appreciate his careful exposition. His reflections merit a considered response.

As his article makes clear, there is much agreement between us when we reflect on what kind of God could be the Creator of the world which the natural sciences describe and we have both struggled with the key problem for our scientifically-dominated century of how that Creator-God could interact with this world. But there are differences stemming perhaps from different philosophical stances (e.g., I work out my 'metaphysics' *ambulando*, he aims to utilise one from the beginning); and also, it increasingly transpires, from different theological stances—as is evidenced in the differing conclusions we come to concerning the content of Christian belief, as is evidenced in our recent respective Gifford Lectures.¹ He has, in his article, sufficiently stressed the similarities in our views with respect to its central themes ('*Creatio Continua* and *Divine Action*') that in the limited compass of this response I shall have inevitably to concentrate on the differences—more or less in the order they arise in his article.

Pantheism

He writes 'Peacocke has usually sought to articulate his understanding in terms of pantheism which is commonly considered to see the world as in some sense part of God, though acknowledging that he exceeds the world' (my italics). He refers to my CWS but nowhere in that book, or in any later publications, do I use this term in the sense of the italicised phrase. I have always had in mind the definition of pantheism as 'The belief that the Being of God includes and penetrates the whole universe, so that every part of it exists in Him but (as against pantheism) that His Being is more than,

¹ Arthur Peacocke, *Theology for a Scientific Age: Being and Becoming—natural, divine and human* (=TSA), 2nd enlarged edition, London, SCM Press, and Minneapolis, Fortress Press, 1993—incorporating in Part III the 1993 Gifford lectures at St. Andrews University.

John Polkinghorne, *Science and Christian Belief: theological reflections of a bottom-up thinker*, London, SPCK, 1994—the 1993–4 Gifford lectures at Edinburgh University.

Other publications of mine referred to in this response are: *Creation and the World of Science* (=CWS), Oxford, Oxford University Press, 1979; and *God and the New Biology* (=CNB), London, Dent, 1986, repr. Gloucester, Mass., Peter Smith, 1994.

and is not exhausted by, the universe.² It is not the case that I have only 'latterly' accepted this definition and indeed I have often stressed that the only ontological dualism I espouse is the distinction between God's being and that of the world. So I am not clear why he so misunderstood my long-held position—he is indeed the only commentator on this aspect of my work to do so. His quotation from my CWS ('God is in all the creative processes of his creation and they are all equally "acts of God". . . .', see his n.9) is actually very close to what he himself states earlier in the same paragraph, namely, 'If God is the ground of all that is . . . he is party to all the events taking place in its history'. What we are both struggling to express here in both these inadequately brief references is the seeming paradox of the transcendent and immanent character of God's relation to the world. I have attempted to soften this paradox by depicting panentheism in terms of a spatial model,³ rather like a Venn diagram illustrating relationships of classes, to indicate how the notions of the transcendence of God over and the immanence of God in the world might intelligibly be held together.

'Chaotic systems'

The implications for theology of the existence of these systems are not at all obvious, especially when attempts are made to weigh the influence of quantum events. So it is not surprising there are differences between us. Even apart from any consideration of quantum events, it is clear that there will always be an eventual unpredictability for us with respect to deterministic⁴ chaotic systems because it is of the nature of our knowledge of the real numbers used to represent initial conditions that they have an infinite decimal representation and we can know them only up to a certain limit. Hence our predictions based on the operative deterministic equations have a 'horizon'. But there would be no such eventual unpredictability for an omniscient God who could know these parameters to any degree of precision requisite for prediction as far ahead as God wished. Thus the irreducible, eventual unpredictability concerning the future states of such systems for us does not apply to God. Hence the problem of how God could affect such systems is no different from that of how God could affect a more 'ordinary' Newtonian system. So, up to this point⁵ in the consideration of such deterministic⁴ chaotic systems, it appears that their existence does not help us with the knotty problem of how God can interact

2 Oxford Dictionary of the Christian Church, eds. F.L. Cross and E.A. Livingstone, Oxford, Oxford University Press, 1983, p. 1027.

3 e.g., CWS, p. 141 and Figure 1 of TSA.

4 Described here as 'deterministic' because they are governed by deterministic equations. Whether or not they are ontologically deterministic as regards their final state(s) is a disputed matter, discussed below.

5 If the initiating events in a deterministic chaotic systems are ('fuzzy') quantum ones, the outcomes of which are amplified to the macroscopic level, then we face the problem of God's knowledge of the outcome of quantum events affecting macroscopic possibilities, a divine knowledge which I take to be only probabilistic (TSA 121–3)—and I believe Polkinghorne does so too. This leads, as he points out, into the still *sub judice* question of whether or not

with the world in any non-intervening way, as we both wish to affirm. This is the conclusion I came to in TSA.⁶

Polkinghorne goes further, however and invokes the critical–realist position, with which I broadly concur, quoting his succinct statement of it ('Epistemology models Ontology'), and deduces from the unpredictability, for us, of the macroscopic states of chaotic systems that they are ontologically indeterminate and thence describable as having ontological 'openness'. I myself am now quite clear⁷ that this move cannot be made on the basis of critical realism. For the critical–realist stance applies to statements about natural phenomena themselves (i.e., about the content of our knowledge of the world) and affirms that we can (tentatively and often imaginatively) proceed to affirm what actually is the case (ontologically) in that natural world. However, statements about unpredictability are second-order ones about our knowledge of a natural phenomena and not about the phenomena themselves. So the move from our inability to predict to ontological indeterminism is not licensed by the critical–realist stance. The uncertainty of our knowledge does not mean, even for a critical–realist, that our knowledge is of something intrinsically uncertain in itself. Moreover, if the intrinsic, ontological indeterminacy and 'openness' of the macroscopic states of chaotic systems cannot be thus inferred, there is no need to invoke his new principle of downward emergence to account for it.

[The analogy with the inferring of intrinsic determinacy of, say, position and momentum of a particle, from 'Heisenberg' uncertainty does not justify this move, as Polkinghorne claims it does. Because in this latter case we have knowledge of the actual uncertainty—namely, an equation (the Heisenberg relation) which specifies precisely the 'fuzziness' (the uncertainties) in the position and momentum of the particle. . . . That is indeed the content of our knowledge of the phenomenon itself, of the parameters appertaining to the particle. . . . So a critical realist can reasonably in this case (if not without dissent by some with a different understanding of the

there can also be 'quantum chaos', as distinct from the consequences of any 'Heisenberg' uncertainty in the parameters of the initiating conditions to which these systems are so sensitive. I have discussed this possibility in more detail in an article still in press ('God's Interaction with the World: the implications of deterministic 'chaos' and of interconnected and interdependent complexity', in 'Chaos, Complexity and Self-organization: scientific perspectives on divine action', eds. N. Murphy, R.J. Russell and A. Peacocke, Vatican Observatory and CTNS Conference, Berkeley, 1993, to be published by the Vatican Observatory and the University of Notre Dame Press, 1995).

⁶ TSA, pp. 156–7. I think I myself only became clearer about all this after I had published Parts I and II of TSA in 1990. In the 2nd enlarged edition (1993), here and there where the restriction of not changing the typography would allow it, I modified some of my adjectives, e.g., by referring to 'irreducible unpredictability' (meaning 'in practice') and I tried to avoid an 'indeterministic' characterisation of chaotic systems. I have taken this into account in rewriting my VO/CTNS, 1993 paper, n. 5 above.

⁷ The situation was identified for me by a letter from Dr Nancey Murphy of 18th Jan., 1991, after I had published the 1st edition of TSA. Some of the ambiguities in TSA, only partly corrected in Parts I and II of the 2nd edition (some of them noted by Polkinghorne) stem from the lack of clarity on this point which has pervaded the discussions of myself and others up till now.

epistemology/ontology relation) postulate an intrinsic indeterminacy in the position and momentum of the particle.]

Polkinghorne refers here, as he has done elsewhere,⁸ to what he regards as my misunderstanding of a passage⁹ in his *Science and Providence* where he wrote

‘. . .the notion of flexible process helps us to see where there might be room for divine manoeuvre, within the limits of divine faithfulness’.

Then, raising the question of whether or not it is permissible to pray for rain (the atmosphere exhibits ‘chaotic’ properties), he went on to say

‘The generation of weather is a much more complex process [than the motions of the solar system], within which it is conceivable that small triggers could generate large effects. Thus prayer for rain does not seem totally ruled out of court. In this way one can gain some rough comprehension of the range of immanent action. It will always lie hidden in those complexes whose precarious balance makes them unsusceptible to prediction’.

I read¹⁰ him to mean here that God somehow acts within the triggering initial events that set off the particular trajectory of a chaotic system. Others have also so read him. For example, quite recently, R.J.Russell¹¹ commented on this same work as follows: ‘Some have suggested that this [a new understanding of God’s action in the world] might be possible if we think of God as somehow altering the initial conditions ever so slightly to bring about large-scale effects in nature (Polkinghorne 1989 [*Science and Providence*]).’ So, the passages from *Science and Providence* quoted above were at least capable of being understood in a way which, we have to accept, he did not intend for, as he says in the article, he finds it ‘pejorative’ to be labelled as ‘interventionist’. The misunderstanding by me and others of what appeared to be his position was not, of course, intended pejoratively for many respectable, and respected, orthodox theologians still hold essentially interventionist views. Subsequently he has placed less stress on the ‘small triggers’ and more on the openness (disputed above) and ‘broadly holistic’ character of these chaotic systems and he later wrote, *contra* the above arguments, that there seems to him ‘to be a coherent possibility to interpret the undoubted unpredictability of so much of physical process as indicating that process to be ontologically open.’¹² If ‘much physical process’ here means chaotic systems, I have given grounds for differing; but this last statement would, in my view, be true for quantum events and systems whose macroscopic states arise from a chain of events initiated by a quantum-controlled one.

8 In his reviews of TSA (1st edit.) in *T.H.E.S.*, no. 971, 14/6/91 and of TSA (2nd edit.) in *Theology*, XCVII (May/June 1994) p. 199.

9 J. Polkinghorne, *Science and Providence*, London, SPCK, 1989, pp. 31–2.

10 In TSA, p. 154.

11 In ‘Cosmology from Alpha to Omega’, in *Zygon*, vol. 29, no. 4, Dec. 1994, p. 568.

12 J. Polkinghorne, *Reason and Reality*, SPCK, London, 1991, p. 42.

Information

Polkinghorne rightly draws attention to our common suggestion of the usefulness of the notion of information in our attempts to model God's interaction with the world. To distinguish it from any merely static interpretation, I refer to God's interaction with the world-as-a-whole as the flow, or 'input', of information and he to 'active information'—and we both point out that this is distinct from an input of energy from God, which would indeed be 'intervention'. In his article he distinguishes between such notions, in which we are referring to a 'change in behaviour pattern' (my italics), and the notion of information in communication theory as simply 'the measure of the recording or transmission of the specification of pattern.' But I myself see what I am suggesting rather as a development and extension of 'Information' as it is in communication theory to this wider issue, along the lines of the useful analysis of J.C. Puddefoot.¹³ Briefly, the usage of 'information' in the communication-theory sense (related to the probability of one outcome among a number of possible ones) can be regarded as explicating the underlying processes ('input' of information) which give shape or form to (that is 'informing' in another sense) the brain processes that are our mental experiences, some of which constitute our knowing. When God's interaction with the world, shaping patterns of events, is conceived of in these terms, then the way is open to enriching and making more intelligible our idea of God's self-communication to the world and furthermore to a fruitful linkage with the theological concept of God's self-expression as the 'Logos of the cosmos'—and so eventually with a Logos- and Spirit-Christology, as I have developed in TSA.

Anti-reductionism—weak and strong

The issues raised briefly in this connection by Polkinghorne are more complex and subtle than can be adequately dealt with in the compass of this response. One source of confusion is that he is sometimes using the above distinction between weak and strong anti-reductionism in a way different from myself in my fullest statement¹⁴ of the question, as long ago as 1976, when there was already a substantial body of philosophical literature on reductionism in the sciences. I there followed the penetrating analysis of Morton Beckner,¹⁵ who uses the term 'organicism' for what Polkinghorne and I would call 'anti-reduction' (or 'non-reduction' often in GNB). Let me quote my reporting¹⁶ of Beckner, trying to avoid his detailed notation:

13 See TSA, pp. 416–7, where I draw on 'Information and Creation' by J.C. Puddefoot in *The Science and Theology of Information*, eds. C. Wassermann, R. Kirby and B. Rordoff, Geneva: Editions Labor et Fides, 1992, p. 7–25.

14 In an article on 'Reductionism in biology—a review of some of the epistemological issues and their relevance to biology and the problem of consciousness', *Zygon* (1976) 307–324—reproduced, and expanded in GNB, chaps 1, 2.

15 M. Beckner, 'Reduction, Hierarchies and Organicism' in *Studies in the Philosophy of Biology: reduction and related problems*, eds. F.J. Ayala and T. Dobzhansky, London, Macmillan, 1974, pp. 163–176.

16 GNB, pp. 17–8.

'Apparently, what many practising scientists are concerned to emphasize is this distinctiveness of the concepts of their own science. . . . This distinctiveness has been more precisely delineated by Beckner as *theory autonomy*, the autonomy of higher-level theories [one's applied to more complex systems] with respect to lower-level theories in the sense that the higher are not epistemologically reducible (according to Nagel's criteria¹⁷) to the lower. This analysis stresses theory autonomy as a relation between parts of scientific language and is carefully distinguished by Beckner from *process autonomy*, which "has nothing to do with the languages we choose to describe them [processes] but rather with some sort of causal independence."¹⁸ He defines a higher-level process [in a hierarchy] as being autonomous with respect to processes in a 'lower' level if, and only if, *the laws of the higher processes are not fully determined by the laws of processes (of a different kind) at the lower level.*¹⁹ . . .

Since the non-reducibility [autonomy] of a higher-level theory to a lower-level theory may be due to differences in their conceptual structure and not to lack of determination of processes in the higher level by processes in the lower level, the autonomy of higher-level processes is not necessarily linked with the non-reducibility [autonomy] of higher-level theories [and vice versa].'

Beckner denotes the combination of process autonomy with theory autonomy as strong organicism (anti-reductionism) and that of process non-autonomy with theory autonomy as weak organicism (anti-reductionism). It is the latter which represents my position in his definitions. The italicised phrase in the above quotation (end of its first paragraph) does not exclude the possibility that the processes that are occurring at the higher level may be integrated into new patterns with new boundary conditions so that the higher complex 'whole' can exhibit new functions and capabilities not exhibited by the parts in the lower level or, of course, in isolation. If there are new inter-relationships between the processes in the higher complex (which is what makes it 'higher') these can, on a critical-realist view, be assigned at least a provisional reality, in the sense that consideration of this higher complex 'whole' simply cannot avoid taking them into account in explaining the system's behaviour. Yet the higher 'wholes' are still an integrated complex of these same lower-level processes (e.g., biochemical processes occur throughout our bodies even though those same bodies manifest the capacity for 'digestion'—and even 'thought') and the exercise of these capacities is, in this sense only, dependent on these lower-level processes, which is what I take the 'determined' in Beckner's definition of process autonomy to mean.

17 These were, roughly: the conditions of: connectability of the terms in the higher-level theory to those in the lower-level one; and of derivability of higher-level laws from terms in the lower-level theories (see GNB, n. 30, p. 163 based on E. Nagel, *The Structure of Science*, New York, Harcourt Brace & Co., 1961, chap. 11).

18 Beckner, *ibid.*, p. 170.

19 *Idem, ibid.*

All of which sounds to me very much like Polkinghorne's 'contextualism' based on the proposal as he puts it, that 'the parts can have their behaviour truly modified by the wholes that they constitute.' But this is what I also think²⁰ yet he is labelling our positions differently—he as a 'strong' and myself as a 'weak' antireductionist. In Beckner's terms, I am certainly the latter, for I agree with Beckner that any proposed combination of process autonomy and theory autonomy of the higher levels in relation to the lower ones (his 'strong' organicism/anti-reductionism) inevitably leads to postulating some non-physical causal entity²¹ as operating at the higher level over and beyond the effect²⁰ of the incorporation of the parts into the relationships and under the boundary conditions of the whole which undoubtedly in many cases affects how the parts behave.

After all this, I am not sure that Polkinghorne and I really differ that much, apart from the labelling, except that he believes that his understanding of the situation allows, more than mine does, for his postulate of 'downward emergence' which, if it means something more and other than top-down causation (whole-part constraint), I find very difficult to pin down.

Thus the debate continues—it is certainly stimulating to engage in these issues with someone as acute as John Polkinghorne and I hope the reader enjoys this exchange!

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20 This is what I have meant in TSA by 'top-down or downward causation'. My preferred term for this is now 'whole-part constraint', as in the paper referred to in n. 5.

21 Thus Beckner concludes, in the case of the biology/physics-chemistry interface, that 'The strong organicist is driven to vitalism' (*ibid.*, p. 174). Polkinghorne and I both deny vitalism.