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God and Differing Interpretations of Quantum Theory – Response to Paul

Introductory remarks

I am grateful to Roger Paul for setting out these two extreme interpretations of quantum theory and opening up the discussion of their theological consequences. Many physicists would regard both extremes with suspicion. Whilst sharing such suspicions, I am concerned here not so much with the truth or otherwise of these interpretations as with the implications if either of them, however bizarre, is judged true. Paul's paper raises important questions about the relationship between science and theology, not just in the sphere under discussion, but more widely. Should scientific theories have any theological implications or drive theology in any way? Famously Karl Barth discusses the doctrine of creation based on Genesis 1 and 2 without reference to science at all. Yet science would rule out some (literalist) interpretations of those Genesis texts, whilst leaving the fundamental doctrine of creation (and indeed the real message of the texts) intact.

The other side of the coin is whether we should favour particular scientific theories on the basis of prior metaphysical commitments. Here one might cite the steady state theory favoured by the atheist Fred Hoyle as against the Big Bang favoured by some theists (including the late Pope) because the latter theory supposedly indicated that the universe had a beginning. Yet many would say, with John Polkinghorne, that either is compatible with theism since the doctrine of creation concerns ontological rather than temporal origin. On the other hand even so notable a Barthian as Thomas Torrance saw the move away from the rigidly deterministic Newtonian universe as liberating for a positive view of divine providence,¹ as do many working at the science-theology interface today, including Polkinghorne. Although I am uncomfortable with the idea of a multiverse, such as arises in the many worlds interpretation (MWI) of quantum mechanics, I am loathe to dismiss it out of hand on prior theological grounds. Rather, my own approach is to evaluate it as objectively as possible as a metaphysical position, in comparison with theism and a single universe, on the basis of criteria such as simplicity (Ockham's razor) and explanatory power.² The same would apply to Wheeler's It-from-Bit proposal.

For now, we need to examine whether the interpretations of quantum theory

1 Torrance, T. F. *Christian Theology and Scientific Culture*, Belfast: Christian Journals Ltd (1980), p 17.

2 Holder, R. D. *God, the Multiverse, and Everything: Modern Cosmology and the Argument from Design*, Aldershot: Ashgate (2004).

discussed by Paul can be accommodated by theology, or should cause us to change our theology, or whether our theology might cause us to reject such interpretations. As we shall see, some of the questions raised are similar to those raised by the putative existence of intelligent life elsewhere in the universe.

Relative State

Let us look at the many worlds interpretation first. Some theologians, as, for example, Arthur Peacocke, like the idea of multiple universes, MWI being one possible way of realising them, because God is deemed even more powerful on such a view. However, *prima facie*, as Paul notes, MWI does raise some searching questions not only about human identity, but also about the fundamental tenets of our faith, namely the incarnation and atonement. It also touches upon issues about which Christians differ, such as the compatibilism versus libertarian free will debate to which a recent issue of *Science and Christian Belief* was devoted.³ The problem of theodicy also rears its head.

Let us begin to unpack the ‘dizzying ontology’ required to speak of ‘me’. For a start, certainly if we follow Saul Kripke, ‘I’ must begin uniquely, from ‘my’ parents’ union, and with the unique genetic inheritance ‘I’ possess.⁴ Even if there were many universes with near copies of ‘my’ parents, or in which different sperm and egg came together from identical copies of them, ‘my’ conception must narrow the field of universes down for ‘my’ origin. However, there will be a multiplicity of universes which have identical copies of ‘my’ parents at this point in their history but differ in other ways. I think Kripke would say that one has to pick one of these couples to be ‘my’ parents. It would then be the case that only after ‘my’ conception would multiple copies of ‘me’ start to exist in different universes.

In ordinary discourse we think of the other universes as only potentially existent. Murray Gell-Mann, although valuing the Everett approach, criticises the view that the many worlds are ‘equally real’, preferring the term ‘alternative histories’, each with its own probability.⁵ He cites a challenge offered by one distinguished physicist to anyone accepting the ‘equally real’ interpretation to play Russian roulette for high stakes on the grounds that in some of the equally real worlds the player would survive and be rich!

If there is libertarian freedom, extended to include ‘free process’ as advocated by Polkinghorne as well as the free will of sentient creatures, the universe could in actual fact have ended up as any one of the alternative possibilities. So the problem for God’s foreknowledge and the problem of evil are the

³ *Science and Christian Belief* (2004)16(2).

⁴ Kripke, S. A. *Naming and Necessity*, Oxford: Blackwell (1981), pp. 110-115.

⁵ Gell-Mann, M. *The Quark and the Jaguar*, London: Little Brown & Co. (1994).

same, whether these possibilities are real or not. In terms of the incarnation, or God's interaction with the world more generally, it is like asking, 'What would God have done if things had turned out differently?' If there is an answer to that question, then all the answers together are deemed to apply in MWI.

However, MWI does seem to make the incarnation conceptually more difficult. By the time Jesus is born in our world, there will be many other possible trajectories, all of which are instantiated in the many worlds interpretation. If Jesus' birth is unique, like mine, in terms of genetic inheritance from a unique Mary, then he will only exist in what is already a small subset of worlds. Hence there might be a need for multiple incarnations to redeem other worlds. (It is certainly hard to believe that other worlds would not contain fallen creatures.) Even if Jesus' death and resurrection in our world were deemed sufficient to redeem all the worlds, it would seem very odd that we just happen to be in the world in which that is so – or indeed he and we are in a subset of worlds together. On the other hand if the Son of God were multiply incarnated would he be truly human?

Similar problems have arisen in the context of consideration of the existence of extraterrestrial intelligent life forms. David Wilkinson discusses both the possibility that a single incarnation on our earth redeems all the other intelligent life in the universe (even if unknown to that life, by analogy with others in that position known to be redeemed, such as Abraham), and the possibility of multiple incarnations.⁶ The scope of the incarnation in the former could be extended to multiple universes, though it makes our position in this universe quite astonishingly privileged.

Regarding multiple incarnations, the main question is, 'Are they possible?'. Wilkinson cites a number of theologians who think so, and this is how God would save aliens. For example, Polkinghorne thinks that God would save little green Martians by becoming a little green Martian. A notable example of a theologian who thinks multiple incarnations are logically impossible is Brian Hebblethwaite.⁷ Hebblethwaite argues that given that God the Son is one divine subject, 'only one human subject can *be* the incarnate, human, form of that one divine life'; otherwise one would be attributing a split personality to the divine Son. He writes that if Jesus is the same person as God the Son, then so would other incarnations be. They would all have to be the same person and that makes no sense. As Hebblethwaite writes, 'One individual subject cannot, without contradiction, be thought capable of becoming a series of individuals, or, a fortiori, a coexistent community of persons.'

This can be related to my point about Jesus' uniqueness in being born of

⁶ Wilkinson, D. *Alone in the Universe: The X-files, Aliens and God*, Crowborough: Monarch (1997).

⁷ Hebblethwaite, B. 'The Impossibility of Multiple Incarnations', *Theology* (2001), vol. CIV, no. 821, pp. 323-334.

Mary and no other. A person born of somebody else cannot be Jesus, and so cannot be God incarnate – even though Jesus is also unique in having existed from all eternity as God the Son. The contradiction becomes manifest at the eschaton, when the incarnations would exist simultaneously.

On extrapolating this line of reasoning to extraterrestrials, Hebblethwaite is led to argue against their existence because of the impossibility of incarnations in them as well as in our world. It would seem that Hebblethwaite is a theologian who would be led similarly by his metaphysical commitments boldly to reject the MWI. Is he offering a hostage to fortune by making a prediction that could be falsified, or should theology be immune from potential scientific discovery? Equally the question arises as to whether MWI could in any sense be verified. Perhaps it was not quite right to call it a scientific theory at the beginning of this article. Rather is it a metaphysical theory since it is all about what actually exists. Indeed Paul makes the point that empirical evidence can be used to support either the MWI or It-from-Bit interpretation of quantum theory. And whereas David Deutsch argues that quantum computations occur in other universes, Polkinghorne counters that it is really the superposition principle itself which makes quantum computing feasible.⁸

So, the resolution of the problem of redeeming all worlds could be the same as for the case of extraterrestrials: either multiple incarnations (though, if we follow Hebblethwaite, of doubtful possibility); or one incarnation in one subset of universes is enough to redeem the whole ensemble (but with the peculiar consequence of highly privileging this universe).

The basic assumption of MWI is that splitting occurs as a result of binary spin-up versus spin-down type measurements. The equally existent results of these basic measurements are multiplied up to give the ‘dizzying ontology’. Such splits would put copies of ‘me’ into subtly different environments and the differences would grow with more and more splitting. The choices ‘I’ make initially in these different universes might be different in circumstances that differ only slightly. An unknown question is how our brain’s functioning, and the way we make free decisions, is influenced by quantum events, but it could be that all the possible results of freely made human choices are instantiated if MWI is correct.

If this is so, then a question relating to the atonement is the following: if ‘I’ accept Christ in one universe but not in another, am ‘I’ saved? Three possible resolutions of this one are: (i) Some copies of me are indeed not saved, but since the copy of me in this world cannot know the others, it hardly matters; (ii) there is some property of me transcending the worlds which ensures that I am saved in each (though that sounds Pelagian, if it depends on *me*); (iii) God providentially ensures that his grace towards me is accepted by all my copies (non-Pela-

⁸ Polkinghorne, J. C. *Quantum Theory: A Very Short Introduction*, Oxford: Oxford University Press (2002), p. 76.

gian because God does it). The answer may thus depend on whether 'I' am considered to be one copy, existing in this universe, or the set of all copies of 'myself', deemed to be different possible states of 'me', all existent.

Yet another problem concerns the extent to which Jesus' life, death and resurrection are pre-determined in any way. This is about the interplay of human free will with the divine plan. There could be many ways of God achieving his plan with Jesus suffering and dying, though I confess that to me the cross seems singularly appropriate. However, there may be a sense in which absolute good, as personified in Jesus, will inevitably meet with rejection (Plato thought this), since this poses the ultimate challenge to human self-esteem. Hence Jesus could have suffered in different ways in different universes. One probably needs to postulate God's working providentially within each universe to bring about his purposes, whilst allowing some variety in both natural and human behaviour. Thus many histories could in principle be accommodated, again by treating them as alternative ways this universe might have been, though 'unadulterated' MWI might seem on the face of it to produce too much variety.

Paul argues that not every universe would be good, as ours is deemed to be in Genesis 1. We can certainly imagine that universes would arise in which choices were made by rational sentient creatures which endowed those universes with more evil than our own, and/or in which there were more 'natural' evil – more devastating earthquakes, viruses, etc. Again, however, these are universes which our universe could have been if our universe possesses genuine 'libertarian' freedom. There is a tension here with some views of God's providence. One can imagine God working within the universe to curb or mitigate the amount of evil there is. Certainly Christian theists (as opposed to deists) see God at work in the world, in history, bringing about his purposes, though how he does so is a subject of much debate, particularly among those working at the science-religion interface,⁹ and this view has to be held in tension with the notion of God's being faithful to his creation with its laws and to his granting of freedom to human beings. One could imagine God (even God's own 'branches' on the many minds interpretation, though I too find this concept uncongenial) doing so in all the branching worlds of MWI, and this might nullify Paul's point about some worlds being evil, or containing more evil than our own. Even if there were more evil, this could be counteracted by more compensating good. A Leibnizian 'best of all possible worlds', if that dubious concept were to have any meaning at all, would have to be the totality of the Quantum Universe in this case.

Compatibilism looks strange in the context of MWI, since the basic idea is that there are no other alternatives. Compatibilists take it that my choice of an

⁹ e.g. Russell, R. J., Clayton, P., Wegter-McNelly, K., Polkinghorne, J. (eds.) *Scientific Perspectives on Divine Action Volume 5*, Vatican City State: Vatican Observatory Publications; and Berkeley, Ca: Center for Theology and the Natural Sciences (2001), as cited by Paul.

action accords with my desires. I do what I want, in accord with my nature. But again if I am really a multiple reality spanning many worlds, it could still be that I do what I want by doing all possible actions! And MWI brings determinism back by instantiating all possibilities. In some ways this could be seen as bringing compatibilism and libertarianism together: 'I can do otherwise AND I do otherwise.' This seems to me to be a response which goes against the grain of what compatibilism is meant to achieve, but is at any rate a possibility. I think compatibilists have to wrestle in any case with the problem Paul identifies (p.18 top) that God does not intervene in any special way because the world (but now, the Quantum World) is deterministic.

Paul is right that theological understanding regarding other worlds would be highly speculative, but then so is the MWI scenario it is responding to. Of course there are many others besides Pullman, whom Paul cites, who indulge in imagining other worlds – C. S. Lewis would be a Christian example.

It-from-bit

Prima facie Wheeler's It-from-Bit proposal looks like leading to a form of Berkeleyian idealism, which denies the existence of the material world. However, it is worth noting that for Berkeley this was theologically positive. A material world could lead to all sorts of deceptions; our own ideas cannot. On Berkeley's view, if material objects do not exist then they cannot cause anything. Only the will of an intelligent agent can do that, and the 'steadiness, order and coherence' of our own ideas are explained by the will of God, 'who works all in all, and by whom all things consist'.¹⁰ As Mary Midgley notes, the necessity of invoking God here, which is ultimately what makes idealism of the Berkeleyian kind defensible, may not be a consequence which quantum theorists like Wheeler find congenial!¹¹

It is possible to take Wheeler's speculative ideas further and posit the existence of an Ultimate Observer who 'coordinates' all observations so as to make them self-consistent. This Ultimate Observer would be located either at the final singularity of a closed (i.e. ultimately collapsing) universe, or at future time-like infinity in an open (i.e. forever expanding) universe,¹² and would resemble God in Berkeley's system. This Observer would actualise the whole

10 Warnock, G. J. *Berkeley*, London: Penguin (1953), pp. 89, 120.

11 Midgley, M. *Science as Salvation: A Modern Myth and its Meaning*, London and New York: Routledge (1992).

12 This is easier to envisage in the case of the closed universe. A time-like line in relativity is one which follows the path of a particle or observer. In an open universe the observers are moving apart. Even so, they come together at 'time-like infinity', which under a certain coordinate transformation (involved in producing a so-called Penrose diagram, useful for displaying the history graphically) becomes a point. See Barrow, J. D., & Tipler, F. J. *The Anthropic Cosmological Principle*, Oxford: Oxford University Press (1986), pp. 470-471. Barrow and Tipler admit that this highly speculative scenario is 'very vague'.

universe, which would not come into existence ‘until’ he does so (‘until’ being in inverted commas since the final state is not in space-time). My own feeling is that this is not to be taken seriously as a physical or even philosophical theory but provides an interesting analogy with the biblical metaphor of God bringing about the existence of the world from without by means of his spoken word, the world as it were being transferred from the mind of God to actuality.

Whilst we may not want to follow Wheeler, it can be said that he has at least made observership an integral part of creation, and that seems a positive thing. In Wheeler’s scheme observers are written into the very structure of the universe. Theologically one would want to assert that God’s intention in making a universe was to bring about conscious rational beings with the potential to relate to him and It-from-Bit is consistent with that.

However, Wheeler’s ‘self-excited circuit’ idea does seem paradoxical. Polkinghorne argues that to speak of ‘observer-created reality’ is to overstate the position, since observers would in any case only create reality out of a potentiality that was already present. Hence he prefers the description ‘observer-influenced reality’.¹³ As Paul acknowledges, the observer’s role ‘cannot be supported without affirming the existence of the origins of the observations that furnish the bits of information’. A ‘self-excited circuit’ still requires God to explain its existence in the first place. Why does such a thing exist? The universe cannot lift itself into existence by its own bootstraps, as it were. It is a bit like the notion (promoted by Peter Atkins, for example) of the universe creating itself out of nothing, the multiple fallacies of which have been refuted by Keith Ward.¹⁴ Indeed it seems highly paradoxical to say that events which led to my existence only exist themselves after I have come to be, and many find this even more bizarre and unacceptable than MWI – for example, Penrose is one who finds the circularity in Wheeler’s approach ‘barely credible’.¹⁵

Paul notes that on one interpretation of It-from-Bit meaning becomes a purely human construction, in accord with the theological views of Don Cupitt. However, surely this is not the case in view of the above. We have seen that the process had to get off the ground: God is responsible for why there is anything at all. And, just as fundamental, God is necessary for coordinating the meaning construed by the observer-participants into a coherent whole.

Paul then discusses the more palatable notion of ‘co-creation’ in the context of the It-from-Bit proposal. This is of course a concept which is already present in theology through the creative exercise of human free will: there are many things which exist, works of art for example, which would not do so but for

13 Polkinghorne *op. cit.* (8), p 91.

14 Ward, K. *God, Chance and Necessity*, Oxford: Oneworld (1996).

15 Penrose, R *The Emperor’s New Mind: Concerning Computers, Minds, and the Laws of Physics*, Oxford: Oxford University Press (1989), p. 295.

human action. Of course none of this is 'creation out of nothing' but neither is it on the It-from-Bit account.

Paul also raises the question of God's self-limitation in the context of quantum indeterminism (saying that the emergence of the universe as a self-excited circuit also implies this). This is part of what Polkinghorne would presumably describe as 'free process'. It is also the case that God is already self-limited theologically if humans have libertarian free will, since it is not possible to predict the actions of creatures possessing such freedom. In addition, we might argue that the problem of theodicy, which is again raised by the realisation that there are alternative histories, and God does not determine which occurs, is similar to that we have already discussed for MWI. There, the alternatives were all realised: now they are possibilities which could occur in our universe. Either way, the issue of the existence and quantity of evil which occurs is a live one: the problem can be mitigated either if God is involved in limiting the set of possibilities which is realised (MWI) or the direction in which the one actualised possibility goes (It-from-Bit). The openness and flexibility in the evolution of the world revealed by modern physics make it more plausible to think of God so acting than the earlier picture of the Newtonian clockwork universe. This openness and flexibility are not just exhibited in the quantum realm, but for example by chaos theory, as preferred by Polkinghorne for the locus of God's action.

Regarding the Abraham midrash, orthodox theology would hold contrariwise that God has no need of the world but creates freely out of love. In the orthodox Trinitarian view God is a community of persons subsisting in the most perfect imaginable relationship of love and therefore not in need of the world. So love is the underlying value and motivation in the Godhead, It-from-Bit, quantum indeterminism, MWI or whatever!

Conclusions

We have seen that it is not impossible for theology to accommodate the bizarre interpretations of quantum theory which Roger Paul describes. The central doctrines of the Christian faith can remain intact. Referring back to the questions I posed at the beginning we have also seen, however, that theology may not be as comfortable with some interpretations as others. Perhaps it is worth reiterating that we are really here talking about metaphysical positions, rather than scientific theories, since (a) there is no direct scientific way of distinguishing between the interpretations (the same experiments are discussed under each); and (b) the subject matter concerns what really exists, which is traditionally more the territory of philosophy than science, notwithstanding the predilection of most scientists, because of the predictive success of science, for some form of philosophical realism.

Paul refers to the delight, or dilemma, in the absence of any scientific discovery pointing to one or other of them, of exploring the theological paths

opened up by these differing interpretations of quantum theory. Hebblethwaite echoes the positive aspect of such sentiments and quotes E. L. Mascall rather appositely in the context of these kinds of theological speculation:

Theological principles tend to become torpid for lack of exercise, and there is much to be said for giving them now and then a scamper in a field where the paths are few and the boundaries undefined; they do their day-to-day work all the better for an occasional outing in the country.

Hebblethwaite himself expresses the hope that 'such speculation is not unrelated to the day-to-day work of responding to the saving grace of God in the face of Jesus Christ'. May that indeed be so!

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