

R. L. STURCH**Quantum Interpretation and Christian World-views**

It has been suggested that interpretations of quantum theory (such as that proposed by Wigner) which bring in the observer's consciousness are somehow related to, or tend to support, 'eastern mysticism'. This paper argues that in fact they come closer to supporting traditional Christian views of human nature, and discusses some of the objections raised to them, for example those which accuse them of non-realism or of being unable to cope with situations where a single event has two or more observers. Analogies are drawn with the nature of secondary qualities and with mediaeval debates over the age of the universe.

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In their admirable discussion of the supposed linkage between modern physics and 'eastern mysticism',¹ Clifton and Regehr seem to treat the 'consciousness' interpretation of quantum mechanics as if it did in fact support the views of people like Capra. It is dismissed as 'contentious, speculative, and . . . only one of a variety of interpretations of QM'² (all quite true); we are left, very probably by inadvertence, with the impression that if it ceased to be these things, it would give serious backing to 'eastern mysticism'. The aim of the present note is to consider whether this interpretation (correct or false) is not in fact more consistent with Christian theism than some might suppose, and to discuss some of the objections that have been raised to it.

In fairness to Capra himself (this is not, I understand, true of some of his 'followers'), it should be noted that he only mentions the subject briefly, towards the end of his book.³ 'Such a development' (the inclusion of human consciousness in theories of matter) 'would open exciting possibilities for a direct interaction between physics and Eastern mysticism' is his comment. This seems very doubtful indeed. The 'consciousness' interpretation (CI for short hereafter) implies, not a monism of the sort which some (not all) Eastern mystics favour, but a rather sharp distinction between physical processes, which go on their quantum-mechanical way normally enough as long as consciousness is not brought into the matter, and the consciousness which, it is alleged, disturbs them and collapses their wave functions.

1 R. K. Clifton and M. G. Regehr, 'Capra on Eastern Mysticism and Modern Physics', *Science and Christian Belief*, 1 (1), (1989) pp. 53-74.

2 Clifton and Regehr, *art. cit.*, p. 62.

3 F. Capra, *The Tao of Physics*, London, Wildwood, 1975, p. 318.

It gives a significant role to human (and perhaps other) consciousnesses, but treats them as something distinct from a physical world which exists in its own right and with its own laws; and this is much more in accordance with the Judaeo-Christian view of the world than with most eastern ones.

Not all 'eastern mysticism' is monist, of course. Theravada Buddhism is not. But it will not fit with CI much more easily than monism will, for it treats sensations as themselves corporeal (as indeed do some other Indian schools). There was at least one such school, the Sankhya, which might accommodate a CI more easily, for it believed in a complex interrelationship of souls or 'persons' and inanimate nature; but this was very different from the pantheist schools Capra seems more interested in, and is not mentioned in his book.

It is interesting that scientists who criticize the CI tend to do so on philosophical or even aesthetic rather than scientific grounds. (This is of course to some extent to be expected, as we are dealing not with quantum mechanics itself but with interpretations which are not distinguishable by experiment.⁴) For example, Davies⁵ argues that 'the attempt to discuss the operation of hardware (electrons running about) by appeal to software (the mind) falls into the dualist trap'. But of course it all depends whether dualism is a trap. Philosophers have argued at great length both for and against the various forms of dualism, but it remains both the common-sense view of the relationship between body and mind (when questions are asked about that relationship at all) and the one in accord with most, though not by any means all, traditional Christian teaching.⁶

Nor does it seem helpful to bring in the distinction between hardware and software. It is worth remarking that the software of a computer is just as much a physical object as the hardware. The programmes embodied in that software are not physical objects, any more than a scientific law is; but

4 David Deutsch suggests a thought experiment which might prove or disprove a version of the many-worlds interpretation in P. C. W. Davies and J. R. Brown, eds., *The Ghost in the Atom*, Cambridge UP, 1986, pp. 97-100.

5 P. C. W. Davies, *God and the New Physics*, Harmondsworth, Penguin, 1984, p. 115.

6 This last statement needs perhaps a little amplification. The Old Testament does not of course raise questions about the relationship of soul to body; but by the intertestamental period such questions were being asked, and answered in some cases (e.g. Wisdom 8:19, 9:15) with a distinction between the two. This continues in the New Testament (e.g. Matthew 10:28, John 3:6, II Corinthians 7:1) though in other passages there is a further distinction drawn between 'spirit' and 'soul' (e.g. Hebrews 4:12). From the patristic period onwards the main distinction was taken for granted; the debates tended to be more about the origin of the soul—whether it was inherited from the parents, created specially for each person, or (a much rarer belief) pre-existent. An additional complication came with the Thomist view that, in Aristotelian terms, the soul was the form, as opposed to the matter of the body (with the soul, however, unusual among forms in that it could exist without the body—though this was of course a temporary and incomplete condition). Dualism of soul and body was the general position of most theologians. It was not, however, a 'Platonic' dualism, regarding the soul as divine or the body as a prison; orthodoxy rejected strongly the idea that the body was evil or that it would not be redeemed with the soul; but it still as a rule distinguished the two. In recent years there has been a strong reaction against dualism, but I think it defensible. (Cf. part 1 of R. L. Sturch, *The New Deism*, Bristol Press, 1990).

they do not in any way resemble awarenesses, thoughts, acts of will, or other mental events, which may in fact have their own 'programmes' to operate by.⁷ Indeed, Davies himself goes on to note that 'hardware and software are hopelessly entangled in the quantum theory'.⁸

Others do not object to dualism so much as to the consequences of the CI's emphasis on life or mind. 'It seems to lead to a very lopsided and disturbing view of the reality of the world', writes Penrose.⁹ For only where there are conscious observers 'would the complex quantum linear superpositions be resolved into actual alternatives.' The rest of the universe would remain, so to speak, only partially real. And this he finds disturbing and hard to accept. This feeling may also lie behind Polkinghorne's description of the CI as 'biocentric',¹⁰ and Casti's classification of the CI among theories which deny the existence of objective reality.¹¹

But is this really the case? The fact that large parts of the universe, while doubtless not themselves containing conscious life, are directly or indirectly (by their causal effects) observable from parts that do, is not perhaps a complete answer, for they will have remained unobserved for a long time before this happens. But there are two further points, related to one another, that need to be made. One is that the CI does not say the universe is unreal till it is observed. It can still be described; not, admittedly, in the kind of detail which can be produced after observation, but in terms of wave functions and 'complex quantum linear superpositions'. Indeed, earlier on in the same book, Penrose, in opposition to the 'Copenhagen' view, has ascribed objective physical reality to just this—to what he calls the 'quantum state'.¹² And d'Espagnat¹³ actually reckons as an advantage of the CI the fact that it is 'explicitly realistic'!

However, it remains true that while the CI does not treat the universe as if, until it impinges on consciousness, it were somehow unreal, still it does treat some of its qualities as indeterminate till then, potential rather than actual. But this is something that need not disturb us. Firstly, because this is also true of other interpretations, except hidden-variable ones. (In the 'many worlds' interpretation, to be fair, indeterminateness is replaced by multiplicity.) Secondly, because we already knew this happened with other qualities. I refer of course to the so-called 'secondary qualities'. A radio may, in the absence of consciousness, give out sound-waves of particular lengths; but there will be no actual music, only a patterned disturbance of the air, until a listener is brought into the affair. Until the appearance of conscious life, the universe was in a sense silent. But music is neither something unreal nor something purely subjective; it is simply

7 Cf. R. L. Sturch, *op. cit.*, p. 21.

8 Davies, *loc. cit.*

9 R. Penrose, *The Emperor's New Mind*, Oxford UP, 1989, p. 295.

10 J. Polkinghorne, *The Quantum World*, London, Longman, 1984, p. 66.

11 J. L. Casti, *Paradigms Lost*, New York, Morrow, 1989, p. 489.

12 Penrose, *op. cit.*, p. 226.

13 B. d'Espagnat, *In Search of Reality*, ET New York, Springer, 1983, p. 87.

something that requires a consciousness to make it actual rather than potential. What the CI does is merely to extend this idea to other qualities of the world—a world in itself real enough.

Alastair Rae¹⁴ objects to this that one cannot really draw a distinction between the existence of an object and its properties. 'If all the properties of an object, its mass, position, energy etc., are quantum in nature and do not have values until they are measured, it is hard to see any meaning in the object's separate existence.' But this is an exaggeration. Some properties of, say, an electron are not indeterminate at all, such as its charge and its mass; others, such as its spin, are indeterminate only within a given range; and even such properties as are more widely indeterminate are represented in a determinate wave-function.

Ian Barbour¹⁵ draws attention to the fact that Eugene Wigner, the best-known advocate of the CI, thought that the introspective or self-referent nature of consciousness was a key factor in its role in collapsing the wave-function.¹⁶ (In fact, Wigner seems not to stress this point much, though it was emphasized by London and Bauer, as far as I know the first explicit advocates of a CI.) 'Why then', asks Barbour, 'do two different observers agree on the result of a quantum experiment?' The obvious answer would be that once the result has been consciously observed, the wave function does collapse, and there is no room left for any other observer to observe any other result. But if the observer's introspection is what produces the collapse, is he not confined to creating 'his own objectivity' (a phrase of London and Bauer), not one which applies to others?

This is possibly the most serious philosophical objection to the CI. There is always a danger, in any view which stresses consciousness, of edging towards solipsism, the idea that maybe only my own consciousness exists.¹⁷ (It is the only one, after all, of which I have any immediate knowledge.) But once again the analogy of secondary qualities may help us. If I hear a piece of music over the radio, I do in a sense 'create my own objectivity'. It becomes true that I am hearing (say) a Schubert violen sonata; it is not necessarily true that anyone else is hearing it; but it is true that if anyone else listens to that radio, it is a Schubert violen sonata that they will hear, and their experiences will have a strong correlation with mine. I have not created 'their' objectivity; but 'my' objectivity enables me to know what theirs will be. Solipsism is a very awkward problem, but not solely for adherents of CI; and most defences that may be made against solipsism generally will, I suspect, defend CI against its supposed appearance there.

14 A. Rae, *Quantum physics: Illusion or Reality?*, Cambridge UP, 1986, p. 70.

15 I. G. Barbour, *Religion in an Age of Science*, SCM, 1990, p. 115.

16 E. P. Wigner, 'Remarks on the Mind-Body Question', in I. Good (ed.) *The Scientist Speculates*, London, Heinemann, 1962, pp. 284 ff.

17 Wigner himself at one point came close to this, ascribing a special status in reality to 'my' consciousness: see his article 'Two Kinds of Reality', *The Monist*, 1964, pp. 248 ff. But it is not entailed by a CI.

In an earlier book, Davies argued that the CI implied the possibility of backwards causation.¹⁸ Suppose that a Geiger counter in an experiment has a 50% chance of having recorded a radioactive nucleus as having decayed. It is then photographed, twice in succession, with no conscious observer being involved. Later the two photographs are inspected by conscious observers, only in reverse order. Of course, both show the same position on the counter. But according to the CI, this position did not become determinate until the first inspection (that of the second photograph to be taken); and this caused the other photograph to become determinate in the same way, even though it was taken earlier. 'Looking at a photograph, perhaps many years later, influences the operation of the camera for the preceding photograph.'

One trouble with the phrasing of this argument is that it does not make clear the indeterminate state of the two photographs. It seems to suggest that photograph A (the one taken first) did in reality have a determinate nature all along, though one affected by the inspection of B, through some kind of retrospective causation. In that case, though, we should have to suppose that B also had all along had a determinate nature (since it would of course always have shown the same result as A). We should have in fact abandoned the indeterminate condition before observation which was the whole point of the CI, and brought in some kind of 'hidden variables' interpretation instead. But this may well be simply a matter of slightly misleading language.

A more important point is that this backwards causation appears even without the CI, in Wheeler's 'delayed choice' variation of the two-slit experiment, and seems quite unavoidable there (as Davies in his later book accepts¹⁹). So the CI entails no difficulty that is not already there in quantum theory (and indeed practice, as what was originally only a thought experiment has in fact been carried out with the results Wheeler expected²⁰).

A similar point to Barbour's is raised by Barrow and Tipler²¹, but given a twist which makes it more of a scientific point than a metaphysical one, and also brings in elements of the 'backwards causation' objection. In our imagined photographic experiment, the observers of the photographs may well be outside each other's 'light cone'. In that case, in some frames of reference photograph A will be developed first, in others photograph B. Which then determines the other? Which is the one which causes the wave-function to collapse? But to this one can make the same reply as was made to the original 'backwards causation' objection: the same difficulty arises in contexts where no CI is involved at all. In this case it is the famous Einstein-Podolsky-Rosen thought experiment and its successors, culminating

18 P. C. W. Davies, *Other Worlds*, Harmondsworth, Penguin, 1988, pp. 133-4.

19 Davies (1984), pp. 110-1.

20 J. D. Barrow and F. J. Tipler, *The Anthropic Cosmological Principle*, Oxford UP, 1986, p. 469.

21 Davies and Brown, *op. cit.*, pp. 9-11.

in the actual experiments of Clauser and Aspect. These equally involve one observation's apparently determining the result of another when the two may well be outside one another's light cones; and it is reasonable to suppose that any resolution of the paradox in the EPR case will apply equally to the CI one.

In point of fact, it seems likely that what brought about this objection was in large part a mistake of language. If we speak of 'causes', we are apt to think of one event (the inspection of a photograph, or the measurement of a photon's polarization) as reaching out and producing some effect, and naturally it seems queer to say that each of two such events could have caused the other. (Causal language like this may also help account for the irritatingly frequent attempts to link CI with parapsychology.) But all that was really asserted (in the CI case) was that the wave-function would be collapsed for all points in the light-cone of either observation, and in the same way. What happens is that, as with secondary qualities, the world takes on a form that is compatible with ordinary sense-experience. If causes are involved, it is only in a quasi-Humean sense of 'constant conjunctions'.

Special relativity also comes into an objection raised by the late John Bell.²² Observing that the CI had never been developed beyond the talk stage, he pointed to the difficulty in making CI theories Lorentz invariant; for the interaction between the mind and the world would apparently have to take place over a finite area of space but at a single point of time. Now the difficulty with this formidable objection is that there are quite good reasons, introspective and experimental, for thinking that the mind does not relate to a single point in time. William James remarked of the 'strict present' (that is, a present point in time) that it was 'an altogether ideal abstraction, not only never realized in sense, but probably never even conceived of by those unaccustomed to philosophic meditation The unit of composition of our perception of time is a duration, with a bow and a stern, as it were, a rearward- and forward-looking end.'²³ And there is also evidence for thinking that the temporal relationships of our consciousnesses of events may not be identical with the temporal relationships of the events themselves. B. Libet found²⁴ that although there was a delay of up to half a second in building up brain activity before there could be conscious experience of certain stimulations of the skin (that is, a delay after the input from nerves in the skin reached the cortex of the brain), nevertheless the subject judged the stimulation to have taken place at about the time the input reached the cortex, a kind of 'ante-dating' which (Eccles notes) 'is not explicable by any neurophysiological process per se' and has to be attributed to the ability of the self-conscious mind to 'play tricks with time'. On both counts it does look as if human consciousness, if it acts on volumes of the brain, were not required to act on a finite volume at a point

22 In Davies and Brown *op. cit.*, pp. 54-5.

23 W. James, *Psychology (Briefer Course)*, reprinted New York, Collier, 1962, p. 287.

24 As described by J. Eccles, *The Human Mystery*, Berlin, Springer, 1979, p. 225. Cf. also Penrose, *op. cit.*, pp. 439-40.

in time, and therefore if the CI were to progress beyond talk into mathematical equations, as Bell understandably wanted, the problem of Lorentz invariance would not be as formidable as it might seem.

Now what has all this got to do with Christian belief? It is simply that a CI ties in rather well with what many Christians believe on wholly different grounds: namely, that God has made a physical world which is good quite apart from human involvement, but has also placed in it people made 'in His image', who are more than physical objects, having souls as well as bodies (intimately though the two are linked), and souls, what is more, whose activities affect the world around us.²⁵ (It has of course other advantages which have nothing to do with Christianity, in that, for example, it involves no entities, whether universes or pilot waves, which were not known to exist already, and attributes the ending of a quantum indeterminacy to something non-physical and therefore not itself caught up in the same indeterminacy.)

We are in a position not unlike that of some mediaeval thinkers over the age of the universe. Thomas Aquinas, for example, believed that it was perfectly possible to demonstrate the reality of a God even if the world had no beginning. That in actual fact it had a beginning he believed as a revealed truth; it could not, as far as he could see, be proved. If it could, this merely made the theistic position stronger. For if the world did have a beginning, then *a fortiori* there must be a cause for its existence.²⁶ There were (he thought) quite sufficient reasons for belief in God anyway; if the world had no beginning, these reasons were made no weaker, but if it had one, they were made somewhat stronger. Similarly here. Christian views of human nature do not in the least depend on any particular interpretation of quantum theory! But if some sort of CI should turn out to be correct, then Christian views of human nature (and of course other views which affirm the independent reality of matter and spirit) acquire extra plausibility. I can see no reason whatever for thinking that 'eastern mystical' views do.

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²⁵ Cf. Sturch, *op. cit.*, part 1, esp. pp. 10–24.

²⁶ Thomas Aquinas, *Summa contra Gentiles*, i, 13, 29–30. Similar debates have of course arisen more recently over contemporary theories about the origin of the universe.