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Cosmology and Christology

We consider here some possible implications of modern scientific cosmology for theological understanding of Christ and his work. In order to do this, we must make the initial decision to view big bang cosmologies within the context of a Christian understanding of God's relationship with the world. Scientific studies of the very early universe and attempts to explain the origin of space-time and matter, together with reflection on the character of modern physics, suggest a need to focus on the origin of the world's pattern as an important element of an adequate doctrine of creation. The idea of a pre-existent logos, which has encountered some opposition in modern theology, provides one way to express such ideas. At the same time, the controversial anthropic principles of modern cosmology suggest that the development of human life plays a central role in the universe, and motivate attempts to understand the doctrine of the Incarnation as a theanthropic principle. Significant ideas of modern cosmology are thus correlated with belief in the divine-human Christ through whom and for whom the universe is created.

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I. Introduction

Modern scientific cosmology began with Einstein's theory of gravitation and observation that some nebulae lie outside our galaxy.¹ Hubble's velocity-distance relationship for galaxies was quickly interpreted in terms of recession from a primeval explosion, raising questions for religious ideas of creation.² Interest in such issues becomes more lively after new discoveries like the recent one which seems to confirm that the microwave background is a relic of the big bang.³ Some argue that science has made the idea of God unnecessary, some that it confirms Genesis, and others that science is irrelevant to theology.

It is not the purpose of this paper simply to discuss once again possible relations between big bang cosmologies and belief in divine creation. Christianity's belief in creation is connected in fundamental ways with its understanding of Christ, and our goal here is to explore the significance of modern cosmology for christology. Scientific discoveries about the early

1 North, J. D. *The Measure of the Universe*. New York: Dover (1990). For big bang theory see Weinberg, S. *The First Three Minutes*, updated edition. New York: Dover (1988).

2 Jaki, S. L. *Cosmos and Creator*. Edinburgh: Scottish Academic (1980). Polkinghorne, J. *Science and Creation*. London: SPCK (1988). Drees, W. B. *Beyond the Big Bang*. La Salle IL: Open Court (1990).

3 See, e.g., Silk, J. 'Cosmology back to the beginning', *Nature* (1992), 356, 741-742.

universe seems to call for renewed emphasis upon some aspects of classical Logos theology, while the controversial 'anthropic principles' of cosmology appear to have a theological parallel in the doctrine of the Incarnation. We begin by considering the relationship between science and theology and some relevant ideas of the two disciplines.

II. The Methodological Question

A fundamental issue in the science-theology dialogue is the connection between our knowledge of God and God's activity in the world which may be derived from experience and reason, and knowledge based upon God's historical revelation. This is the old question of the role of natural theology. Views about it within the Christian tradition range from the decree of Vatican I, that the true God can be known by reason through the creation, to Barth's 'Nein' to any such knowledge.⁴

There is something to be said for Barth's negative view. Even if traditional arguments for God from nature and reason seem convincing, they establish only the existence of a First Cause or Unmoved Mover. This 'God' does not have the distinctive features of the living God of the Bible. But these traditional arguments also just do not work. It is not lack of information or intelligence which keeps some scientists from believing in God.

A strict 'Barthian' position would end any science-theology dialogue. Torrance has argued, though, that what this line of thought really rejects is an *independent* natural theology which stands apart from the divine revelation which culminates in Christ.⁵ Valid knowledge of God can be gained from study of the world if we begin with the belief that the triune God is the creator of the universe. Legitimate natural theology can be developed only within the context of specifically Christian theology.

Taking this approach, we view scientific knowledge about the beginning and future of the cosmos in the context of the Christian doctrine of creation. Science may provide support or plausibility arguments for this doctrine, but it cannot be the basis for it. On the other hand, the doctrine of creation does not provide details about how God created the world. It is with such details that scientific cosmology can assist theology.

III. The Christian Understanding of Creation

Scripture begins by saying that God created the universe 'in the beginning'. Though this is an important aspect of the biblical picture of creation, it is far from the whole story. Psalm 104, a great hymn of creation, praises God

4 For the Vatican decree and its context see Jaki, *Cosmos and Creator*, Chapter 3. Some relevant parts of Barth's *Church Dogmatics* are collected in Barth, K. *Church Dogmatics—A Selection*, ed. G. W. Bromiley. Edinburgh: T. & T. Clark (1961), Section I.3.

5 Torrance, T. F. *Reality and Scientific Theology*. Edinburgh: Scottish Academic (1985).

for establishing the heavens and the earth, but concentrates on God's ongoing work as creator in providing us with everything we need today.

This ongoing work takes place through natural processes. There may be an exceptional set of miraculous events of measure zero, but almost everything which happens in the natural world can be understood in terms of processes obeying rational laws. Those who believe in God as the creator must then see those processes as the instruments through which God acts to sustain the universe, even as they conceal God from direct observation. Similar ideas have been expressed in various ways in doctrines of providence of traditional theology. One may say that God, as the First Cause, works through created things as secondary causes, or that God 'concurrs' or 'co-operates' with natural processes which God himself creates, in order to bring about desired effects.⁶

God is thus *hidden*, though everywhere present and active, in the world, and is seen only by faith. 'What meets our eyes,' as Pascal said, 'denotes neither a total absence nor a manifest presence of the divine, but the presence of a God who conceals Himself [cf. Is. 45:15]. Everything bears this stamp.'⁷ This is a central feature of the 'theology of the cross': The hiddenness of God's power and glory on Golgotha, where God's saving work is centered, is characteristic of all the divine activity.⁸

It has often been assumed that creation in the beginning differed qualitatively from the ongoing work included under the idea of concurrence. The latter could be seen as mediated through natural processes, but not the former. But the value of such a distinction is doubtful. If God's activity today is mediated through natural processes, and if those processes have been the same for billions of years, it is natural to try to extrapolate the idea of concurrence into the past. Furthermore, Genesis 1 does describe a mediated creation of living things (1:11–12, 20–21, 24–25), and this idea was widely held by Church Fathers.⁹ How far into the past we may extrapolate concurrence, and how close we can get to an absolute beginning for the universe, are questions considered in the next section. We shall see that science may be able to explain the origin of matter and its organization into complex structures in terms of basic fields and mathematical laws which describe them, but it cannot explain why those fields and laws, and not others, should be operative.

In Genesis 1, God creates by speaking, a concept related to the prophetic 'Word of the Lord'. In the prologue of the Fourth Gospel it is the Word of God, the divine Logos, through whom all things were made, who was 'made flesh' in Jesus. A similar idea is expressed in Col. 1:13–20, though

6 Murphy, G. L. 'Chiasmic Cosmology: An approach to the science-theology dialogue', *Trinity Seminary Review* (1991) 83–92. For a general discussion see *The Providence of God*. Farley, B. W. Grand Rapids MI: Baker (1988).

7 Pascal, B. *The Pensees*. Harmondsworth: Penguin (1961), p. 222.

8 McGrath, A. E. *Luther's Theology of the Cross*. Oxford: Basil Blackwell (1985).

9 Messenger, E. C. *Evolution and Theology*. New York: Macmillan (1932).

the term *logos* is not used there. These passages speak of a pre-existence of Christ before the Incarnation. It is essential to note, however, that they are not concerned merely with existence, but with a creative role of the Logos in the beginning (Jn. 1:3, Col. 1:16, Heb. 1:3). This activity of the Logos in creation will help us to make theological sense of scientific cosmology.

IV. Big Bang Theories and Anthropic Principles

The galactic recession implied by Hubble's discovery can be extrapolated back in time to a theoretical epoch when all the matter in the visible universe would have been concentrated together. This big bang, between ten and twenty billion years ago, can be described in some sense as the origin of the present universe. This model received further support from detection of the microwave background which can be identified with the relic radiation from the 'primordial fireball' a few hundred thousand years after the beginning of the cosmic expansion. And we can get even closer to the beginning. Atomic nuclei formed in the first minutes of the expansion give us information about that very early epoch. A great deal of current work is devoted to theoretical and observational searches for information from even earlier periods, the first fractions of a second in which the energies of particles would have exceeded those in the largest terrestrial accelerators.

This raises the question of whether science can go on to explain the origin of the physical universe, space-time and matter, in terms of natural processes. That is the goal of some current work on quantum cosmology, which tries to combine Einstein's general relativity with quantum theory in a consistent way. The work of Hawking is widely known, though he and others are still far from any definitive account of cosmic origins.¹⁰

It might seem that the whole idea is misguided. How can matter, and even space-time itself, come into being with no antecedents, in any way that science can describe? But the ideas of relativity, gravitation, and quantum theory together suggest that such a process is, in some sense, possible. This can be illustrated by the following model.¹¹

In relativity, the law of conservation of mass is subsumed under that of energy via Einstein's $E = mc^2$. A collection of particles will have a positive energy due to their rest masses and motions, while their Newtonian gravitational potential energy is negative. We can imagine a state which initially contains no particles, and thus no energy, making a quantum jump to a state which contains particles but whose total energy ($mc^2 + \text{kinetic} +$

10 Vilenkin, A. 'Birth of inflationary universes', *Physical Review* (1983) D27, 2848–2855. Hartle, J. B. and Hawking, S. W. 'Wave function of the universe', *Physical Review* (1983) D28, 2960–2975. Hawking, S. W. *The Natural History of Time*. London: Bantam (1988). Chapter 8. Drees, *Beyond the Big Bang*, especially Chapter 2 and Appendix 4.

11 Murphy, G. L., 'The paradox of mediated creation ex nihilo', *Journal of the American Scientific Affiliation* (1987) 39, 221–226.

potential] is still zero. Particles would thus have formed from 'nothing' without violating the energy conservation law.

That is a quite crude model, a hybrid of special relativity, Newtonian gravitation, and quantum mechanics. Better theories require the apparatus of quantum field theory, in which fields are described in terms of operators which emit and absorb particles. A consistent quantum theory of gravitation has not yet been achieved. For now, our oversimplified model may persuade the skeptical to keep an open mind about the possibility of a scientific explanation of the origin of matter.

But can science describe a *creatio ex nihilo* in the sense in which theologians use the concept? While 'matter' in the gross sense may arise from a state in which there is no 'matter', that state cannot really be described as nihil. The processes of which we have spoken can only take place if various quantum fields describing space-time (gravitation) and matter are assumed to exist. Even more fundamentally, the mathematical laws which describe those fields must be assumed to be operative.

Some quantum cosmologies go beyond attempts to explain the origin of our material universe. The 'chaotic cosmology' of Linde envisions an array of 'mini-universes' formed as expanding bubbles in the supercooled fields of the early universe. Our world would be one mini-universe expanded to dimensions of billions of light years. Other mini-universes with quite different properties would also exist. The best-known quantum cosmology is that of Hartle and Hawking, in which an attempt is made to transcend the concept of a universe coming into temporal existence. By introducing imaginary rather than real time, they find it possible to produce a theory in which the universe has no boundaries in space or time. In a sense, the universe simply is.

There is a good deal of speculation in all such attempts to penetrate into the 'Planck instant', approximately 10^{-43} sec, at the beginning of the universe.¹² It is, however, speculation constrained by basic principles of physics. Other scientific speculation has given rise to the 'anthropic principles', which suggest the idea, unpopular among physicists since the decline of Aristotelian science, of a purpose for the universe.¹³

The starting point for the anthropic principles is the observation that many of the parameters which characterize our universe, such as the strengths of the fundamental interactions, have just the values which make the evolution of intelligent life possible. If those parameters were a little different, life in any form we know of would not have developed. One may

12 Murphy, G. L. 'The fundamental length of quantized gravitation', *American Journal of Physics* (1974), 42, 958-959.

13 Barrow, J. D. and Tipler, F. J. *The Anthropic Cosmological Principle*. Oxford: Clarendon (1986). Two responses are Clifton, R. K., 'John D. Barrow and Frank J. Tipler: *The Anthropic Cosmological Principle*' and Osborn, L. H., 'A theological perspective on Barrow and Tipler's: *The Anthropic Cosmological Principle*', *Science and Christian Belief* (1990) 2, 41-46 and 47-52 respectively.

be content with accepting that as a 'coincidence'. Some who are not satisfied with that explanation have seen here an expression of some basic principle that the universe must allow intelligent life to develop. One version, the 'Participatory Anthropic Principle', appeals to the crucial role which observers play in quantum theory. It states that such observers have to come into being in order for the universe to exist. The development of intelligent life within a universe would therefore be a necessary condition for that universe to exist.

Such ideas, which seem to restore humanity to a central place in the cosmos from which it was displaced by Copernicus and Darwin, have been hotly debated. Certainly the anthropic principles cannot be tested by observation in as direct ways as can many other scientific theories, but they should not on that account simply be ignored. Scientists have other ideas, such as the rationality of nature, which cannot be tested directly, but which are helpful in suggesting theories and observations. Some people reject stronger forms of anthropic principles as thinly disguised religion, while others see the 'coincidences' from which the principles arise as a vindication of traditional design arguments for a creator. We will find subtler and deeper parallels with Christian thought.

V. The Search for Pattern

At this point we make what may seem to be a digression from our primary theme. It is, however, essential to consider just what it is that physical science can be said to discover.

The course of science over the past century shows that naive realism is untenable. A Newtonian scientist might claim to discover the true natures of the matter and forces which comprise the world, but those entities have been replaced in relativity and quantum physics by space-time curvature and operators in Hilbert spaces. Physics today will not say what matter 'really' is. Yet physics does progress, and learns to explain and predict new things about the world. What is it actually discovering?

The answer given by some major physicists of this century takes us in a sense back to Plato. The material world is a representation of mathematical pattern, as Plato described, using the limited resources of Greek mathematics, in the *Timaeus*.¹⁴

It is true that few physicists would describe themselves, with Penrose, as 'fairly determined Platonist[s]'.¹⁵ One who might have is Heisenberg, whose autobiography shows the influence which the theme of the *Timaeus* had on

14 An edition with a helpful introduction and notes by the translator H. D. P. Lee, is *Plato: Timaeus and Critias*. Harmondsworth: Penguin (1971).

15 Penrose, R. *The Emperor's New Mind*. OUP: Oxford (1989), p. 113. Penrose argues (especially in Chapters 3 and 4) for the eternal existence of mathematical truths but not, as we shall, that the physical world is a representation of mathematical pattern.

16 Heisenberg, W. *Physics and Beyond*. London: Harper & Row (1971).

him throughout his scientific career.¹⁶ And Dirac, echoing Plato's 'God is always doing geometry', said that the task of the theoretical physicist is to achieve, by a search for 'beautiful equations', better and better approximations to the true pattern of the world.¹⁷

One could perhaps express the situation by saying that God is a mathematician of a very high order, and that He used very advanced mathematics in constructing the universe. Our feeble attempts at mathematics enables us to understand a bit of the universe, and as we proceed to develop higher and higher mathematics, we can hope to understand the universe better.

But a purely Platonic philosophy of physics needs major correctives. We know, since the discoveries of non-Euclidean geometries in the nineteenth century, that there is not a unique mathematical pattern which might underlie the physical world. Many universes, differing in dimensionalities, structures of their laws, and values of parameters, might exist. The universe is both rational and contingent, as Torrance has emphasized,¹⁸ and we must observe it to determine what kind of universe it is. Einstein expressed clearly the roles of the two basic elements of science:¹⁹

Experience remains, of course, the sole criterion of the physical utility of a mathematical construction. But the creative principle resides in mathematics. In a certain sense, therefore, I hold it true that pure thought can grasp reality, as the ancients dreamed.

Modern science could not function without reason and experiment, but no one would even bother to do science without a conviction that the physical world is worth studying. In a purely Platonic view, the material universe is only an inferior copy or shadow of the true world of forms, and investigation of the physical world to discern its pattern is like looking for the answer in the back of the book because one is not smart enough to solve a problem by pure reason. Most scientists, on the other hand, think that the world is worth studying in its own right. That means also that the pattern we seek is not a static one, like the triangles of the *Timaeus*. Our world is characterized not only by motion but by irreversible motion,²⁰ and becoming, as well as being, is worthy of study.

The material world is superior to bare mathematical pattern. This is a value judgment which cannot be proved scientifically, but it is a judgment

17 Dirac, P. A. M. 'The evolution of the physicist's picture of nature'. *Scientific American* (May 1963) 206, 45-53. The saying often attributed to Plato is in Book VIII of Plutarch's 'Table Talk'. He prefaces discussion of it by saying, 'While this statement is not made explicitly in any of Plato's writings, it is well enough attested and is in harmony with his character.' See Vol. IX of Plutarch's *Moralia* in *The Loeb Classical Library*. Cambridge MA: Harvard (1969), pp. 118-119. I am indebted to Dr. Paul R. Murphy for this citation.

18 Torrance, T. F. *Divine and Contingent Order*. Oxford: Clarendon (1981), especially Chapter 2.

19 Einstein, A. *Essays in Science*. New York: Philosophical Library (1934), pp. 12-21.

20 Prigogine, I. *From Being to Becoming*. San Francisco: Freeman (1980). Murphy, G. L. 'time, thermodynamics, and theology', *Zygon* (1991) 26, 359-372.

which has to be made if we are to find science worthwhile. It is also a basic assertion of Christian theology. God's 'very good' of Gen. 1:31 is said of the material world, not merely of an ideal pattern in the mind of God. And the permanent religious value of matter is ensured for Christian thought by the Incarnation and the resurrection of the body.

Plato's insight is thus valuable but incomplete. The world as 'embodied mathematics' is better than pure pattern. We may describe this as an 'inverted Platonism', in which mathematical pattern finds its fulfillment in the material world.

VI. 'All Things Were Created Through Him . . .'

Our reflections on modern cosmology and on the character of physics suggest that the true pattern of the world, the laws of nature to which our scientific theories approximate, is essential to what the world is. This must be taken into account in any theology which claims to deal with the creation of the world which science studies. Such a doctrine must speak about the origin and maintenance of the world's pattern as an important part of God's creative work.²¹ God is the creator of the laws of nature as well as of space-time and matter which obey those laws.

This formulation already sets us apart quite clearly from a strictly Platonic view. The pattern of the world is not to be understood as something eternally existing alongside God. It lies on the creature side of the basic creator-creature division. We must think of the pattern which is 'activated' as our world to be generated by the uncreated Logos, the divine Reason.

By speaking of the Logos in this way we are not allowing science to impose alien ideas upon Christian theology. The creative activity of the pre-existence Christ is clearly expressed in Jn. 1:1-3, Col. 1:13-20, and Heb. 1:3. The Johannine use of the term Logos is especially significant. While its primary roots are in the Old Testament 'Word of the Lord' and the *memra* of the targums, it provided for Philo and the early Christian apologists such as Justin Martyr, some common ground with ideas of a cosmic *logos*, or 'world reason', ideas of contemporary Stoics and Middle Platonism.²² Our survey of cosmology suggests that the Logos concept can play a similar role for us today, and that some features of the Church's early Logos christologies are needed if we are to present creation adequately in dialogue with science.

The Logos must, however, be 'larger' than the ancients realized. It is the source of all possible patterns for universes, though it is not to be limited to that. (To say 'God is a mathematician' need not mean that God does

21 Murphy, G. L. 'A positive approach to creation', *Journal of the American Scientific Affiliation* (1980) 32, 230-236.

22 Brown, R. E. *The Gospel of John I-XII*. Garden City NY: Doubleday (1966), Appendix II. Barnard, L. W. *Justin Martyr*. London: Cambridge University (1967), Chapter VII.

nothing but mathematics.) The Logos is active in creation, the divine instrument through whom the mathematical pattern of what will be the cosmos is selected and 'set into motion'. There is no necessity that all possible patterns be embodied. It is an act of divine will which gives our world material reality.

It is essential to emphasize that the eternal Logos is not to be seen merely as the pattern of the world which we inhabit. We noted that there is not a unique pattern but a multiplicity of possible mathematical forms for worlds. To identify the Logos simply with the pattern of our world would require either the Arian idea that the Logos is a creature or denial of *creatio ex nihilo* by giving the pattern of the world the same status as God.

The quantum cosmologies of Linde and of Hartle and Hawking call for comment here. In the former, ours is one of many mini-universes, others of which may have quite different properties. But they must all represent special cases of a basic pattern. They would not be so diverse as to include qualitatively different but internally consistent worlds embodying, for example, finite arithmetics. The creation of such an assembly of mini-universes would still involve the selection of one pattern (including many 'mini-patterns') out of many possible patterns.

The Hartle-Hawking proposal seems to do away with the idea of the universe coming into existence in time. That would be consistent with some approaches within the Judaeo-Christian tradition.²³ It does not obviate our argument that the Logos must be prior to the universe, though the priority then has to be understood in a causal, rather than a temporal, sense.

The Logos we are speaking of at this point is the pre-Incarnate Word, the *logos asarkos* or 'unfleshed Word', who is active in the origination of the world in which he will become incarnate. The idea of an unfleshed Logos has received a good deal of criticism in modern theology. We would have to agree with Hodgson that any idea of the Logos as a being somehow intermediate between God and the world must be rejected.²⁴ More recently, Jenson has argued that the idea of a pre-existent Logos was needed because Christianity adopted the static Greek concept of deity, and characterizes the unfleshed Word as 'Jesus' metaphysical double'.²⁵ But the idea is based on New Testament texts, not metaphysical speculation. That usage in itself might be considered a consequence of accommodation to mythological language. What is at issue, however, is not simply the existence of the Logos before the conception of Jesus but his activity in creating the pattern

23 Drees, *Beyond the Big Bang*, pp. 69–75 and 141–150.

24 Hodgson, L. *The Doctrine of the Trinity*. New York: Charles Scribner's Sons (1944), Lecture V.

25 Jenson, R. W. *Second Locus in Braaten, C. E. and Jenson, R. W. Christian Dogmatics*, Vol. 1. Philadelphia: Fortress (1984), pp. 154–155.

of the world. Such an activity (and, *a fortiori*, existence) cannot be ignored in a satisfactory modern doctrine of creation.

Pannenberg has examined the concept of an unfleshed Word in some detail and finds problems with it. His criticisms which touch on theology-science issues are of interest here:²⁶

A contemporary analogy to the Apologists' Logos Christology perhaps would have to look something like this: Jesus Christ would have to be conceived as the embodiment of Einstein's theory or of some other inclusive physical law.

... The laws of physics are inherent in the processes they describe; they do not transcend them and are hardly mediators of divinity!

From the standpoint of 'inverted Platonism', the statement about the laws of physics is incorrect. The laws of physics are not merely descriptions of observed phenomena but approximations to the fundamental pattern which underlies the world. The first statement also has to be qualified. Jesus, the incarnate Logos, will indeed be seen as an embodiment of the laws of physics. The unfleshed Word would not, however, contain just the pattern represented by Einstein's theory of gravitation, but that together with the patterns of Newton's theory, Whitehead's, and all other consistent possibilities (together with patterns corresponding to non-gravitational phenomena).

VII. '... And for Him ...'

We would, however, know nothing about *who* the Logos is without the Incarnation. In the absence of any knowledge of the Word made flesh, the Logos might be seen as no more than an impersonal repository of contingency plans for possible worlds.

The Logos of our universe is Jesus of Nazareth. Here the anthropic principles are suggestive. The weakest forms of those principles point out that the basic properties of our world would have to be as they are for humanity as we know it to develop. The pattern of the universe is embodied in each of us. Stronger forms, such as the Participatory Anthropic Principle, argue that intelligent observers such as human beings are needed in order for the universe to come into being.

The doctrine of the Incarnation means that the universe reaches its fulfillment not in humanity alone but in humanity indwelt by the Logos, the Word made flesh. It may be called a theanthropic principle.²⁷ The pattern of the cosmos was chosen with Jesus in view. This is what Col. 1:16 means when it says that all things were created not only through him but for him.

And a few verses later Colossians (2:9) says that 'in him the whole

26 Pannenberg, W. *Jesus—God and Man*, 2d ed. Philadelphia: Westminster (1977), p. 166.

27 Murphy, G. L. 'The Incarnation as a Theanthropic Principle', *Word & World* (1993) XIII, 256–262.

fullness of deity dwells bodily'. Our talk of 'contingency plans', one of which is given material form in the universe in which the Logos is incarnate, should not suggest that Jesus is somehow an incarnation of part of the Logos. He has, of course, the particularity of an organism in our universe, a male Jewish human born approximately 2000 years ago. In this he incarnates the pattern of our universe and not that of another. But unlike other humans he has the capacity to know the patterns of alternative universes. The human can incarnate the whole Logos.

VIII. '... And in Him All Things Hold Together.'

We began with belief that God is active in the world through natural processes which at the same time hide God's presence. This belief can be extrapolated back to the beginning of the universe. The idea of natural processes as representations of mathematical pattern suggested that the laws of nature must be seen as part of creation, which can best be done through the New Testament's picture of creation through the divine Logos. On the other hand the anthropic principles, which reintroduce the idea of cosmic purpose, have a theological parallel in the belief that the purpose of the universe is the incarnate Logos.

The beginning and end of the universe naturally attract our attention, but Israel's worship of God as creator began with events of its own history. The Christian doctrine of creation continues to deal with God's present activity in the world, and sees it centred in Christ. Col. 1:15-20 says that the one 'through whom' and 'for whom' all things were made is also the one in whom all things 'hold together' (v. 17). This is true even though God appears absent, the divine activity being concealed by the natural processes which God uses. In the same manner, God's work of reconciliation takes place where God seems absent (Mk. 15:34), in the apparent defeat of the cross (Col. 1:20).

In a similar way, scientific understanding of the beginning and end of the universe starts with today's laboratory science. According to quantum field theory, the world at the sub-atomic level involves continual processes of annihilation and creation of particles. Capra, who argues for a similarity between modern physics and Eastern mysticism, sees in these processes the Hindu dance of Shiva, the endless cycle of life and death, creation and destruction.²⁸ The Christian will see it differently. The form of the world is not pure mathematics but mathematical pattern incarnated in 'the first born from the dead', through the blood of whose cross 'all things' are reconciled to God. 'From the beginning,' Bonhoeffer says, 'the world is placed in the sign of the resurrection of Christ from the dead.'²⁹

28 Capra, F. *The Tao of Physics*. Boulder, Co: Shambhala, (1975), Chapter 15.

29 Bonhoeffer, D. *Creation and Fall/Temptation*. New York: Macmillan (1959), p. 19.

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