THEOLOGY AND SCIENTIFIC COSMOLOGY

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Part 1 of 5

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Theory: The first major cosmology to influence Christianity, Ptolemaic cosmology, was thoroughly dualistic, as was its successor, Newtonian cosmology. Einsteinian cosmology goes beyond dualism, without embracing either monism or pantheism, and therefore offers a way for theology to interact with scientific thought without abandoning its traditional culture.

Purpose: To explore the significance of cosmology for Christian theology

SECTION I: THEOLOGY THROUGH COSMOLOGY

1. General Introduction

The objective of the research reported in this study is the theological definition of cosmic disorder, even if such cosmic disorder be considered as a metaphor. The approach described in the last chapter as "Theology through Science" entails a consideration of scientific or physical cosmology (contemporary and historical) as at least suggestive for contemporary and future theology. This is indeed the view of Thomas F. Torrance, for a very substantial portion of his project for a "scientific theology" takes as its subject matter scientific cosmology. Indeed, in CFM (1985)[1] he gives emphatic expression to the importance of scientific cosmology for Christian theology: "...scientific cosmology and Christian eschatology must be thought carefully into each other, for the future of the human race may be at stake."[2]

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[1] **The key to these abbreviations can be found here.**

[2] **The Christian Frame of Mind [CFM], 1984, p. 47.**

We shall therefore begin this chapter by considering the possible nature of "theology through cosmology", although this will be balanced by a portion of the chapter in which Torrance's discussion of the reverse sequence – "cosmology through theology" – will be analysed.

There are many occasions in which Torrance has argued in extenso the significance of scientific cosmology for theology.[3] This has been true especially in his repeated expressions of admiration for the achievement of Albert Einstein. Einstein, indeed, is credited with the very existence of modern scientific cosmology: "Professor Jaki has suggested that cosmology achieves scientific status from the time of Einstein's 1917 essay on "Cosmological Considerations of the General Theory of Relativity" (DCO, p. 151). Torrance does not appear to disagree with this assessment.

One of the publications in which Torrance expatiates upon the achievement of Einstein in scientific cosmology and its relevance for theology is CTSC (1980). The lecture on "Christianity in scientific change", one of the *Queen's University Lectures in Theology* (1980), is a good example of this. The birth of Einstein is described as an event of great significance in natural science. According to what might be called the Torrance historiography, Einstein, along with Maxwell, joined the ranks of those who, like Galileo and Newton, decisively turned the course of scientific thought. In the case of the earlier two natural scientists, their achievement was to develop the method and structure of classical mechanics applicable to all motion in the universe. Maxwell and Einstein, for their part, were responsible for an even more basic change in the understanding of physical reality and its scientific explanation. Their work "altered the fundamental structure of physics" (CTST, p. 11). Just as Galileo's death was in the same year as that in which Newton was born, so James Clerk Maxwell died in the year which saw the birth of Albert Einstein. Maxwell is notable for his discovery of the mathematical properties of radiation through which the understanding of electricity, magnetism and light were brought into a coherent, unified conceptual framework. The technical results, the technological consequences of Maxwell's achievement are everywhere visible today in our electronics, in systems of illumination, locomotion and communication. They have transformed industry and the way humans live domestically and socially.

According to this account of the history of science, Einstein inherited, scientifically speaking, the insights of Maxwell. The latter's intellectual achievement, particularly the partial differential equations, is described as immensely fertile. Torrance considers that Maxwell led up to Einstein – and beyond. Einstein himself is described as claiming that the partial differential equations are the natural expression of the primary realities of physics.

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[3] **See especially: books, DCO, TCFK ch. 8, CTSC, RST; and articles: TSI, FIST.**

However, in Torrance's opinion, of the four scientists singled out as exceptionally praiseworthy it is Einstein who is the most important. He is described as being responsible for the greatest achievement of all. This is his formulation of the special and general theories of Relativity.

These "irreversibly switched the course of classical physics and laid it securely upon much profounder, unifying foundations appropriate to a much wider range of empirical evidence" (CTST, p. 12).

Einstein's achievement, in Torrance's view, began with his "startling" papers of 1905 on Quantum Theory, Statistical Mechanics and Special Relativity. As with Maxwell, his work is to be regarded as having profound consequences in addition to its intrinsic value. Maxwell initiated a deep change from mechanical to relational thinking, but Einstein brought this change to its culmination. The effects of Einstein's discoveries are considered by Torrance to reach "right down into the very foundations of our understanding of the universe" (CTST, p. 12). This is why Einsteinian scientific cosmology is so important for theology and the Christian faith. It affects everything we know. It goes far beyond the limits of physics.

2. The Church in an Era of Scientific and Cosmological Change

Another approach to the importance of cosmology for theology, and an additional achievement of the significance of Einstein's work, is to be found in T.F. Torrance's essay, The Church in the Era of Scientific and Cosmological Change,[4] which appears in Theology in Reconciliation [TRcl] (1975).

This chapter is an important source of understanding of Torrance's own comprehension of the history of cosmology. Thus he speaks of the two great mutations in scientific and cosmological outlook which have already taken place in the history of Western culture.

The first, he asserts, took place when Greek history "with its sharp distinction between unchanging necessary being and the changing appearance of things gave rise to *Ptolemaic cosmology* which envisaged a deep split in the cosmos, between the intelligible realm of celestial realities and the sensible realm of terrestrial phenomena" (TRcl, p. 267). This, he thinks, created a radical dualism in the very fabric of Greek science, as well as its surrounding philosophy and culture.

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[4] This was a lecture delivered to the Church Leaders' Conference of the British Council of Churches, in 1972; it was published in The Month, 1973.

Such dualistic cosmology can be seen expressing itself in hybrid forms of religion such as Arianism, Adoptionism, Docetism and Gnosticism. The struggle of the Christian Patristic theologians overthrew this dualism, and left the legacy of the doctrine of the inherent intelligibility of contingent existence – a doctrine which may perhaps be regarded as having "laid the foundation stone for all modern empirical science" (TRcl, p. 268).

If this claim is valid, it is a further demonstration of the important interconnections and cross-fertilisations at work in the interaction of science and theology. On the other hand, it is probably still too early in the historical inquiry into the emergence of "modern science" to regard as established any one line of explanation of the emergence of that science. Non-religious historians of science may continue to be inclined to regard religion as a positive hindrance in the development of the scientific outlook.[5]

Unfortunately, Torrance continues, this *Ptolemaic cosmology* was reintroduced into Christianity through St. Augustine of Hippo. With it came the unwelcome accompaniments of philosophical and cultural dualisms between the intelligible and the sensible realms. In the Middle Ages, the introduction of Aristotelian physics, metaphysics and psychology into mediaeval thought exacerbated this trend. The theological dualism between the Deity, seen as immutable and impassible, and existence, seen as temporal and contingent, was deepened. The entire structure of Latin Christianity and its Augustinian heritage may be considered to have been conditioned by this dualism.

However, a second great mutation in scientific and cosmological outlook took place, according to Torrance, when the changes initiated by Copernicus, Kepler and Galileo were developed by Sir Isaac Newton and mathematically elaborated in his "system of the world". This was *Newtonian cosmology*. It too was characterised by a thorough-going dualism – in this case between absolute space and time and the contingent events that take place within their embrace, between volume and mass, primary and secondary qualities, and so on. Regrettably, this linked on to and gathered up into itself the Augustinian dualism that passed over into the modern world through the Reformation and took on a distinctively Protestant form (TRc1, pp. 268-69).

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5 Cf. Bertrand Russell, The Scientific Outlook (New York: Norton, 1962).

Newtonian thought thus built a deep-seated dualism into the whole fabric of Western science, influencing Protestant institutions and structures. Not only science but philosophy and indeed all of culture have been thus affected. Traces can be seen in Protestant scholasticism, Protestant deism, and even Protestant philosophy – discernible as a secularised form of Augustinianism. Social institutions are likewise affected – cut off from God, who is considered as inert and unrelated to such matters.

This dualism cuts away the ontological roots, the origin and depth, of all cultural institutions and thought itself, leaving theology bereft of real power to guide and inspire.[6] According to Torrance's analysis, the great mutation of thought which took place at the Reformation was after all only a transition from one form of dualism to another.

The third great mutation in the scientific and cosmological outlook of Western culture was the most important, it is asserted. "Compared with the other two", he writes, "this has the proportions of a *gigantic revolution*, the full implications of which we cannot yet anticipate. This is the new *Einsteinian cosmology*. It rejects dualism, but without embracing either monism or pantheism. It goes altogether beyond the orbit of thought of both monism and pantheism." (TRcl, pp. 269-70).

***Einsteinian cosmology*, going beyond dualism, is grounded in the mutual interaction of the space-time metrical field and all matter/energy in the universe: $E=mc^2$. This cosmology bespeaks a radical reorientation in knowledge. As Torrance summarizes the matter, structure and matter, form and being, are inseparably woven together. This imports, he contends, the end of the analytic era in science. It also implies the restoration of a genuine ontology – another significant point for theology, which has for so long concerned with the nature of Being. The mechanistic universe is replaced by a dynamic universe conceived in onto-relational terms, the old forms of causal connection and natural law are replaced with field-structure and field-laws (TRcl, p. 270).**

3. <u>The significance of Einsteinian cosmology for Christian theology</u>

What does all this have to do with Christian theology? Nothing like this had ever happened before, in the entire history of science, philosophy and culture, asserts Torrance – except when the pre-Augustinian Greek Fathers had to carry through the same revolution modern science is today doing.

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[6] On this "dualism", cf. Torrance's <u>Theological Science</u>, p. 82, passim.

Thus, for the first time, he thinks, Christian theology finds itself in the throes of a scientific culture which is not antithetical to it, but which operates with a non-dualistic outlook on the universe. Such *Einsteinian cosmology* is therefore in certain respects not inconsistent with contemporary theology, even the theology of the creation and incarnation. Furthermore, the *Einsteinian cosmology* should be juxtaposed with classical Patristic theology – although the latter must be recast in the idiom and style of our own era (TRcl, p. 270).

In Christian Theology and Scientific Culture (CTSC, 1980), Torrance also inquires directly into the significance of *Einsteinian cosmology* for theology. He points out that theology is always done within a prevalent culture, and since the present culture is essentially scientific, theology must be done in such a way as to find an audience among those who are operating in the scientific culture. Also, Christianity should "contribute creatively to the controlling ideas of this scientific culture if it is to take root and grow within it" (CTSC, p. 14). However, if this is to be possible, Christian theology must be prepared to engage in radical and critical clarification of its own conceptual tradition in the light of questions arising from its interaction with scientific development.[7]

More generally, Torrance considers that there are several positive aspects in recent scientific change which may affect Christian theology beneficially. One such benefit is the appearance of a more flexible and yet more faithful way of knowing – appropriate to what we seek to know. Epistemology and ontology are dynamically wedded in both our inquiries and our formulations. According to *Einstein this change in scientific thought' which represents a victory over the notions of absolute time, and space or over the idea of an inertial system, became possible because the concept of the material object was gradually replaced as the fundamental concept of physics by that of the field, and the Newtonian way of conceiving of physical laws was replaced by another which equated them with dynamic field-structures. The significance of this lies in the fact that contingent reality can be seen as a continuous integrated manifold of fields of force in which relations between bodies are just as ontologically real as the bodies themselves* (italics added: CTSC, p. 27).

Reality is thus relational, field-relational, onto-relational as much as it is discrete, atomistic, or itemized. The laws governing reality's transformations are subtle principles rather than rigid formulations. The things of the cosmos are identifiable by their transformations and their inter-relations as by their supposed *essentia*.

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[7] **Loc. Cit.**

Investigation itself, therefore, is an investigation of relationships: the cosmos is to be studied and probed not by a search for a static uniformity of causal patterns, abstracted form the field of force in which they exist, but in accordance with their immanent relatedness in the universe and in terms of their own inherent dynamic order (CTSC, pp. 27-28).

Therefore *Einsteinian cosmology* shows a cosmos where form and being, and movement, are inseparably fused together. Things and events are to be explained in terms of *ontological reasons*. In this Einsteinian cosmology we are to inquire into what things are in terms of their own interior relations, in which they exhibit an intrinsic intelligibility independent of our perceiving and conceiving of them.

They discriminate themselves from our scientific constructs and formalisations about them. This is the gift of Einsteinian cosmology to Christian theology: "the importance of this change in the understanding of rigorous scientific knowledge can hardly be overestimated".[8] As a result, the new cosmology gives to Christian theology the opportunity to dismantle its own dualisms, its objectivism, positivism, subjectivism, and other unwanted legacies from the Newtonian-Augustinian synthesis of thought.

Einsteinian cosmology also equips Christian theology, in its attempts to think about the cosmos or created order, with the philosophical synthesis of general relativity. This is important for Christian theological comprehension of the variety and unity in the creation. General relativity defines the universe as a continuous whole (CTSC, p. 30). Like the Christian doctrine of the creation of all things by one God, it declares the universe to be characterised throughout by a unitary rational order. The pervasive rational order of the world, though multivariable in its modes and multiplex in its forms of order (numerical, verbal, aesthetic, and organic or biological: CTSC, p. 31) is unitary in its character.[9]

Finally, Christian theology can benefit from scientific cosmology's portrayal of the stratified structure of the universe. The knowledge achieved by science embodies layers of coherent comprehension which answer to and are affected by the coordinated layers of orderly relations in reality itself. Reality has an integrated, complex structure consisting in part of an ascending hierarchy of orderly relations. In their ascent they prove ever more profound and comprehensive, though reality as a whole is multi-levelled and multi-dimensional. Within and among the sciences the stratified structure obtains, as it can and should in Christian theology.

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[8] Ibid.

[9] For further discussion of these four "modes of rationality in the complex manifold of rationality in the universe, see also CTSC, pp. 114-115.

Such, in overview, are a representative sample of the potential gains to Christian theology, in Torrance's view, of its attention to the discoveries and theories of scientific cosmology.[10]

The possible losses are not extensively discussed by him; they also deserve mention if our account is to be comprehensive. They are such as were mentioned in the first chapter: the contingent nature of science, partaking of the Fall of Man; the alienation and scientistic nature of certain philosophies of science, which can pass over into theology, there to appear as intellectualism or some theological counterpart to scientism; the tendency to rationalism and the exaltation of Law over Gospel, while the irrational or demonic in science is heavily discounted; and the possible presence of two contradictory strands of thought – the personalist and the mechanist – in the core of Torrance's thought. We shall return to these possible problems throughout this study. It must be emphasized, however, that these are only possible problems. They are not proven to be operative Moreover, the greater weight which Torrance gives to the influence of theology on cosmology, compared with the converse, goes a long way to mitigating such adverse effects, should they in fact occur.

Part 2

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[10] There is a substantial amount of corroborative material, pertaining to the data presented in this section about cosmology and theology, in the second and third chapters of Divine and Contingent Order (DCO, 1981). See chapter 2: "God and the Contingent Universe", and Chapter 3: "Theological Scientific World-Views". Example: "Is it actually the case, however, that there is no distinctively biblical or Christian view of the universe?" (DCO, ch. 3, p. 63). He goes on to show how theology operates with "basic cosmological conceptions of its own which it cannot give up" (DCO, pp. 63-64). We shall return to this material in chapters 4 & 5.