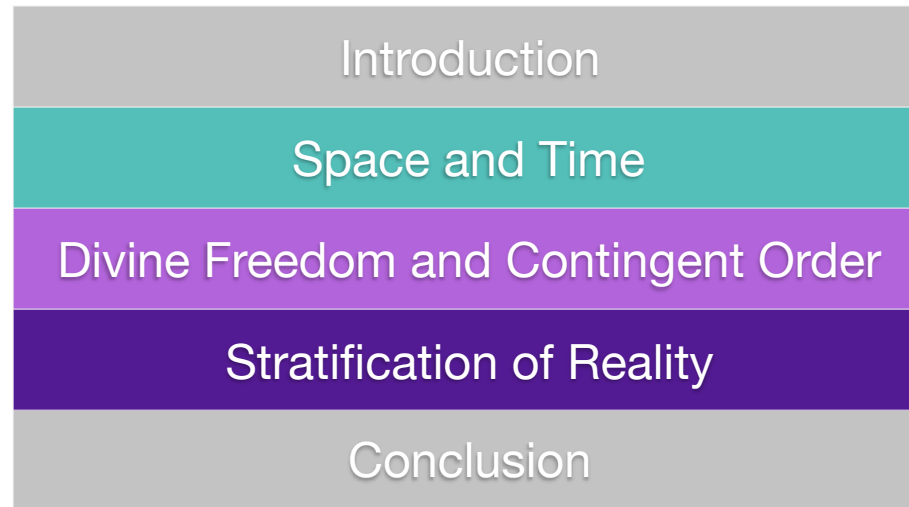


**Torrance, Science and New Creation:  
Did the Resurrection Change the Order of Nature?**

Kerry Magruder  
History of Science Collections  
University of Oklahoma

**Abstract:** In Thomas F. Torrance's creational theology, the natural order of space and time is both open and relational. For Torrance, "contingent order" is a corollary of divine freedom and love. Space and time are but one level of contingent order. By "stratification of reality" we refer to multiple interrelated levels of contingent order. Torrance understood the Resurrection of the humanity of Christ as a re-ordering of the creation in these terms, restoring rather than violating the lawful regularities of any specific level. The Resurrection is the starting point for a creational theology in which we begin to comprehend the staggering cosmic significance of the Resurrection to transform the entire creation.

## Did the Resurrection change the order of nature?



In the next several sessions we will focus upon three main issues: space and time, divine freedom and contingent order, and the stratification of reality. These three basic ideas are central to understanding the creational theology embedded in *Space, Time and Resurrection* as well as Torrance's other works. Moreover, each idea builds upon the others. Since there will be a cumulative effect, we will cycle back to them again in a fourth session at the end with some case studies and concluding reflections.



## Did the Resurrection change the order of nature?

?	Did the Incarnation change nature? human nature?
?	Did the Incarnation change the laws of nature?

Last Christmas, as a conversation starter, I started asking people a question to draw them into deeper reflection on the meaning of the season:

Did the coming of Jesus in the Incarnation change nature? Or Human nature?

- Did it change the Laws of nature? Some people just said, “What???” Others’ eyes lit up and we had some good conversations.
- Whatever we say about the Incarnation applies to the Resurrection, so I was astonished and excited when Bob asked me if I would present a few thoughts here at Firbush on how, according to TFT, the Resurrection changed the order of nature.

According to Torrance, the Parousia is a single connected event, encompassing Christ’s birth/life/death/resurrection/ascension and return. Yet the Resurrection is the best starting point for thinking theologically about the creation.

## Did the Resurrection change the order of nature?

Yes	Did the Incarnation change nature? human nature?
?	Did the Incarnation change the laws of nature?

For the first question, we must answer yes if we believe that we are implicated and affected by the birth, death and resurrection of Christ more than by Adam.

## Did the Resurrection change the order of nature?

Yes	Did the Incarnation change nature? human nature?
?	Did the Incarnation change the laws of nature?

The second question might prompt one who holds a merely transactional understanding of atonement to consider a realistic alternative. Yes, the cosmos is affected, really so, at the level of being or ontology, and not just transactionally. Yet to answer yes might betray an underlying dualistic deistic sensibility about the order of nature.

We shall see that Torrance holds that neither creation nor new creation need violate the order of nature, because God made the natural order open to his participation in it from the start. So the answer is no, it's not *necessary* for the laws of nature to have changed for God to be at work really transforming it from within. (The same is true for how he heals and transforms us, restoring order deep within.)

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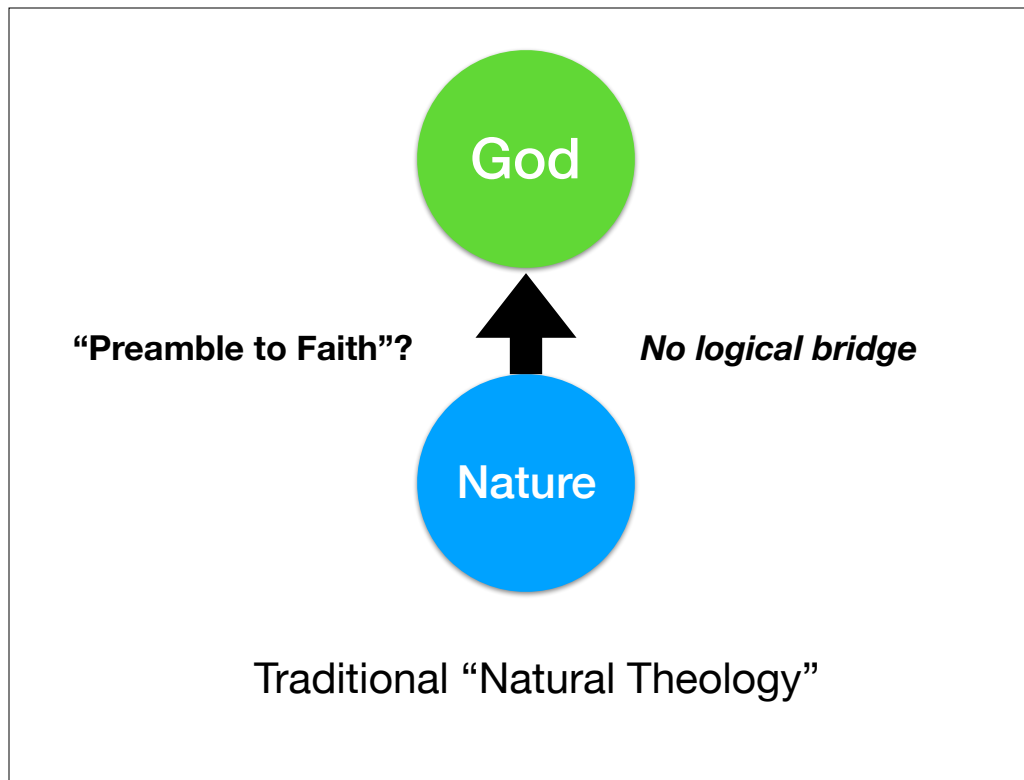
He *could* change the laws of nature if he wishes, but it's not necessary that he do so.

Did the Resurrection change the order of nature?

Yes	Did the Incarnation change nature? human nature?
?	Did the Incarnation change the laws of nature?
Yes!	Is the Incarnation <i>real</i> ?

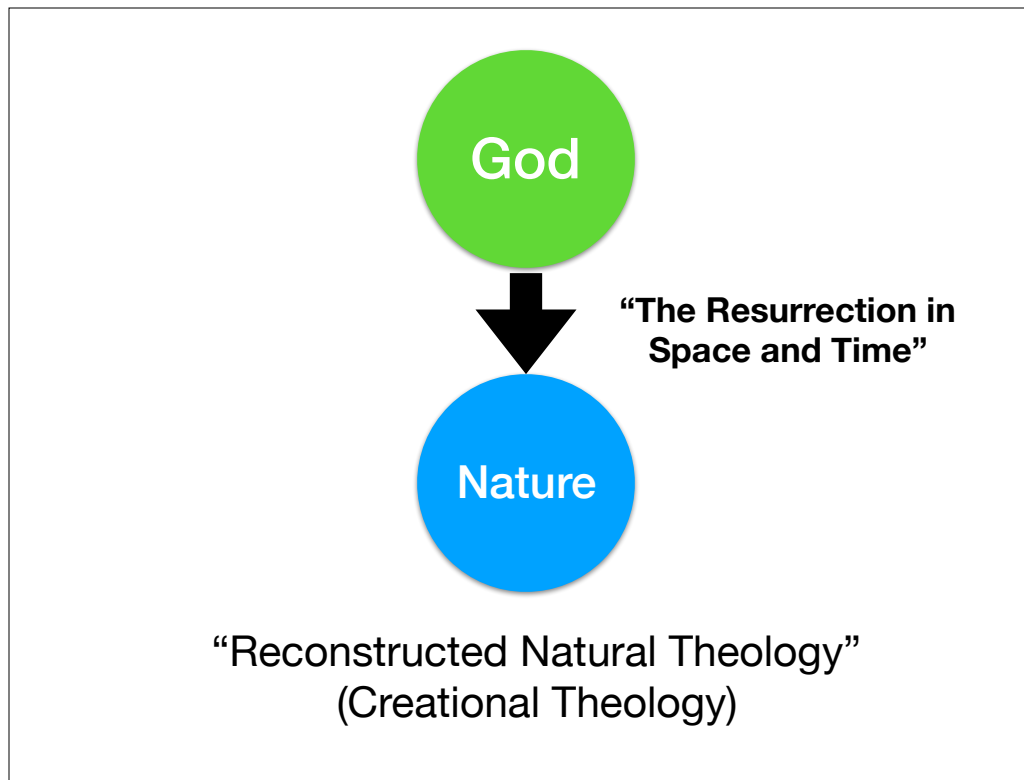
But the bottom line for a realistic conception is this: Did the incarnation, resurrection and ascension make a *real* or ontological difference? YES!

For Torrance, they are not to be demythologized.



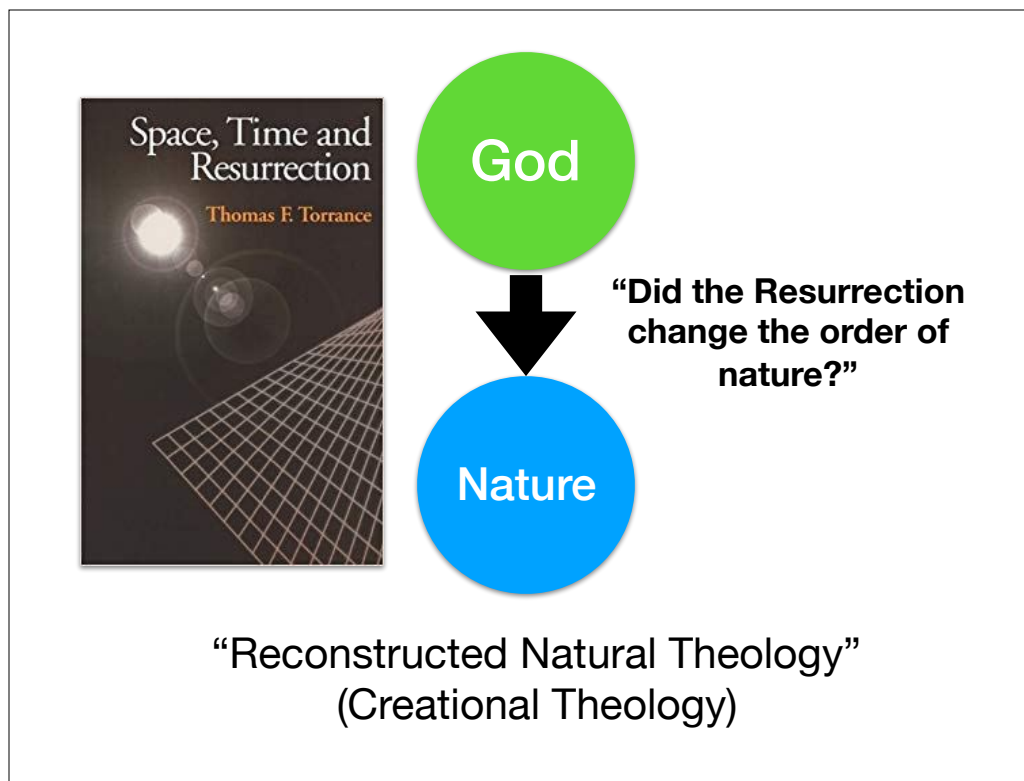
The question whether the Resurrection changed the natural order is not part of traditional “natural theology.” Traditional natural theology is understood as starting with nature, and reasoning from nature to God.

- Its practitioners hope that it might serve as a “preamble to faith,” to lead a skeptic on the basis of reason or nature alone to consider basic theism perhaps.
- But Torrance insisted there is “no logical bridge” that leads from nature to the Father, Son and Spirit, or even to the God of Abraham, Isaac and Jacob.



Rather, for Torrance, a “reconstructed natural theology,” for which I’ll use the term “creational theology,” leads in the reverse direction. Starting with the revelation of God in Christ, we ask not only about, for example, the Resurrection and humanity, but also about

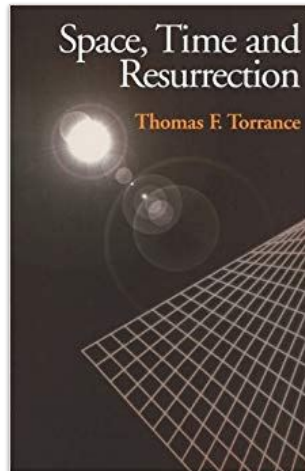
- “the Resurrection in space and time.” This is why Torrance’s book,
- *Space, Time and Resurrection*, turns out to be an excellent introduction to Torrance’s views on what he meant by a so-called reconstructed natural theology. In that creational theology, it does make sense to ask:
- “Did the Resurrection change the order of nature?” By asking this question we are not trying to argue scientists to faith; rather, we are seeking to grasp the staggering consequences of what we say we believe.



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- “Did the Resurrection change the order of nature?” By asking this question we are not trying to argue scientists to faith; rather, we are seeking to grasp the staggering consequences of what we say we believe.

## Did the Resurrection change the order of nature?



1. Encourage everyone to read *Space, Time and Resurrection*
2. Encourage theology students find creational theology intelligible and not an obstacle to reading STR
3. STR an intro to creational theology, repays careful study

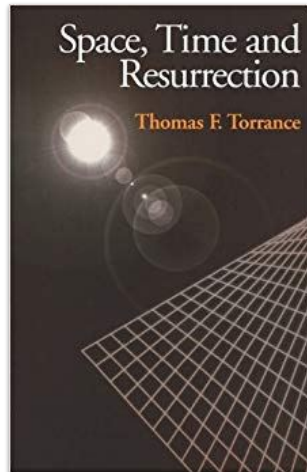
How to Read the Creational Theology  
in Thomas F. Torrance's *Space, Time and Resurrection*

We will focus on how TFT addresses these questions in a single book, *Space, Time and Resurrection*. The same themes are addressed in other works at greater length and with more thoroughness, yet for simplicity's sake we will limit references to other works.

1. •For the main goal is to encourage everyone to read (or re-read) STR (as we'll call it).
2. •A second goal is to encourage theology students to find the creational theology in STR more intelligible and not an obstacle to reading it. The goal here is not to compare, assess or engage TFT's theology. We will not consider the secondary literature in theology, nor seek to make a new contribution in theology. Rather, the more modest purpose is just to prepare anyone to read STR with greater understanding, to make STR more accessible.
  - An alternative title would be "How to Read the Creational Theology in STR."
3. •3rd goal is to show that STR can make an effective introduction to TFT's creational theology, if you want to read it for that purpose. In addition, the conclusion will suggest that STR still repays careful study from the standpoint of the ongoing task of developing a creational theology today.



## Did the Resurrection change the order of nature?



1. Encourage everyone to read *Space, Time and Resurrection*
2. Encourage theology students find creational theology intelligible and not an obstacle to reading STR
3. STR an intro to creational theology, repays careful study
4. Begin to explore "*History of Science 101*" for STR, and intellectual context for TFT

4. •And finally, as a historian of science rather than a theologian, I'd like to suggest that if you're interested in TFT, you'll want to explore the history of science as well as theology. While not engaging the history of science in any depth, I'll make references to some background sources a student would encounter in "History of Science 101."  
In addition, if you'll indulge me, I'll raise a few historical queries of my own that some of you may be able to answer. This paper is a work very much still in progress, a first step in my journey of trying to better comprehend TFT in his historical and intellectual context for the history of science. Some of the queries I'll make may not be answered in the archives (which I have yet to visit), so I'll appreciate hearing any personal reminiscences you wish to share.

Did the Resurrection change the order of nature?

Questions?

Introduction

Space and Time

Divine Freedom and Contingent Order

Stratification of Reality

Conclusion

So that's the introduction.

• Questions? •

## Did the Resurrection change the order of nature?

Introduction

Space and Time

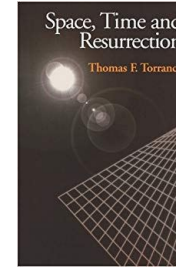
Divine Freedom and Contingent Order

Stratification of Reality

Conclusion

Let's look into the first issue, space and time. We will see that, according to Torrance, space and time are open and relational.


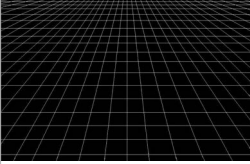
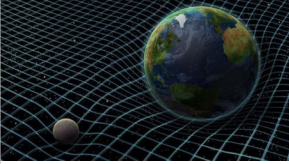
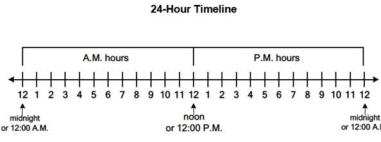

“...it is necessary to see that the resurrection means the redemption of space and time, for space and time are not abrogated or transcended. Rather are they healed and restored, just as our being is healed and restored through the resurrection.” (p. 90)



Torrance writes: (quote)

That space and time are in need of redemption, and that the Resurrection of Christ accomplishes that redemption, are not obvious concepts, so if this sounds a little bit confusing you're in good company.

## Two views of Space and Time

	Container	Relational
Space	Spherical container (Ptolemaic) or infinite geometrical 3-D grid (Newtonian)  	Places in interaction (Biblical, Patristic, Einstein) 
Time	Mathematical timeline 	Moments in interaction 

Torrance refers to two views of space and time. • The left column is the container view, and • the right column is the relational view. • In the container view, space is a receptacle for things or events, a container in which things move. In the middle ages the universe was a spherical container. With the shift to Newtonian cosmology, space became an infinite 3-dimensional geometrical grid. • In the container view, time is merely an infinite numerical timeline, on which events can be plotted. • On the other hand, in the relational view, places arise as an expression of how things are connected, a field of relations. • Time is an expression of moments in relation, as in music or dance. • These distinctions will become more clear as we proceed.

Improper relations between science and theology: space and time constraining divine freedom.

New Creation that has broken in on the old order is not contained by it, confined by it, but introduces a whole new level of order. “So far as theology is concerned, a dualism forces upon it a deistic disjunction between God and the universe, in which God is not conceived of as acting objectively within space and time, with the result that theological and natural science are kept entirely apart. So far as natural science is concerned, a dualism forces upon it a mechanistic conception of the universe as a closed gravitational system of bodies in motion which are externally connected through cause and effect, in which the idea of God has no place at all...” (p. 180). Dualism may be epistemological or cosmological or, more likely, both. Dualism gives rise to a deistic disjunction in which miracle or resurrection is an interference in the laws of nature.



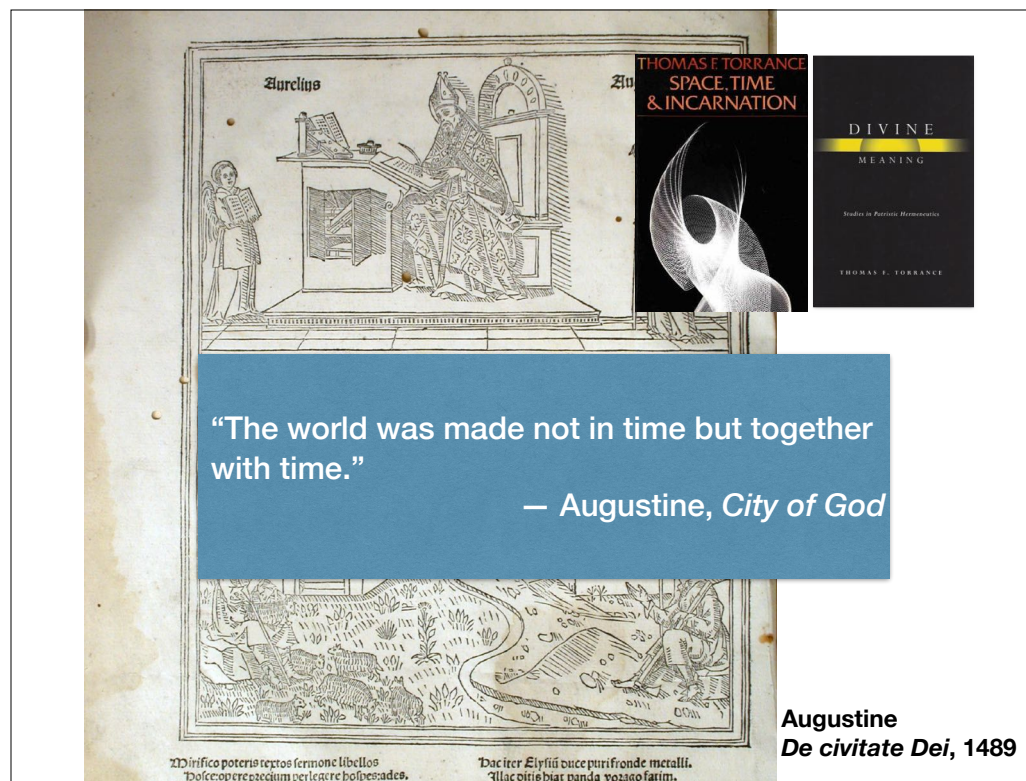
For now, we can summarize the Container view of space and time as

- the Monty Python view of God intruding upon the world,



and the relational view of space and time as a Great Dance.

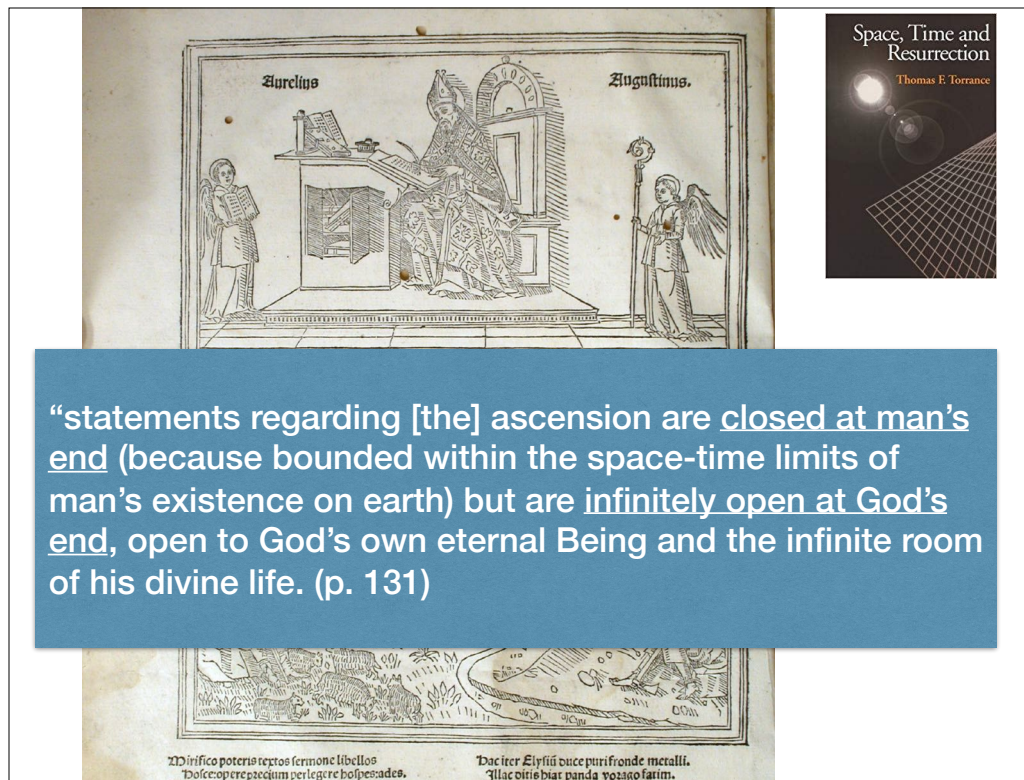




Augustine is our first example of a relational view of space and time.

- For Augustine, time itself is part of the creation: “the world was made not in time but together with time.” For Augustine, both space and time came into being. The creation did not occur within space, or within a timeline, as if space and time were "containers" for the act of creation. Rather, creation included the origination of the spatial and temporal relations themselves. In other words, for Augustine there was a first moment of time, before which time did not exist. Augustine's conception that time and space had a beginning tantalized cosmologists and physicists for two millennia.
- TFT explores patristic views of space and time, particularly the Greek fathers, with great insight in STI...
- and in *Divine Meaning*. Taking those studies as a baseline, he comments in STR on the open, relational view of space shared by many of the Church fathers, with respect to Christ's Ascension:





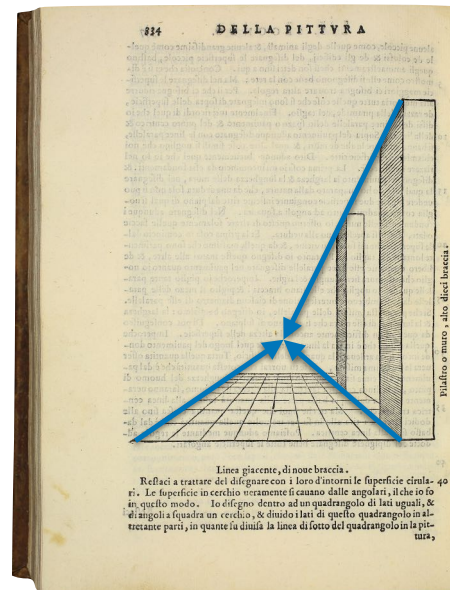
(Quote)

The relational view, that was shared by many of the Church fathers, not just Augustine, perceived space and time as open to higher realities, including God and other persons.



Consider a Byzantine icon of the Trinity.

### Linear Perspective



Leon Battista Alberti  
"On Painting" (Venice, 1568)

### Open Perspective



Byzantine icon  
The Trinity

The icon employs a different kind of perspective than naturalistic drawings such as the treatise "On Painting" by Alberti, on the left.

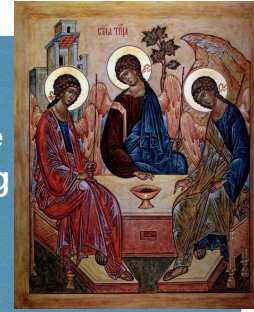
- Alberti's "linear perspective" is based on a vanishing point inside the picture.
- In contrast, the icon employs an "open perspective," where the vanishing point lies beyond the picture; the reverse of linear perspective. Torrance elaborates:

— — — — —

Leon Battista Alberti, "On Painting," in *Opuscoli Morali* (Venice, 1568)

Cf. *Theological Science*, on open concepts (p. 23); STI (p. 18, similar to STR). Baker/Speidell, p. 302.

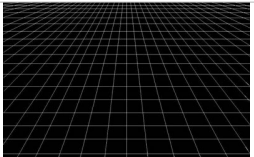
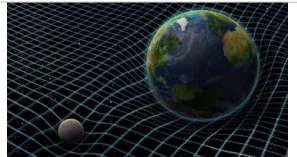
“Here we discern the theological significance of the intention in Byzantine art in a deliberate reversal of the natural perspective in depicting the dais on which the figure of Christ is made to stand, lest it should be enclosed within converging lines, which when produced meet at a finite point. When the lines depicting the dais are made to diverge, against the natural perspective, then when produced they never meet but go out into infinity. At one end of the ikon or mosaic the figure of Christ stands in bounded space and time, but at the other end he transcends all such limitations. He became man without ceasing to be God, and lived within our physical and historical existence without leaving the throne of the universe.” (*STR*, pp. 131-132)

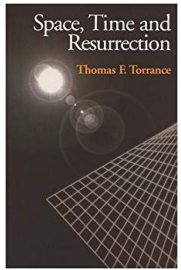


(Quote)

- Space is open for higher relations, for Torrance, as in the Byzantine icon.



	Containers	Expressions of Relationships
Space	Spherical container or infinite geometrical 3D grid 	Places in interaction 



“It should not need to be said that the use of spatial language here, as with the ascension, does not imply some alleged mythical ‘three-storied’ picture of the world; even in the Old Testament it is clearly recognized that ‘the heaven of heavens cannot contain God’ (1 Kings 8: 27; 2 Chron. 2: 6, 6: 18; and Acts 7: 48f.); As I have shown (*Space, Time and Incarnation*) the problem lies in the presuppositions of the biblical interpreter in respect of a receptacle view of space, not in biblical or early Christian theology.”  
 (Footnote 3 on p. 110)

So TFT concludes: (quote)

In the ascension, Jesus did not leave us as if emptying a container. Rather, places and times express modes of relation, for he remains in direct relation with us, just in a different mode. “He ascended in order to fill all things with his presence.” From our side we do not see him, but only by the Spirit with the eyes of faith. Yet there is One undivided parousia. In reality, space and time remain the expression of his ongoing relations with his creatures.

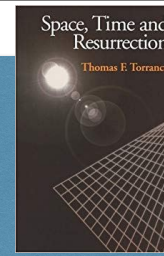
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He is not absent from space as from a container. Relational rather than container conception of the Ascension:

“The ascension of Christ is thus an ascension to fill all things with himself, so that in a real sense he comes again in the Ascension. He had to go away in one mode of presence that he might come again in this mode of presence, leaving us in the mode of man's presence to man, and returning to us in the mode of God's presence to man, and thus not leaving man bereft of himself.” (P. 132)

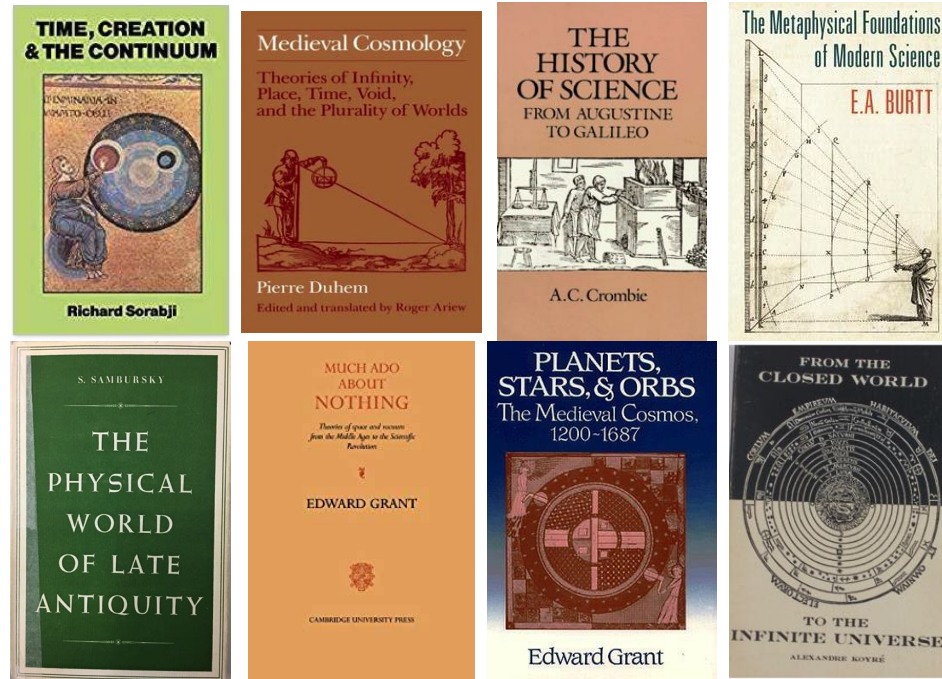
“through the Spirit that we can think of Christ as historically absent and as actually present... Through the Spirit Christ is nearer to us than we are to ourselves” (p. 135)

“We have great difficulty in speaking about this because of our abstract notions of space, but let us remember that as time is to be understood as time for something, the time in which we live our life, time for decision, time for repentance, time for action, and the ‘time’ of God is the time in which God lives his own life, the time which God has in himself for his own eternal will of love, so we must think of space as room for something, as place defined in terms of that which occupies it. This means that we must not abstract the notion of space from that which is located in space – for space concretely considered is place, but place not abstracted from purpose or content, and place not without ends or purposeful limits. Time and space must both be conceived in relational terms, and in accordance with the active principles or forces that move and make room for themselves in such a way that space and time arise in and with them and their movements – they are not receptacles apart from bodies or forces, but are functions of events in the universe and forms of their orderly sequence and structure.” (p. 130)



Torrance here summarizes the differences between container and relational views: (quote)  
Make sense? Want to learn more?...

## History of Science 101



Interested in a class project on this topic for History of Science 101? These would be helpful background sources:

- TFT cited the studies of space and time in ancient physics by Shmuel Sambursky and Richard Sorabji, both of whom also wrote on John Philoponos, the late ancient natural philosopher whom Torrance analyzed in some detail.
- TFT was undoubtedly aware of Pierre Duhem's Medieval Cosmology,
- and cited Alastair Crombie.
- Edward Grant has produced the most exhaustive studies of space and time in the medieval cosmos,
- while Burtt and Koyré are classic works that interpreted the Sci Rev as a fundamental shift in the metaphysics of space and time.

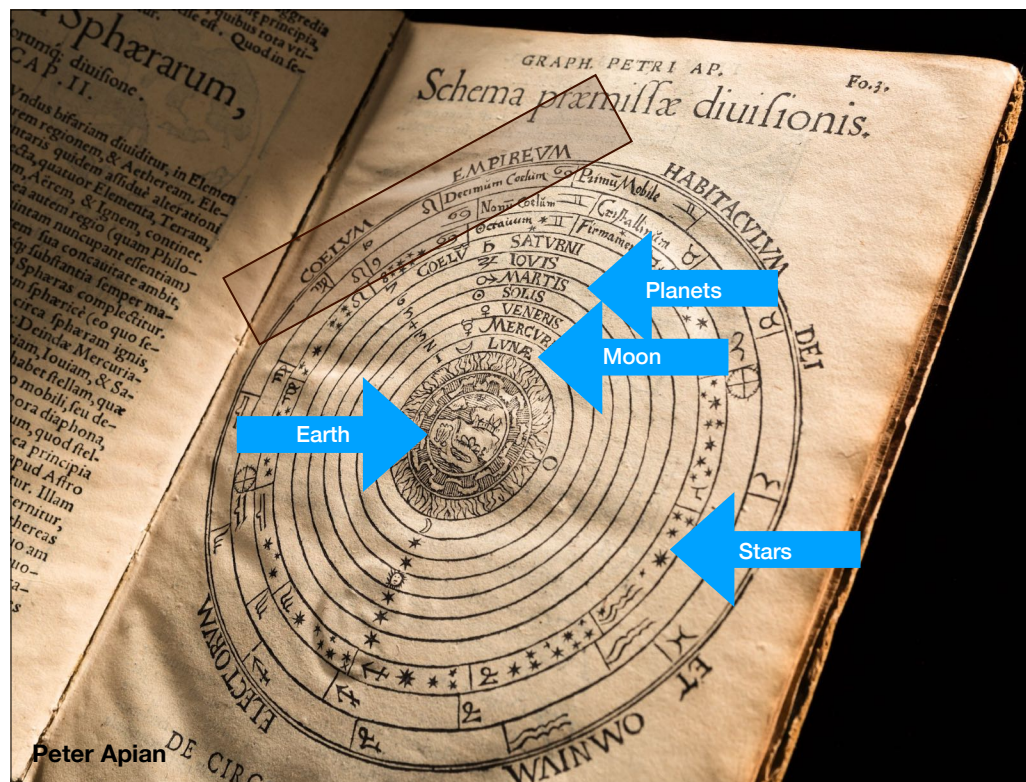
(While sources like these in the history of science were significant for Torrance, he also developed his views in light of discussions of space and time as found in scientists such as Einstein, of course, and theologians such as Daniel Lamont, Karl Barth and Oscar Cullman. When I insert comments about History of Science 101 in this talk, for the sake of time, I'll omit references to theological sources.)

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Sambursky, Physical World of the Greeks cited in DCO.

Burtt cited in DCO and TC.



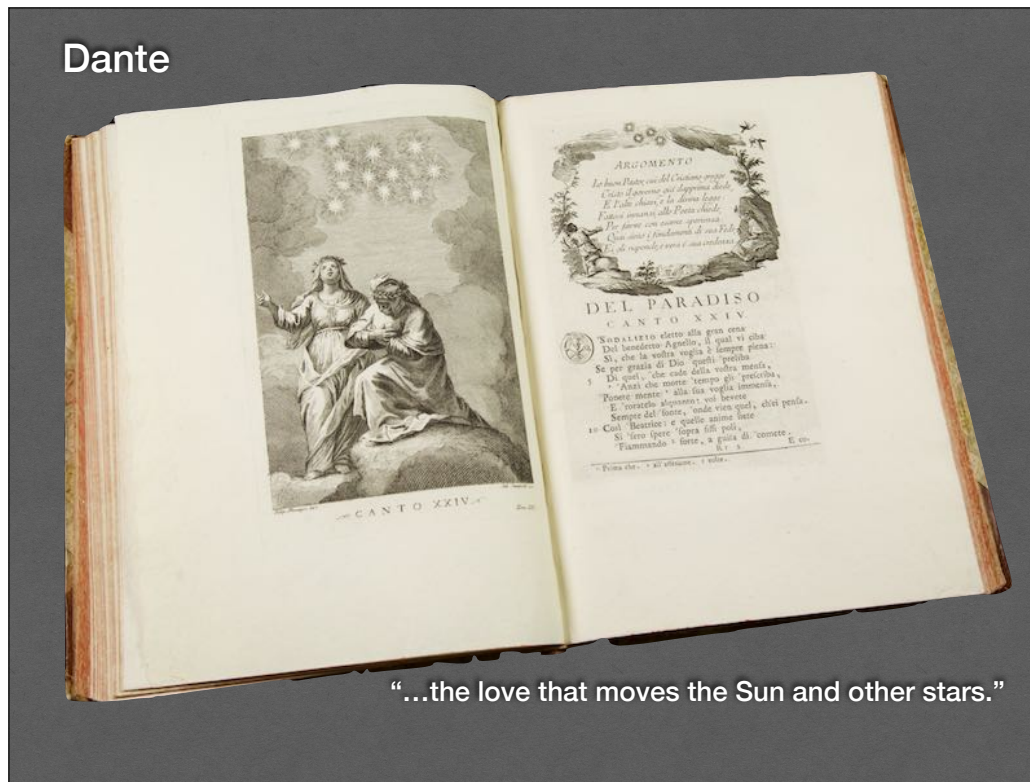


This cosmic section by Peter Apian illustrates the late medieval view of the universe.

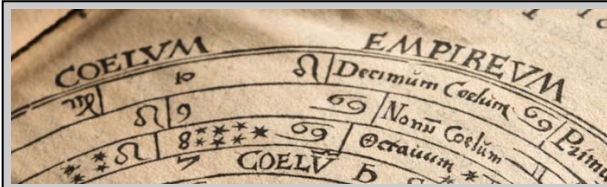
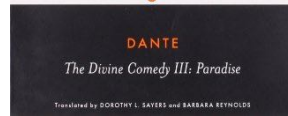
- A central spherical Earth...
- is surrounded by the Moon embedded within a solid sphere carrying it around the Earth once a month. The solid sphere explains why the same side of the Moon always faces the Earth.
- Other spheres turn in place, carrying the planets.
- Another solid sphere contains the fixed stars, and rotates around the Earth once each day.
- The Empyrean heaven, shown here beyond the spheres, is the habitation of God and of all of the elect.



## Dante

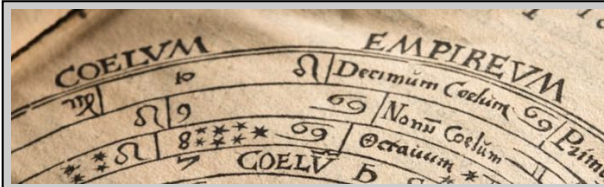
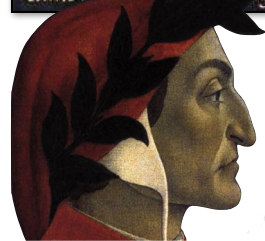
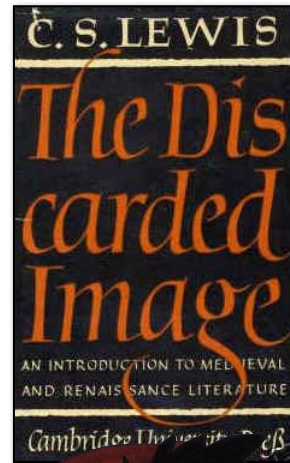


The empyrean heaven, identified by Peter Lombard, was the outermost sphere of the medieval cosmos. Descending from it the universe is filled with "the love that moves the Sun and other stars" (the poignant closing line of the *Divine Comedy*).



"We have won beyond the worlds, and move  
Within that heaven which is pure light alone:  
Pure intellectual light, fulfilled with love,  
Love of the true Good, filled with all delight,  
Transcending sweet delight, all sweets above."  
Dante, *Paradise*, Canto XXX, trans. Sayers

In approaching that place of love, Beatrice exclaims to Dante: (p. 319)

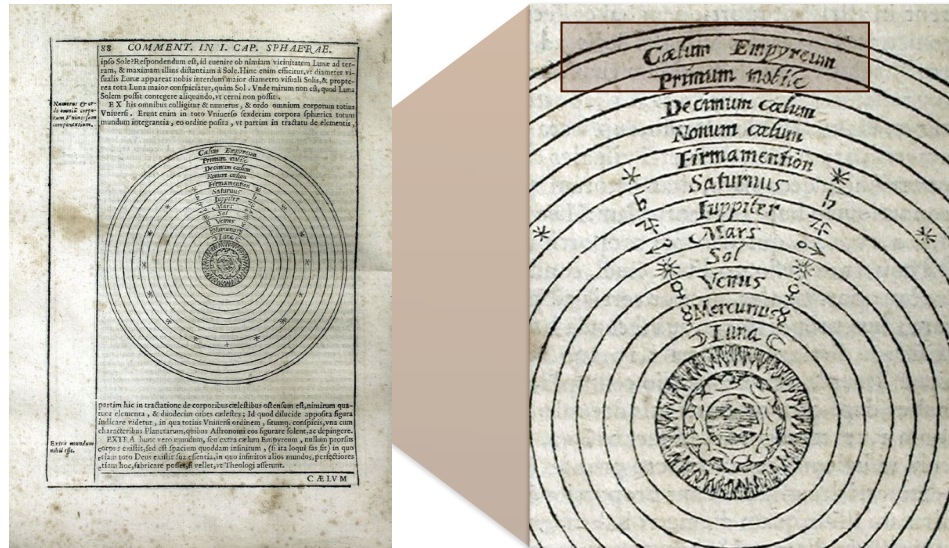


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Dante, *Paradise*, Canto XXX, trans. Sayers

"At this frontier the whole spatial way of thinking  
breaks down. There can be, in the ordinary  
spatial sense, no 'end' to a three-dimensional  
space. The end of space is the end of spatiality."  
C.S. Lewis, *The Discarded Image*

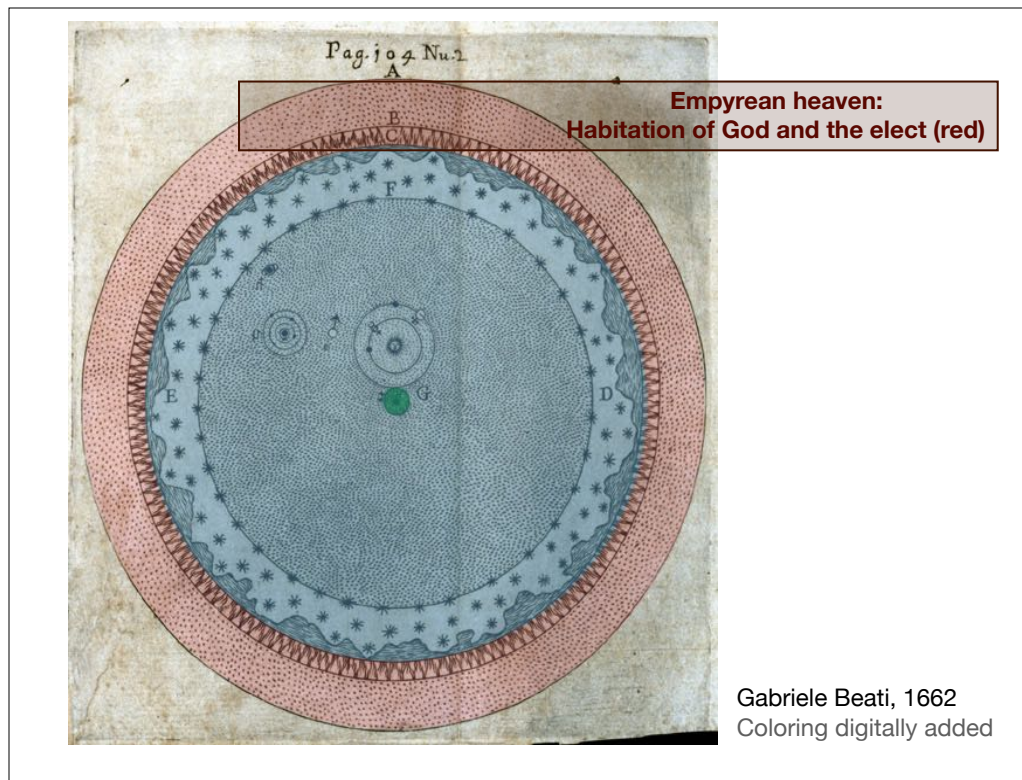
C. S. Lewis explains: (p. 97).

## Empyrean heaven: Container



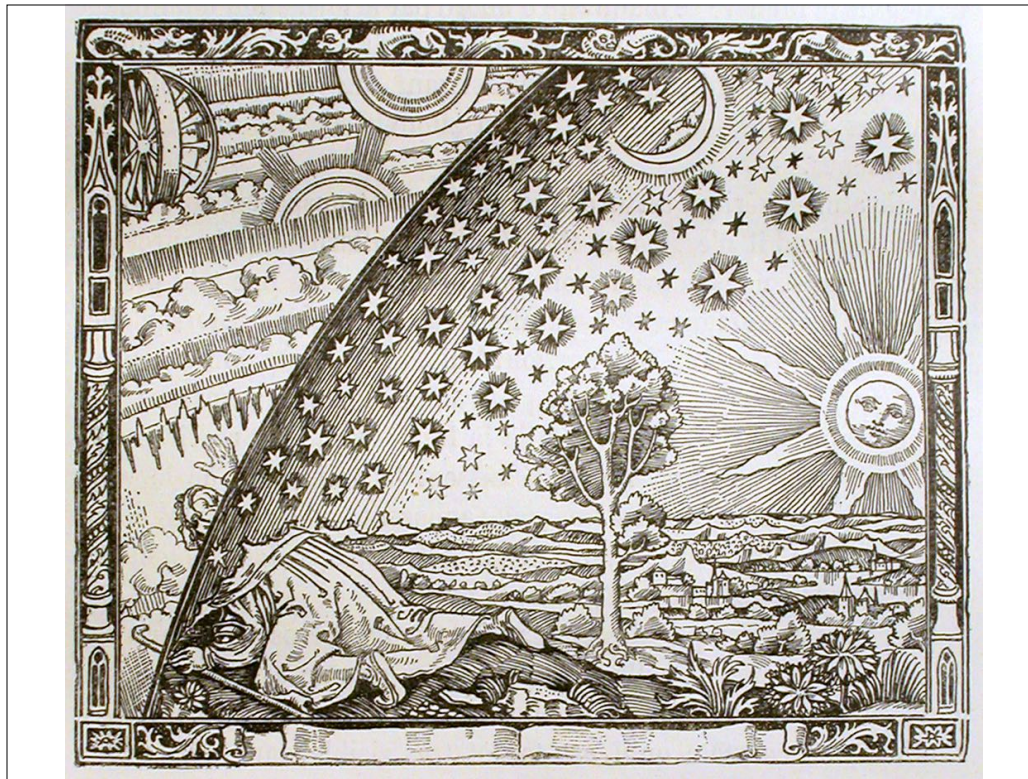
Christoph Clavius, *Sphaera*

No matter how much medievals tried to “baptize” Aristotle, the container notion of space seems built-in to the Aristotelian/Ptolemaic cosmos. This cosmic section, like countless others, depicts the Empyrean Heaven as a space enclosed by the limit of the outermost container. We’re far from the Byzantine icon now. And it affected theology: During the late Middle Ages, Reformation and Counter-Reformation, theological disputes arose about the Two Natures of Christ, the Ubiquity of Christ, and the Physics of the Eucharist. STR devotes several pages to Lutheran views of kenosis and the extra-Calvinisticum. We won’t take time to go into these issues here, but simply note Torrance’s point that these disputes arose in part because of the shared underlying container views of space and time.



Catholics, too. This section comes from a Jesuit cosmologist at the Collegio Romano. The entire red portion is the habitation of God and of the elect. They are away out there, watching us from a distance.





Do you recognize this image? It offers a useful way to contrast the container and relational views of space.



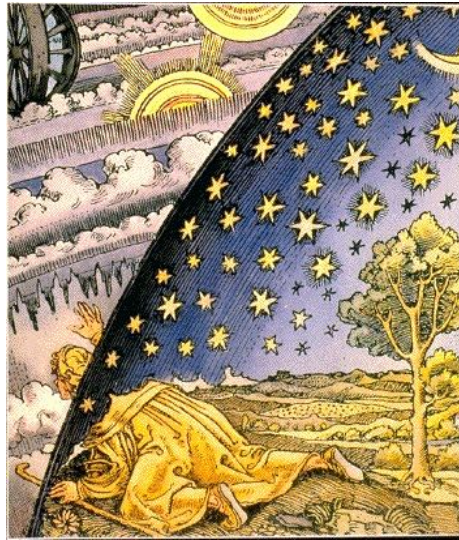
J. D. Bernal



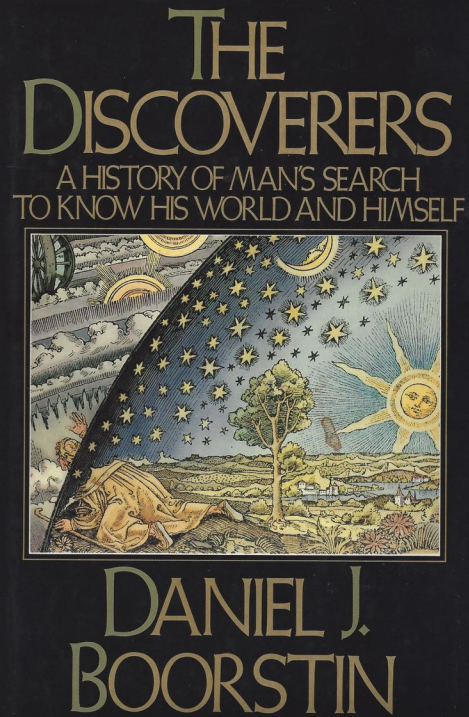
84. In medieval times there was a return to the concept of a flat Earth and a dogmatism about the crystalline celestial spheres, here epitomized in a woodcut showing the machinery responsible for their motion discovered by an inquirer who has broken through the outer sphere of the stars. Sixteenth century.

But first, have you seen it used to depict the charming naivete of medievals who believed the Earth was flat? So thought J.D. Bernal. His caption reads: “In medieval times there was a return to the concept of a flat Earth and a dogmatism about the crystalline celestial spheres, here epitomized in a woodcut showing the machinery responsible for their motion discovered by an inquirer who has broken through the outer sphere of the stars. Sixteenth century.” But Bernal was obviously misled, for medievals knew the Earth was round.



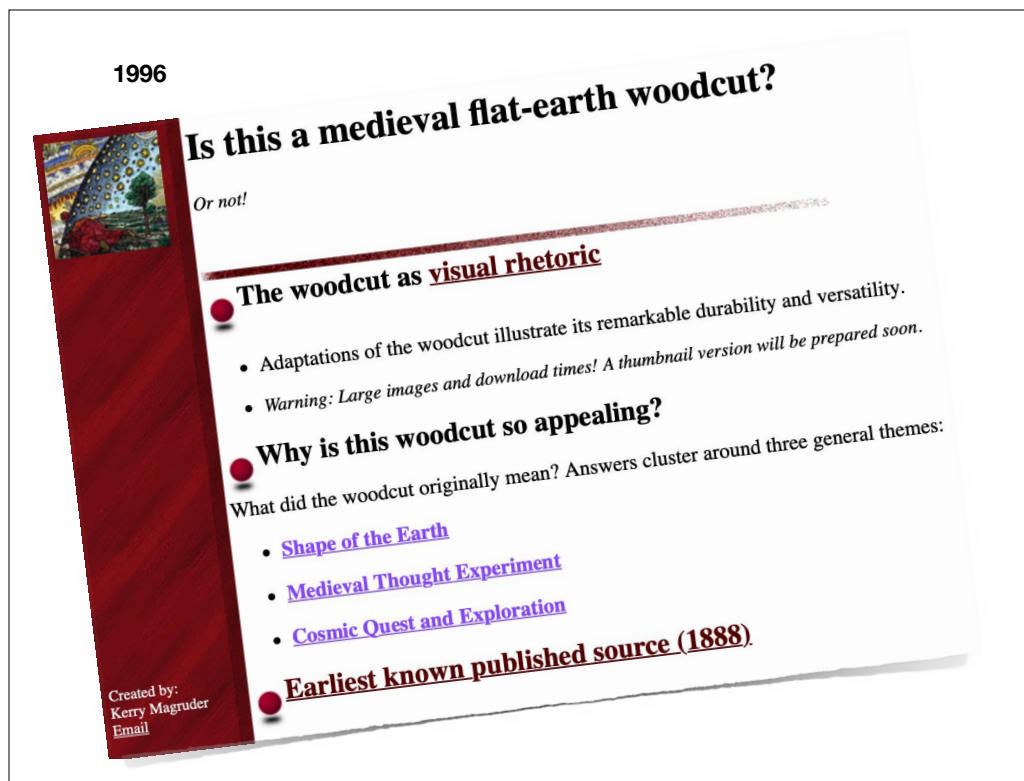


"Jacket art: early 16th century woodcut  
courtesy of Bettman Archive"



Daniel Boorstin chose it to adorn his bestseller, *The Discoverers*. Although the jacket attributes this version to an "early 16th century woodcut," it cites only the Bettmann Archive for its source. Where did they get it? The text of the book does not say. Boorstin himself does not discuss the picture. Yet, like Bernal, he does perpetuate the erroneous myth about medieval belief in a flat Earth.

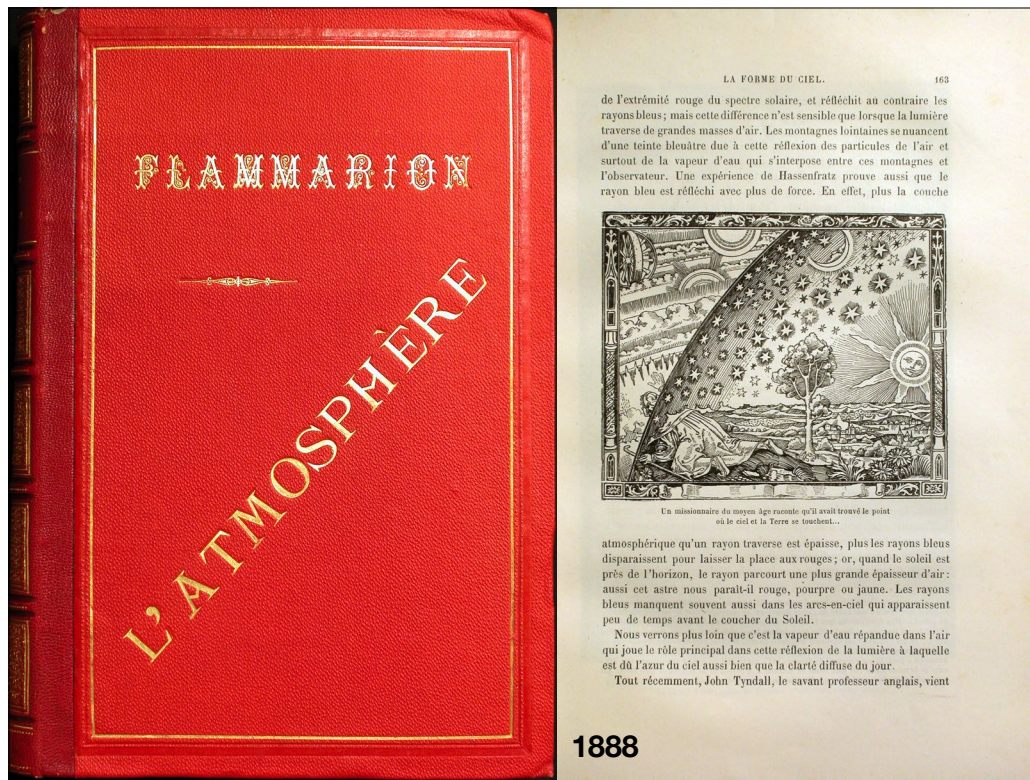




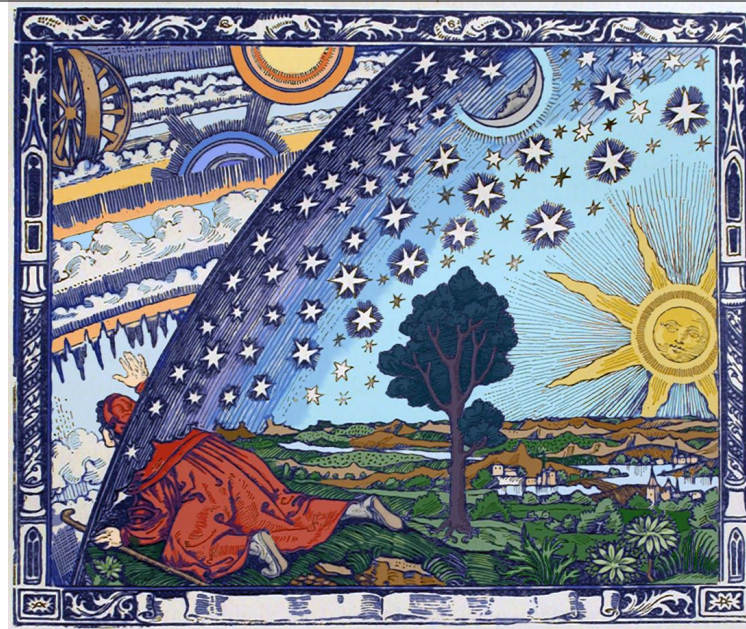
Back in 1996 I created a little website to explore the story of this illustration. Google “not a medieval woodcut” and you’ll find it. I’m happy to say it has been (plagiarized) shared freely across the internet.

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<http://kvmagruder.net/flatEarth/>



It was first published in 1888 in this book on meteorology, written by a popular 19th-century science writer, Camille Flammarion. This is its first appearance. It's not from the middle ages or the 16th century at all.



Colorized by Susanna Joy Magruder (CC-by)

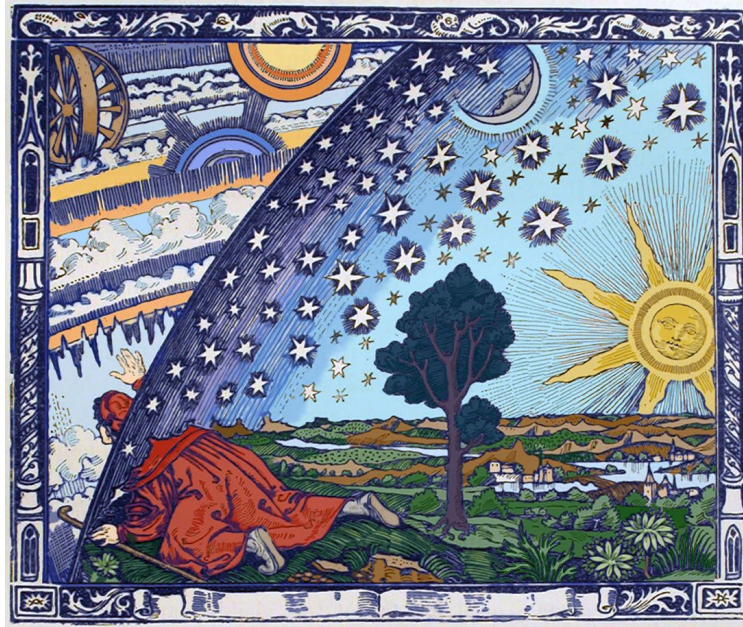
Despite the association of this image with the flat Earth myth, I believe its true enduring appeal is rather how it evokes the exhilaration of a common quest of discovery and exploration: the challenge of boldly going where no one has gone before.

- This version was colorized by my youngest daughter, Susanna, and you can use it free of charge.

Yet if this engraving depicts anything about medieval science, it would have to be not the shape of the earth, but:

- "If you thrust your hand beyond the outermost sphere, would your hand be in a place?" This was a common medieval thought experiment, derived from Aristotle via Stoic commentators, regarding concepts of place and finitude.





**“If you thrust your hand beyond the outermost sphere,  
would your hand be in a place?”**

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Answer	Reason	View	Example
It's impossible!	There is no space there to place your hand into	Container	Aristotle, Albert of Saxony (14th century)
Yes	Because the presence of your hand creates space	Relational	Jean Buridan (14th century)
Yes	Because space was already there	Container	Shift from spherical to infinite geometrical grid (Newton)

**“If you thrust your hand beyond the outermost sphere, would your hand be in a place?”**

Here are the two views of space in a nutshell:

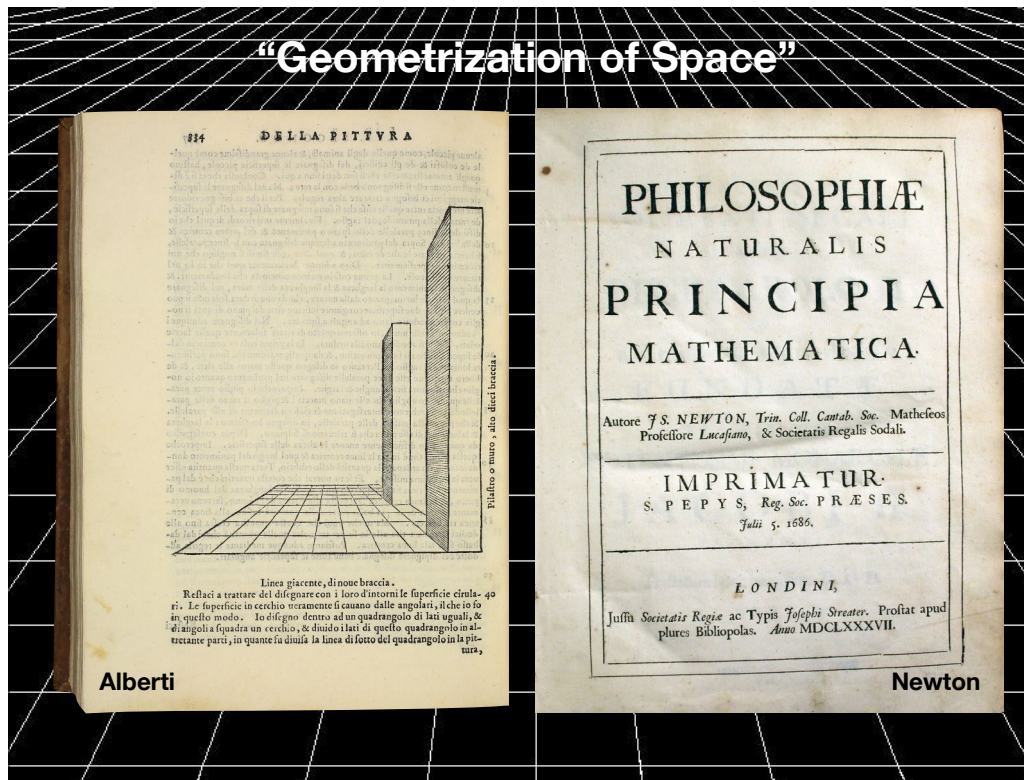
- If you say it's impossible, • because there's no space there to place your hand into, • then you have a container view of space. • (Aristotle, Albert of Saxony).
- If you answer yes, • because the presence of your hand creates the space, • then you have a relational concept • (like Jean Buridan, not far from Dante).
- If you answer yes, • because space was already there, • then you have a container view of space and • are well on your way from a spherical shaped container to an infinite-in-all-directions 3-D grid.

Questions like this one were explored with logical rigor which led to drastic revisions in the fundamental definitions and postulates of Aristotelian physics. They're just thought experiments, of course, but they played a significant role in the transformation of the concept of space into the quite different infinite-in-all-directions "space" of Euclidean geometry and Newtonian physics.

— — — — —

Another example of container thinking: Nicole Oresme on the actual upward trajectory of the Ascension.

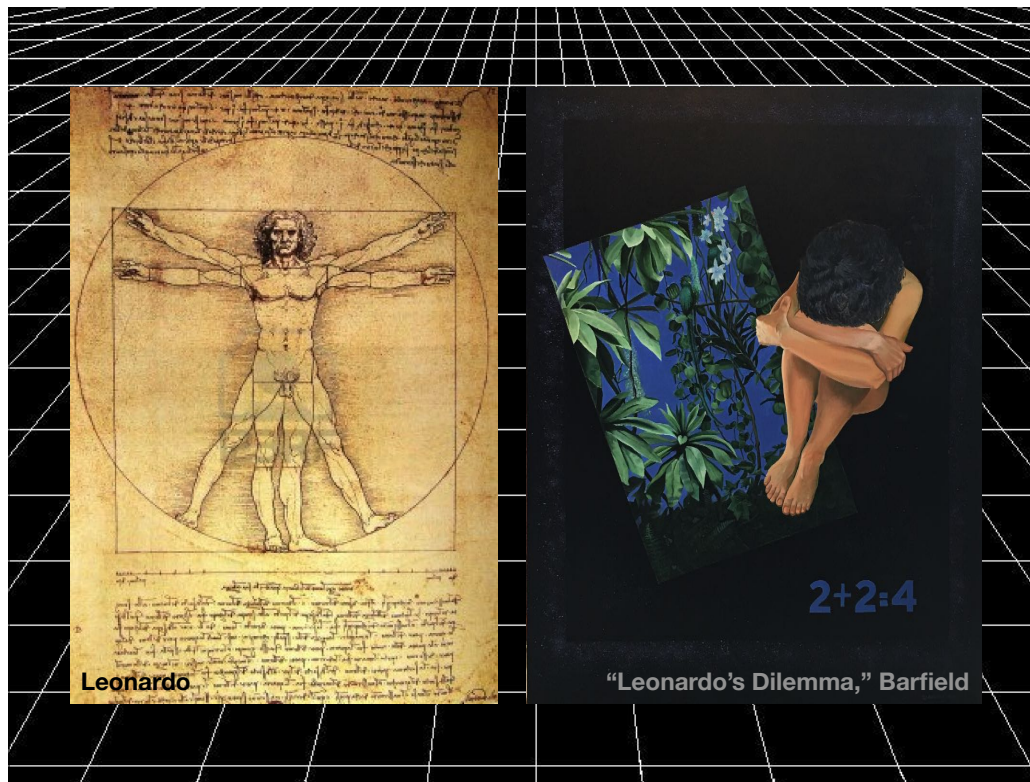
## “Geometrization of Space”



The “geometrization of space,” the transition from space as a spherical container to an infinite-in-all-directions geometrical 3-D grid, was a cultural shift, occurring in the arts (with the development of linear perspective) as well as in physics (with Newton’s absolute space and time). In physics, the arts, and in broader culture, it then became difficult to conceive of God’s acts and being inside the world.\* There came about a deistic disjunction between God and the universe, which traditional natural theology sought to fill.

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\*To address this question was Newton’s most fundamental aim in all his scientific work: “The consistency [in Newton's quest] lies in his overwhelming religious concern to establish the relationship between Creator and creation.” Dobbs, *Janus*, 12.



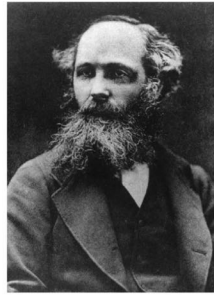
As with God, so eventually humanity, too, became caught in the grid. Giovanni Gentile said that Leonardo painted in an attempt to capture the soul. Despite the beauty of the Vitruvian Man, Leonardo did not believe he had succeeded, and died in despondency.\*

- In “Leonardo’s Dilemma,” contemporary artist Michael Barfield rejects a mathematized, container view of space as providing no room for the human being, nor for the garden. Torrance frequently addresses this split and its ramifications in his works.

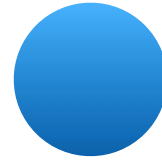
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\*As pointed out by Francis Schaeffer, *Escape From Reason*.





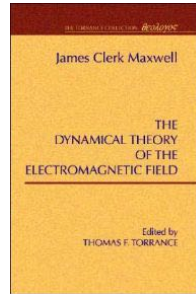
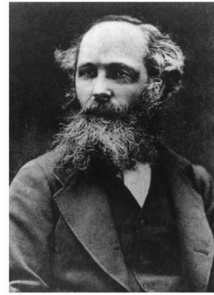
$$\begin{aligned}\nabla \cdot \underline{E} &= \frac{\rho}{\epsilon_0} \\ \nabla \cdot \underline{B} &= 0 \\ \nabla \times \underline{E} &= -\frac{\partial \underline{B}}{\partial t} \\ \nabla \times \underline{B} &= \mu_0 \left( \underline{J} + \epsilon_0 \frac{\partial \underline{E}}{\partial t} \right)\end{aligned}$$



At the end of the 19th century, with James Clerk Maxwell's field equations, this deistic, container view of space came crashing down. Maxwell's equations redefine nature in terms of relations.

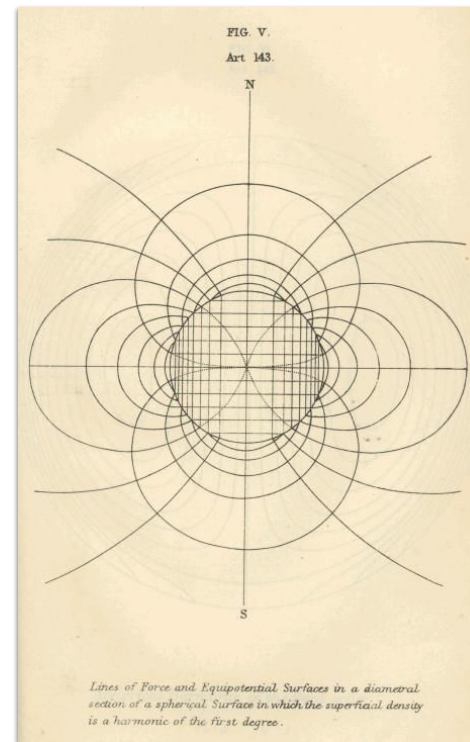
- No longer can we think of a single particle in isolation moving through a void...





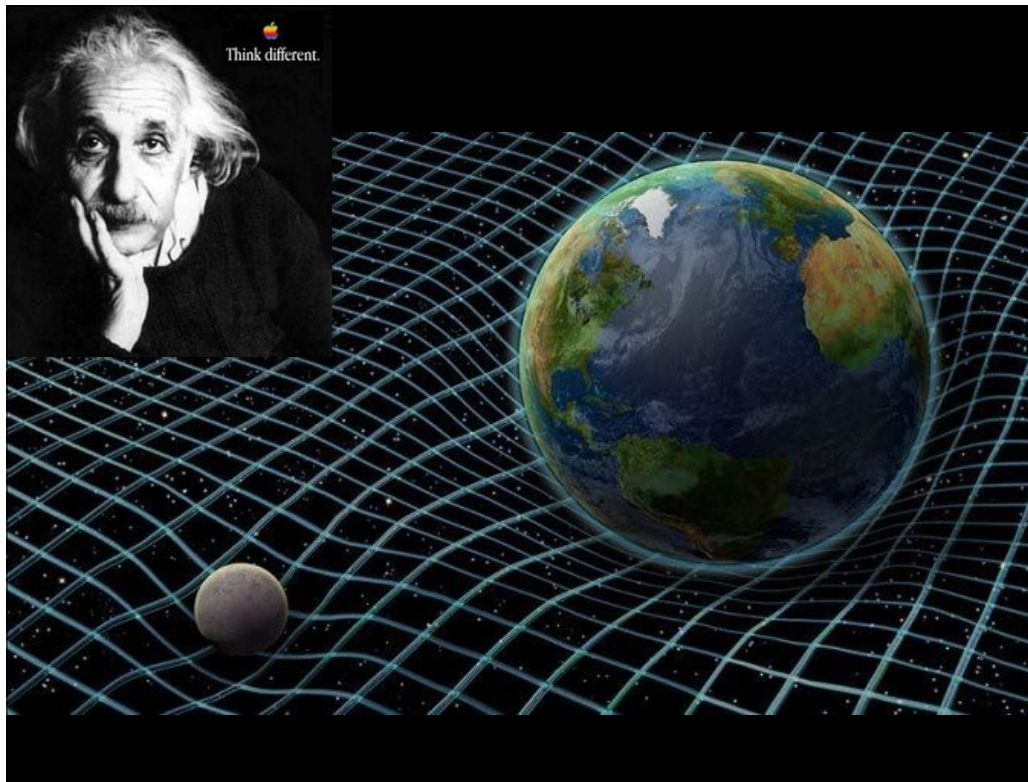
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**Onto-relational:**  
relations part of the nature/being

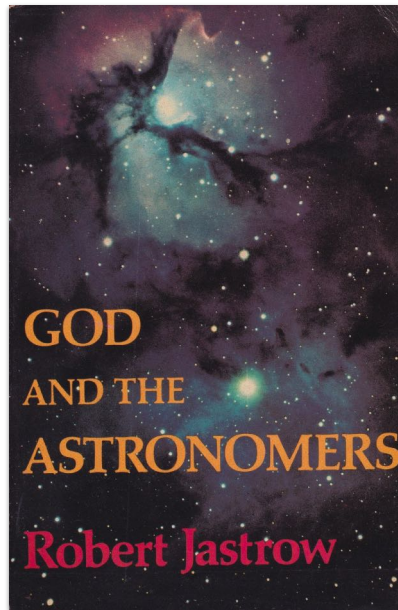


Rather, every particle expresses a field of being, in which its relations with others are part of its nature.

- We can label this paradigm shift as Onto-relational; now relations are part of the nature or being of any thing. This is true of humans, too: as in the poem of John Donne, “no man is an island.” Or, as Mr. Rogers would ask, “Who loved you into being?” Think about how your identity as a person is related to those who loved you into being. The same principle of onto-relations applies to every thing in the universe; no atom is an island.
- Torrance published an edition of Maxwell’s chief work in this area, *The Dynamic Theory of the Electromagnetic Field*.



When Einstein's general theory of relativity led him to suspect that the universe began in a "Big Bang," that is, in a singularity whereby even time and space came into existence along with matter and energy and physical laws, some of Einstein's friends feared that he had fallen into the hands of priests. From the start, Big Bang cosmology was perceived as confirming a basically Augustinian conception of creation, a relational rather than container view of time and space.



1978

“...at this moment it seems as though science will never be able to raise the curtain on the mystery of creation. For the scientist who has lived by his faith in the power of reason, the story ends like a bad dream. He has scaled the mountains of ignorance, he is about to conquer the highest peak; as he pulls himself over the final rock, he is greeted by a band of theologians who have been sitting there for centuries.”

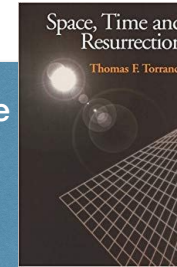
— Robert Jastrow

Cosmologist Robert Jastrow wrote:

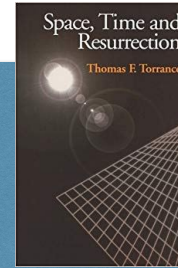
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Robert Jastrow, *God and the Astronomers* (1978), p. 116.

“Perhaps the first point to note is the basic change in the concept of reality. This has to do with the transition from the earlier concept of reality, which since the days of Galileo and Newton was identified with what is causally necessary and quantifiable, the world of ‘real, mathematical time and space’, as Newton called it, in contrast to ‘the apparent and relative time and space’ of our ordinary experience, to a new concept of reality in which that kind of dichotomy is transcended and in which structure and matter, or the theoretical and empirical components of knowledge, are inseparably one. The older view of reality was one in which its analysed particulars (atoms, particles, etc.) were conceived of as being externally and invariably connected in terms of causes...



STR includes a passage, about two pages in length, on how changes in the conception of space and time have now made the resurrection much more intelligible in relation to the natural sciences. Let's read that long passage aloud to conclude this section:



Such a view, however, began to shatter itself against the actual ‘fact’ of the electro-magnetic field which could not be explained in such a mechanistic way, and since the emergence of relativity theory has had to give way to a profounder and more differential view of reality in which energy and matter, intelligible structure and material content, exist in mutual interaction and interdetermination. This is a dynamic view of the world as a continuous integrated manifold of fields of force in which relations between bodies are just as ontologically real as the bodies themselves...

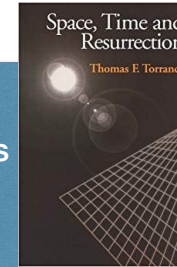
**“Onto-relations” = no thing can be defined in isolation from its relations**

#### Quote

- As we have noted, this reconception of space entails a shift to thinking in terms of onto-relations, which means that no thing can be defined, or understood, or truly known, in isolation from its relations with other things. “Relations between bodies are just as ontologically real as the bodies themselves...”



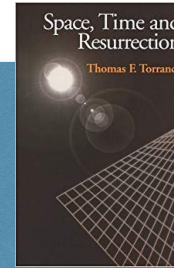
...for it is in their interrelations and transformations that things are found to be what and as and when they are. They are to be investigated and understood not by reference to a uniformity of causal patterns abstracted from the actual fields of force in which they exist, but in accordance with their immanent relatedness in the universe and in terms of their own inherent dynamic order. In such a universe in which form and being and movement are inseparably fused together, things and events are to be explained and interpreted in terms of their ontological reasons, that is by penetrating into what they are in themselves in their interior relations...



**“Onto-relations” = no thing can be defined in isolation from its relations**

Quote





in which they exhibit an intrinsic intelligibility independent of our perceiving and conceiving of them, and thereby discriminate themselves from our scientific constructs and formulations about them. The effect of all this is very far-reaching. It emancipates us from the narrow-minded and cramped way of thinking in which we impose our own abstract patterns upon the universe and rule out of court all possibilities which transgress the prescriptive conditions we have laid down for what is conceivable or real. At the same time it gives rise to a powerful ontology in which the fatal gap between empirical and theoretical concepts is transcended, and in which being is found to be essentially open, requiring open concepts and open structures of thought for its understanding. ” (pp. 184-185)

**“Onto-relations” = no thing can be defined in isolation from its relations**

Quote.

So Torrance urges us to shift from a container to a relational concept of time and space, to viewing time and space as open structures, expressions of onto-relations. Space and time are open and relational.

Did the Resurrection change the order of nature?

Questions?

Introduction

Space and Time

Divine Freedom and Contingent Order

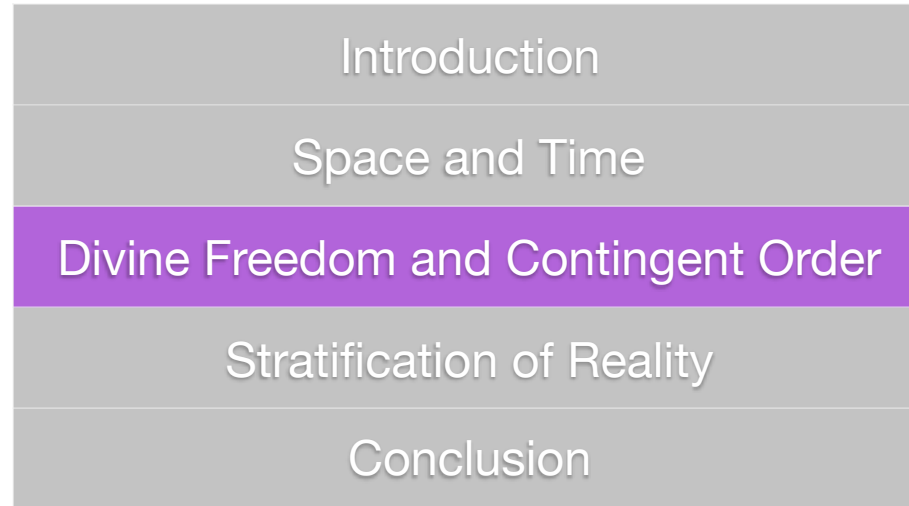
Stratification of Reality

Conclusion

So that's a not very spacious but timely look at space and time.

• Questions? • Next up is Divine freedom and Contingent order. (BREAK)

## Did the Resurrection change the order of nature?



START: What is “contingent order,” and why is it a corollary of divine freedom?

-----

“once an event has taken place, it becomes 'necessary' – in the sense that it cannot now be other than it is. At this point, however, we are liable to suffer from a delusion, for we tend to think that, because it is now a necessary fact, it had to happen.” P. 92. We tend to transpose temporal relations into logical or causal relations (as in notions of predestination where grace is converted into necessity). The Resurrection cannot be interpreted as subject to temporal constraints, for it is a redemption and recreation of time.

<b>Regularities:</b>	Necessity	Demonstrative knowledge (logical/causal)	Divine wisdom or Natural laws
<b>Rare occurrences, unique events, singularities:</b>	Chance	Unintelligible, irrational	Divine will (arbitrary, capricious)

Aristotle, *Physics* (Bk II), *Posterior Analytics* (Bk I)

For Aristotle and many later natural philosophers, regularities in the natural order occur by necessity. We can achieve *demonstrative* knowledge of their “reasons why” only if it is *impossible* for them to be otherwise. This necessary order of things reflects the perfection of divine wisdom, or the immutable laws of nature.

- In contrast, rare occurrences, unique events, or singularities arise by chance. By their very nature, they are unintelligible; no rational reason can explain them, or why, if they occur at all, they do not occur regularly. Rare events reflect an arbitrary and capricious divine will.
- For Aristotle and many later philosophers, then, the natural order reflects a combination of chance and necessity, where only those things that occur by necessity are natural and may be known.

Tradition:		Divine wisdom
Regularities:		Necessity
Rare or unique events, singularities:		Chance
Methodologies:		Causal reasoning, logical demonstration

The early Christian fathers, however, rejected explanations of the natural order in terms of chance and necessity, even when couched in terms of necessary divine wisdom.

- They created an alternative conception of the natural order as an expression of divine freedom and love.
- The regularities of the natural order, which might have been otherwise, express God's covenant faithfulness.
- The Incarnation and creation from nothing, are paradigm examples of unique events. Yet even though they are singularities, they are not unintelligible, arbitrary or capricious actions of divine will, but intelligible in retrospect on the same grounds as the regularities, namely God's covenant faithfulness.
- To know God's covenant faithfulness, we must open ourselves to the results of empirical and historical investigation, for we can't put God in the box of *a priori* causal reasoning or necessary logical demonstration. There was nothing predictable about Bethlehem or Calvary, but they are intelligible in retrospect in terms of covenant faithfulness and divine freedom to love.
- "Contingent order," then, refers to intelligible order that might have been otherwise. For Christians, BOTH the regularities of the natural order AND the rare occurrences are contingent. It's a package deal where contingent order is the opposite of both chance and necessity. Unlike necessity, contingent order might have been otherwise. Unlike chance, contingent order is intelligible, in retrospect.



Tradition:	Divine freedom / love	Divine wisdom
Regularities:	Covenant faithfulness	Necessity
Rare or unique events, singularities:	Incarnation Creatio ex nihilo	Chance
Methodologies:	Empirical/historical component essential “intelligible in retrospect”	Causal reasoning, logical demonstration

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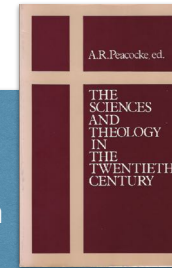
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Tradition:	Divine freedom / love	Divine wisdom
Regularities:	<b>Contingent order:</b> Might have been otherwise; Intelligible in retrospect	Necessity
Rare or unique events, singularities:		Chance
Methodologies:	Empirical component essential	Causal reasoning, logical demonstration

10

“The universe is contingent for it does not exist of necessity: it might not have been at all and might very well have been different from what it is. Yet in coming to be, the universe is characterised by an open-structured order which partakes of contingency.” (p. 85)



This table lists these same points more compactly. Torrance contrasts contingent order with chance and necessity throughout his writings, such as a short essay where he says:



The Burgess Shale fossils have “confronted our traditional view about progress and predictability in the history of life with the historian’s challenge of contingency — the ‘pageant’ of evolution as a staggeringly improbable series of events, sensible enough in retrospect and subject to rigorous explanation, but utterly unpredictable and quite unrepeatable. Wind back the tape of life to the early days of the Burgess Shale; let it play again from an identical starting point, and the chance becomes vanishingly small that anything like human intelligence would grace the replay.”  
— Stephen Jay Gould, *Wonderful Life* (1989), p. 14.

Let’s apply our definition of contingent order to a quote by Stephen Jay Gould, from *Wonderful Life*. (READ)  
Quite mistakenly, contingent order — the leading characteristic of Darwin’s view of the history of nature — is sometimes taken by advocates of evolution as an argument against Christian theism.

**Contingent events...**

1. might have turned out otherwise,
2. are not deducible or fully specifiable in advance,
3. may be rare or unusual,
4. but nevertheless become intelligible when considered in retrospect by methods such as historical reconstruction.

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Gould’s quotation describes events as contingent when they: (read).

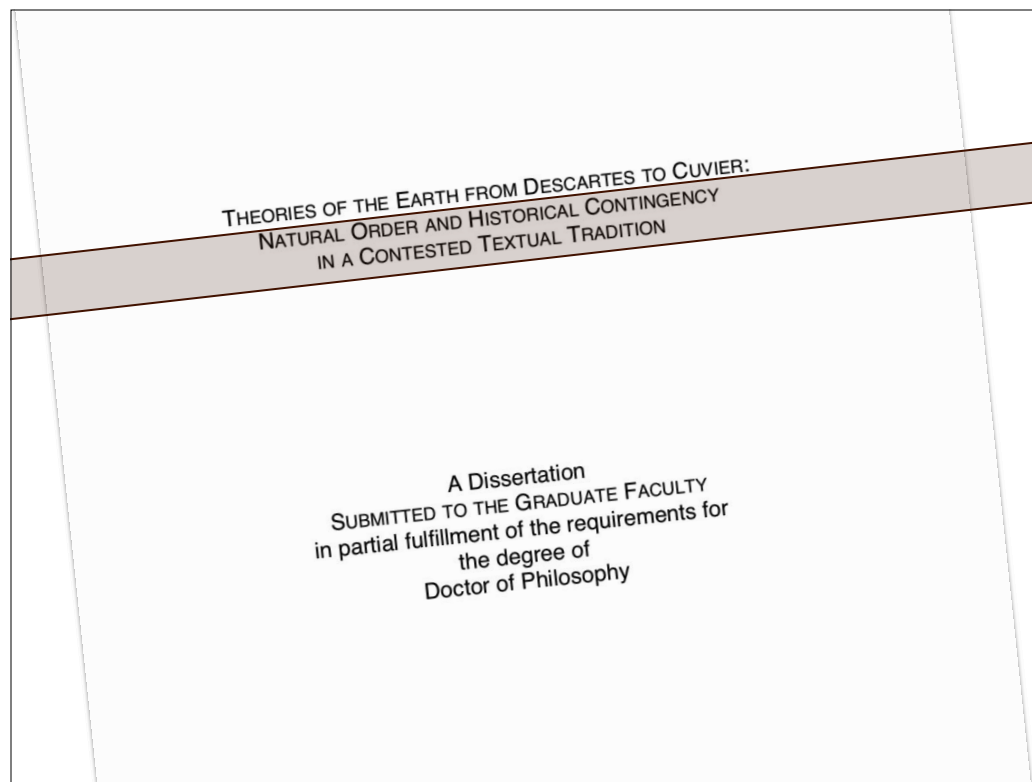


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These characteristics largely match the criteria we just specified. Without realizing it, Gould was describing an approach to contingent order that developed historically in a theological and intellectual tradition emphasizing divine freedom.



Long ago I wrote a dissertation on “Natural Order and Historical Contingency in a Contested Textual Tradition,” that of 17th and 18th century Theories of the Earth.

From Aristotle's physics to the chaos theory of the late twentieth century, diverse perspectives of order and disorder in nature have been bound up at the conceptual heart of natural philosophy. Phrases common to historians of science such as "the temporalizing of the Chain of Being"<sup>3</sup> or "from natural history to the history of nature"<sup>4</sup> reflect the intimate relations between perspectives of natural order and visions of the past. Theories of the Earth offer a

<sup>1</sup> Stephen Jay Gould, *Wonderful Life: The Burgess Shale and the Nature of History* (New York: W. W. Norton and Company, 1989), 14. *Wonderful Life* was second only to Charles Lyell's *Principles of Geology* in the survey of members of the Geological Society of America by D. M. Triplehorn and J. H. Triplehorn, "Geologists Select the Great Books of Geology," *Journal of Geological Education*, 1993, 41: 260-261. Gould's quotation precisely describes "contingent" or "contingency" as used in this study to refer to events which, according to a given historical actor, might have turned out otherwise, are not deducible or fully specifiable in advance, may be rare or unusual, but nevertheless become *intelligible* when considered in retrospect by methods such as historical reconstruction. This definition of "contingent" is analytical rather than an actor's category, and displaces the chance vs. necessity polarity altogether. The word "chance," although often used by historical actors and in *Wonderful Life* synonymously with "contingent," here will be reserved for phenomena which were regarded by a given actor as *unintelligible* due to their apparently random or accidental character. This nescient verdict is consistent with Aristotle's usage of *tyche* in Book II of the *Physics*, although Aristotle defined chance as the cause of what does not regularly occur and therefore regarded rare or unusual events as *unintelligible* in every case. On the other hand, to affirm the possible intelligibility of rare events and so distinguish between chance and contingency is not idiosyncratic; rather, it is consistent with a long-standing theological usage of *contingere*, about which see Thomas F. Torrance, *Divine and Contingent Order* (Oxford: Oxford University Press, 1981), reprised in Thomas F. Torrance, "Divine and Contingent Order," in *The Sciences and Theology in the Twentieth Century*, ed. A. R. Peacocke (Notre Dame: University of Notre Dame Press, 1981), 81-97. Torrance explores, in patristic theology, how the Incarnation and *creatio ex nihilo* served as two prime exemplars of rare or even unique but nevertheless intelligible (and therefore contingent) events.

My first footnote deliberately honored TFT. It's too tiny to read here, but it says:




— — This definition of "contingent" ... displaces the chance vs. necessity polarity altogether. The word "chance," although often used by historical actors and in *Wonderful Life* synonymously with "contingent," here will be reserved for phenomena which were regarded by a given actor as *unintelligible* due to their apparently random or accidental character... Torrance explores, in patristic theology, how the Incarnation and *creatio ex nihilo* served as two prime exemplars of rare or even unique but nevertheless intelligible (and therefore contingent) events. — —

In other words, when viewed in light of divine freedom, *nature* becomes more like *history*, its order contingent rather than necessary.

— — — — —

Full quote: — — This definition of "contingent" ... displaces the chance vs. necessity polarity altogether. The word "chance," although often used by historical actors and in *Wonderful Life* synonymously with "contingent," here will be reserved for phenomena which were regarded by a given actor as *unintelligible* due to their apparently random or accidental character. This nescient verdict is consistent with Aristotle's usage of *tyche* in Book II of the *Physics*, although Aristotle defined chance as the cause of what does not regularly occur and therefore regarded rare or unusual events as *unintelligible* in every case. On the other hand, to affirm the possible intelligibility of rare events and so distinguish between chance and contingency is not idiosyncratic; rather, it is consistent with a long-standing theological usage of *contingere*. Torrance explores, in patristic theology, how the

## Divine Freedom and Contingent Order

	Science stream
	History of Science stream
	Theology stream

Let's get a little historical bearing on this tradition of divine freedom and contingent order by interweaving three streams: in science, history of science, and theology.

## Divine Freedom



Science stream

First, the science stream.



Tradition:	Divine freedom / love	Divine wisdom
Regularities:	<b>Contingent order:</b> Might have been otherwise; Intelligible in retrospect	Necessity
Rare or unique events, singularities:		Chance
Methodologies:	Empirical component essential	Causal reasoning, logical demonstration
	Basil Augustine Peter Damian Duns Scotus John Calvin Francis Bacon Pierre Gassendi Blaise Pascal Robert Boyle Isaac Newton Samuel Clarke James Clerk Maxwell	Parmenides Plato Aristotle Ibn Rushd (Averroës) Peter Abelard Rene Descartes G. W. Leibniz Voltaire Stephen Hawking

These two conceptions of the natural order, as arising either from divine freedom and love, or from divine wisdom, illumine the development of science from Basil and Augustine to Robert Boyle and Newton. Many other names could be added to the lists. The two camps are not always cleanly divided; there has always been a continuum, or a field of contested relations, in between the two. The dialectic between divine freedom and necessity is one of the leading themes in my survey courses in the history of science.

## Divine Freedom and Contingent Order



Science stream

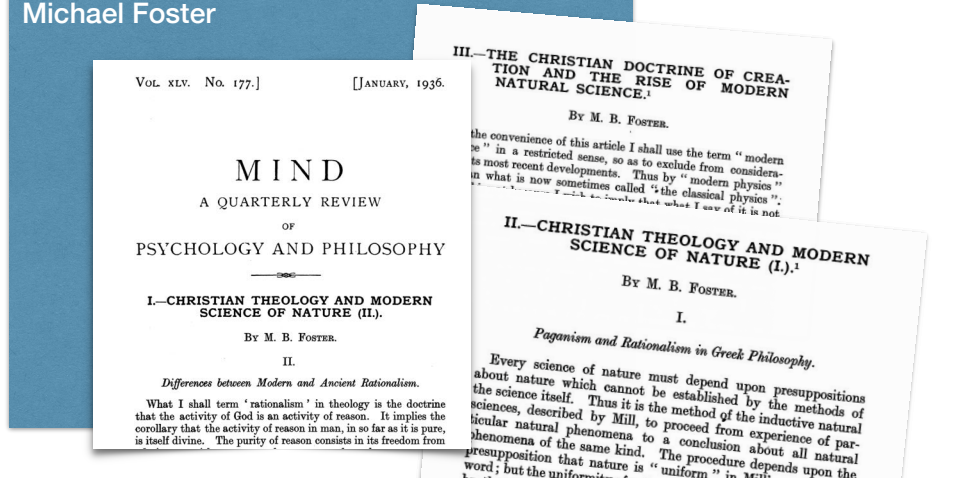


History of Science stream

So who are some of the historians of science known for their work in this area?

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Regularities:	<b>Contingent order:</b> Might have been otherwise; Intelligible in retrospect	Necessity
Rare or unique events, singularities:		Chance
Methodologies:	Empirical component essential	Causal reasoning, logical demonstration

Michael Foster



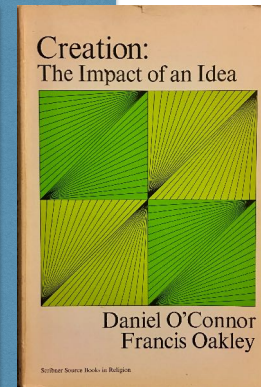
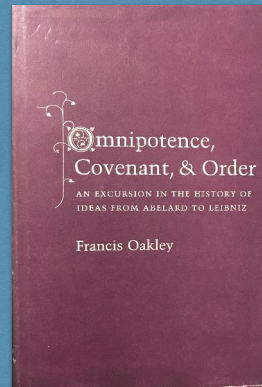
The historiography begins, for the sake of the 20th century, with three articles by Michael Foster, a philosopher (not a historian) at Christ Church, Oxford. Against Hegel's conception of the divine *reason* superintending the flow of history, in these articles Foster asserted that notions of divine *freedom* lay at the heart of the rise of modern science and its empirical methodologies. Not everything Foster said was taken up by historians, of course, for that would be an oversimplification. Nevertheless, his provocative articles established the modern debate.

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The term "voluntarist" is about as difficult to define as "Puritan" or "Augustinian."

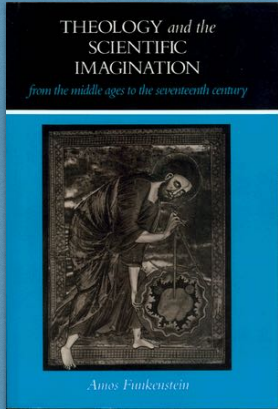
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Michael Foster  
Francis Oakley



Francis Oakley took up the Foster thesis, not as a philosopher but as a historian of ideas. *Omnipotence, Covenant and Order: An Excursion in the history of ideas from Abelard to Leibniz* is a classic work of intellectual history.

- And he produced an anthology: *Creation, The Impact of an Idea*.

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<div> <div> Michael Foster Francis Oakley Amos Funkenstein </div> <div>  </div> </div>		

Amos Funkenstein provided a magisterial examination of the issues in *Theology and the Imagination from the Middle Ages to the Seventeenth Century*.

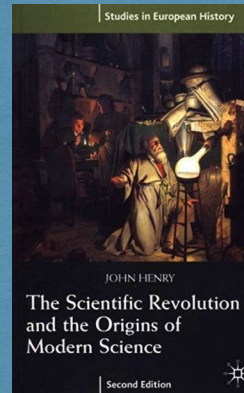


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<div> <div> Michael Foster  Francis Oakley  Amos Funkenstein  Margaret Osler </div> <div> <div> DIVINE WILL  AND THE  MECHANICAL  PHILOSOPHY </div> <div> <i>Gassendi and Descartes  on Contingency and  Necessity in the Created  World</i> </div> <div> MARGARET J. OSLER </div> </div> </div>		

One illuminating study is Margaret Osler, *Divine Will and the Mechanical Philosophy: Gassendi and Descartes on Contingency and Necessity in the Created World*. In my view, Osler's study serves as an excellent first book to read on the subject.

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Michael Foster  
Francis Oakley  
Amos Funkenstein  
Margaret Osler  
John Henry

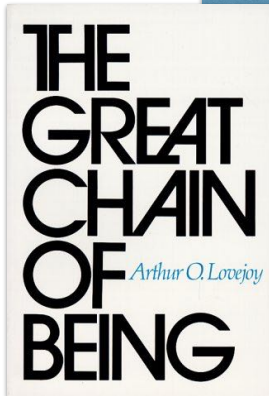


Prof. John Henry, in the Science Studies Unit of the University of Edinburgh, is one of the leading historians actively working in this area. This is, in my opinion, the best available introduction to the Scientific Revolution. Read it along with Osler and you'll have an excellent grasp of the historiography.

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<https://edinburgh.academia.edu/JohnHenry>

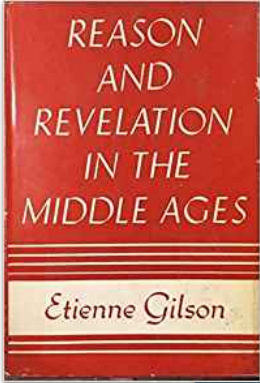
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Arthur Lovejoy

Back in 1936, almost contemporary with Foster, Arthur Lovejoy penned the classic account of the intellectualist tradition, emphasizing divine wisdom and reason. *The Great Chain of Being* is the work that prompted Francis Oakley's rebuttal.

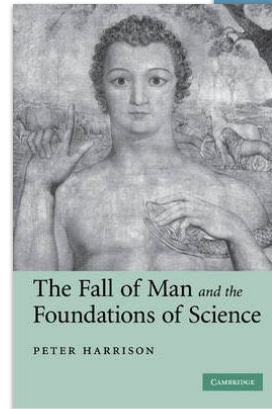
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Arthur Lovejoy  
 Etienne Gilson

Etienne Gilson produced many works in the service of 20th-century Thomism. *Reason and Revelation in the Middle Ages* is a classic articulation of the intellectualist position. Foster stated that his work was initiated in protest against Gilson, not merely Hegel.

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Arthur Lovejoy  
Etienne Gilson  
Peter Harrison

More recently, the historian of science Peter Harrison has criticized the historiography and its associated terms (e.g., voluntarists and intellectualists), as excessively ambiguous for the early modern period. There certainly are significant disagreements among historians about what constitutes either tradition, and some historical actors have been classified as defenders of divine freedom in one respect and divine wisdom in another. In view of these complexities, Harrison prefers to turn his attention to theological commitments regarding the Fall and the need to mend the effects of the Fall in working toward the Great Restoration. But in my opinion, it's not an either-or choice, as Harrison seems to assume. And in any case, complexity is unavoidable for any contested historical tradition.



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Michael Foster Francis Oakley Amos Funkenstein Margaret Osler John Henry		Arthur Lovejoy Etienne Gilson Peter Harrison

*Hist. Sci.*, xlvii (2009)

**VOLUNTARIST THEOLOGY AT THE ORIGINS OF MODERN SCIENCE: A RESPONSE TO PETER HARRISON**

**John Henry**  
*University of Edinburgh*




There is a historiographical tradition which links two different theological approaches to God's creation of the world (and his subsequent relationship to it) with correspondingly opposed attitudes to the most reliable scientific epistemology. These two approaches are usually referred to as voluntarist and intellectualist theology. The

John Henry responded to Harrison's arguments at a workshop in May 2008 at the University of Aberdeen. I find Henry's essay persuasive, although he focuses on the divine will (the tradition of voluntarism) more than on divine freedom. This article is another excellent place to get started exploring the current literature in the history of science.

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Many more historians than these have written on voluntarism and divine freedom, of course, but these are essential reference points and sufficient to get started exploring the historiography.

## Divine Freedom and Contingent Order

	Science stream
	History of Science stream
	Theology stream

So let's turn to the theology stream.

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Duns Scotus

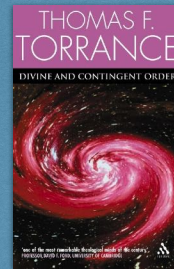
Pascal Centre for Advanced Studies  
in Faith and Science  
Redeemer College, Ontario  
5-day research conference, 1992

Although already listed among the scientists, Duns Scotus deserves another mention here among the theologians. In 1992, the Pascal Centre for Advanced Studies in Faith and Science at Redeemer College held a 5-day research conference. Papers were distributed in advance to stimulate discussion and debate. As a graduate student at the time, without funding, I drove the 2500 miles round-trip from Oklahoma to Ontario in order to attend. I'd never heard of TFT, but he gave two keynote presentations. I had just started a dissertation project on the role of chance in Ockham's physics, and went down to ask him about it. He rolled his eyes back in his head, quoted Duns Scotus to me, in Latin, and then, suddenly staring directly into my eyes, gave me a penetrating explanation of contingent order as an alternative to both chance and necessity. Our brief exchange was over in just a few minutes, but I walked away knowing I would have to rethink everything I had learned from Aristotle and Ockham. I promptly obtained a copy of his book,

- *Divine and Contingent Order*. I believe the Duns Scotus quotation he recited to me appears in translation on the very first page of that book: (read quote). (Preface, p. vi)

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Duns Scotus



“The creation of things proceeds from God not out of any necessity whether of being or of knowledge or of will but out of pure freedom which is not moved, much less necessitated, by anything outside of itself...”

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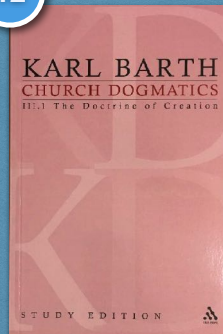
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Duns Scotus  
Karl Barth

12

**II/1 Divine  
attributes:**  
“God is the  
One who loves  
in freedom.”



### III: *The Doctrine of Creation*

“In the same freedom and love in which God is not alone in Himself but is the eternal begetter of the Son... He also turns as Creator *ad extra* in order that absolutely and outwardly He may not be alone but the One who loves in freedom.” III/1, 50

In *Church Dogmatics* II/1, when presenting his understanding of the Divine attributes, Karl Barth developed the thesis that “God is the One who loves in freedom.”

- Later, in Part III. “The Doctrine of Creation,” Barth returned to the same thesis:
- (quote).
- The natural order is fundamentally an expression of divine freedom to love. An expression of divine love, not just the divine will or mind.
- Some historians of science and theology unfortunately focus solely on the naked will of God, potentially arbitrary or capricious. That is to move us over to the category of inscrutable chance instead.
- An emphasis on divine freedom and love, the tradition from Duns Scotus to Karl Barth to Torrance himself, stands against both chance AND necessity.



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Duns Scotus  
Karl Barth, CD III.1

1952  
Professor, Edinburgh  
New College

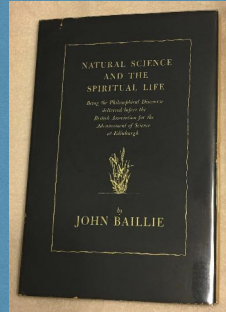
“It is to the clear recognition of this element of contingency in nature that modern science owes its very being... Christianity has always insisted that the world of nature is no mere emanation of the divine Reason but a free creation of the divine Will.” (pp. 23-24)

Can you guess who wrote these words back in 1952? “It is to the clear recognition of this element of contingency in nature that modern science owes its very being... Christianity has always insisted that the world of nature is no mere emanation of the divine Reason but a free creation of the divine Will.” (pp. 23-24).

- Here’s a hint: it was by a prof in Edinburgh. Moreover, at New College. With that information in hand, we might assign it to TFT! But it’s actually from
- John Baillie, who directed attention to the papers by Michael Foster mentioned earlier. His little book is *Natural Science and the Spiritual Life*, a lecture presented to the British Association for the Advancement of Science at its meeting in Edinburgh.

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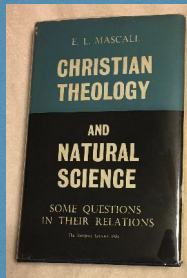
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Duns Scotus  
Karl Barth, CD III.1  
John Baillie (1952)  
Eric L. Mascall (1956)



Nature “will be both contingent and orderly, since it is the work of a God who is both free and rational. It will embody regularities and patterns, since its Creator is rational, but the particular regularities and patterns which it embodies cannot be predicted *a priori*, since he is free; they can only be discovered by examination.”  
(p. 94)

Citing both Michael Foster and John Baillie, as well as Alfred North Whitehead on the contrary side, Eric Mascall wrote:

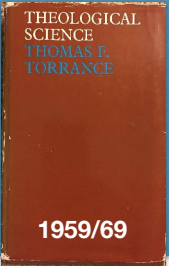
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“For Mr. Foster it is the freedom of God and the consequent contingency of the world in Christian thought that is the main stimulus provided by Christianity for modern science, in contrast with the logicism and necessitarianism of the Greeks;...” (p. 95)

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 John Baillie (1952)  
 Eric L. Mascall (1956)  
 Thomas F. Torrance



1959/69

“To interpret nature in light of final and primary causes left little room for the element of real contingency in nature, to the recognition of which modern experimental science owes its existence. This had to wait until the period of the Reformation for its real beginning, when men learned to think differently of the nature of God and of His relation to creation as something utterly distinct from Him while yet dependent upon His will for its being and ultimate order...” (p. 61)

TFT engaged with Barth, Baillie, Mascall, and others, in his Hewett Lectures for 1959, later published as *Theological Science* (1969, p. 61ff):

- Read quote.
- In 1979, TFT presented a little essay we quoted from earlier, “Divine and Contingent Order,” at an Oxford International Symposium on “The Sciences and Theology in the 20th Century.”
- The expanded book by the same title is his magisterial discussion, seminal and provocative. Too often the three streams, of scientists, historians and theologians, have been kept apart, but one strength of Torrance’s book is that he brought them together. He interacted with scientists, theologians, historians, and philosophers of science, to create a distinctive synthesis. Another strength is that he interpreted divine will, as had Barth and Duns Scotus, not as a naked will to power, but as a freedom to love.
- Voluntarist is a term used in the literature to refer to both divine freedom AND divine will, but it can be misleading. Unfortunately, there’s no equally appealing Latin equivalent for divine freedom.

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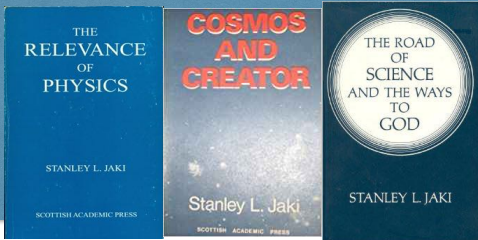
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 Stanley L. Jaki



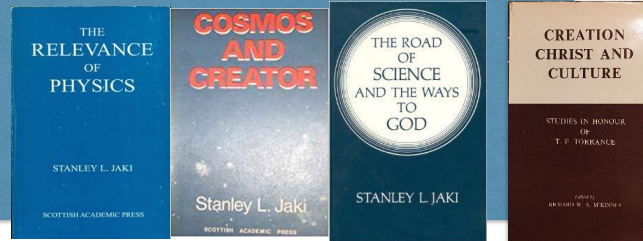
Stanley Jaki, a Hungarian Benedictine, produced more than 40 books in the history and philosophy of science.

- TFT read Jaki's *Relevance of Physics* with delight.
- TFT asked Jaki to prepare a more concise version accessible to a wider public, which resulted in *Cosmos and Creator*. Both of these were published by the Scottish Academic Press.
- TFT was instrumental in obtaining an invitation to Jaki to present the Gifford Lectures in 1975 and 1976 at the University of Edinburgh. In this work, *The Road of Science and the Ways to God*, Jaki praised TFT's interpretations of Einstein and Polanyi.



“...rational laws could not be simply derived in a Platonic, or *a priori* fashion from the preferences of the mind... As a Christian, Copernicus firmly believed that the world was not a self-explaining entity. His Christian faith told him that the ultimate explanation of the world could only be found in the wisdom and will of the Creator. From the wisdom of the Creator it followed that the world had to be fully rational. The will of the Creator implied that the specific pattern of rationality embodied in the world was a choice which man, himself a creature, could not dictate to the Creator...” (p. 158)

Stanley L. Jaki



- Divine freedom
- Contingent order
- Empirical methods
- Realism

And Jaki contributed a chapter to a Festschrift in honor of TFT, *Creation, Christ and Culture*.

- QUOTE. Jaki belongs on this list in part as a reminder of the complexity of both of these contested traditions in their ongoing interactions. Jaki opposed Foster by defending Gilson and attacking Kant, and Jaki pointed to the medieval synthesis rather than the Reformation as the source of the realistic tradition underlying modern science.
- Yet despite these differences, Jaki's recurring themes were contingent order as a result of divine freedom, with a consequent need for empirical methodologies, in a realist conception of knowledge. Those are the fundamental points, and on them Jaki and TFT agreed.

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Jaki, "Theological Aspects of Creative Science," pp. 149-166.

Did the Resurrection change the order of nature?

Questions?

Introduction

Space and Time

Divine Freedom and Contingent Order

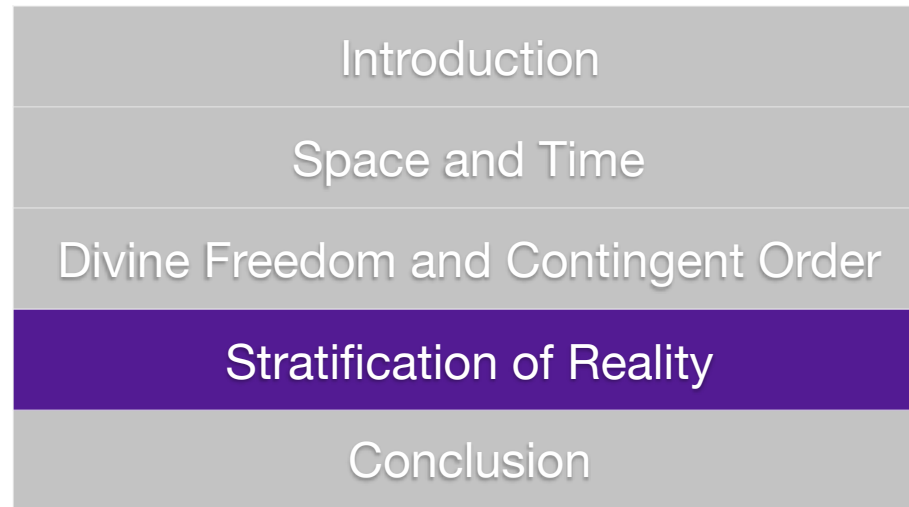
Stratification of Reality

Conclusion

So that's a little taste of the discussion of contingent order, and why it is a corollary of divine freedom.

- Questions?
- Next up is Stratification of Reality. (BREAK). •

## Did the Resurrection change the order of nature?



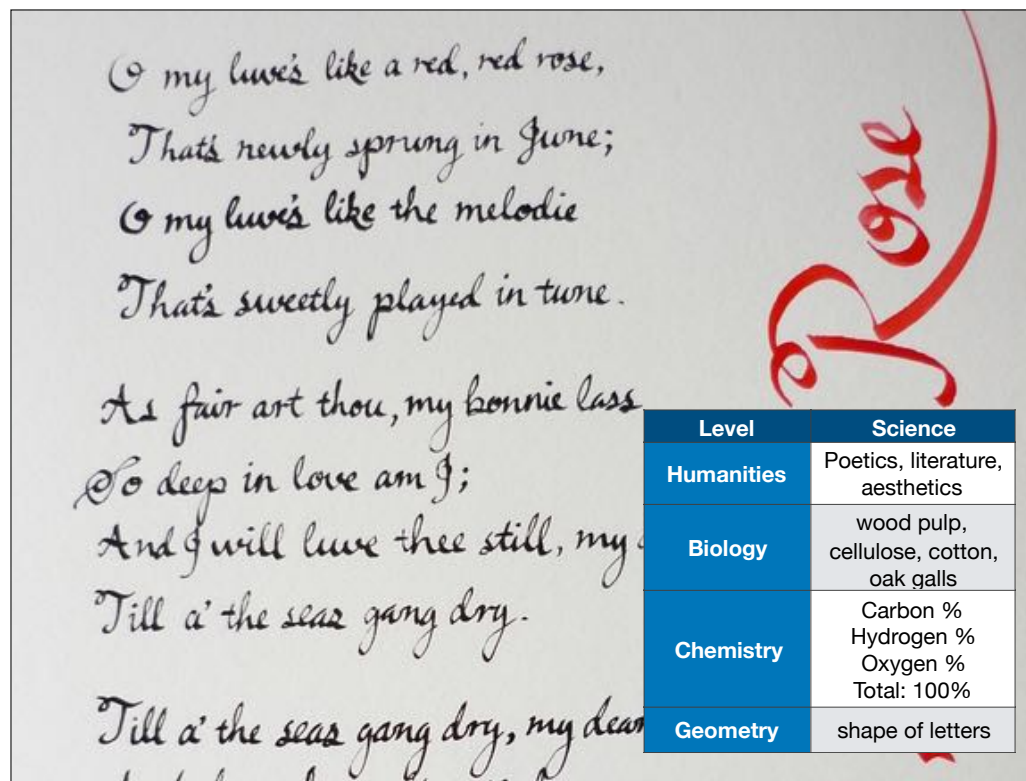
Stratification of Reality. The first two sections have served as a prelude to this section. We saw that the natural order of space and time is both open and relational. Here we will take that a step further and see that space and time are but *one* level of natural order. *Each* level is a contingent order, open and relational. The “stratification of reality” refers to various levels of contingent order and how they are inter-related.

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At other times, by the “stratification of truth,” TFT may refer to different interrelated levels of truth, including the basic evangelical and doxological level (eg proclamation of the Trinity), the theological level (e.g., economic Trinity), and the scientific level (eg immanent Trinity; cf. *Ground and Grammar*, pp. 156ff). In this respect, TFT points to Einstein as an example of a multi-level conception. Here we focus only on how the levels are considered in STR.



Consider how we might study this object. We might focus upon any of several levels:



In the humanities, we might focus on its literary aspects as a poem, and its meaning.

- If we were biologists, we might be interested in the cellulose or cotton used to make the paper, or the oak galls and plant pigments for the ink.
- If we were chemists, we might obtain a chemical analysis of the paper and ink.
- Or if we were new to the alphabet, we might focus upon the shape of the letters and other geometrical aspects.

None of these levels are complete in themselves. The higher levels provide meaning for the lower. Nor is any level superfluous: there would be no poem without the paper and ink, no words without the individual letters. At any time, we might shift our focus between levels: we might attend carefully for a moment to the shape of a letter, and a moment later to the beauty of the calligraphy, or to the meaning of the line. To fully appreciate the reality we are given, we need to integrate the levels, to bring them all into relation. These levels are a simple example of what we mean by stratification of reality.

## Life's Irreducible Structure

Live mechanisms and information in DNA are boundary conditions with a sequence of boundaries above them.

Michael Polanyi

If all men were exterminated, this would not affect the laws of inanimate nature. But the production of machines would stop, and not until men arose again could machines be formed once more. Some animals can produce tools, but only men can construct machines; machines are human artifacts, made of inanimate material.

The *Oxford Dictionary* describes a machine as "an apparatus for applying mechanical power, consisting of a number of interrelated parts, each having a definite function." It might be, for example, a machine for sewing or printing. Let us assume that the power driving the machine is built in, and disregard the fact that it has to be renewed from time to time. We can say, then, that the manufacture of a machine consists in cutting suitably shaped parts and fitting them together so that their joint mechanical action should

So the machine as a whole works under the control of two distinct principles. The higher one is the principle of the machine's design, and this harnesses the lower one, which consists in the physical-chemical processes on which the machine relies. We commonly form such a two-leveled structure in conducting an experiment; but there is a difference between constructing a machine and rigging up an experiment. The experimenter imposes restrictions on nature in order to observe its behavior under these restrictions, while the constructor of a machine restricts nature in order to harness its workings. But we may borrow a term from physics and describe both these useful restrictions of nature as the imposing of *boundary conditions* on the laws of physics and chemistry.

Let me enlarge on this. I have exemplified two types of boundaries. In

whereas the second is of the machine type. By shifting our attention, we may sometimes change a boundary from one type to another.

All communications form a machine type of boundary, and these boundaries form a whole hierarchy of consecutive levels of action. A vocabulary sets boundary conditions on the utterance of the spoken voice; a grammar harnesses words to form sentences, and the sentences are shaped into a text which conveys a communication. At all these stages we are interested in the boundaries imposed by a comprehensive restrictive power, rather than in the principles harnessed by them.

### Living Mechanisms Are Classed with Machines

From machines we pass to living beings, by remembering that animals move about mechanically and that they have internal organs which perform functions as parts of a machine do—functions which sustain the life of the organism, much as the proper functioning of parts of a machine keeps the machine going. For centuries past, the workings of life have been likened to the working of machines and physiology has been seeking to interpret the organism as a complex network of mecha-

**Science 160 (1968): 1308-1312**

Any coherent part of the organism is indeed nuzzling to physiology—and

Torrance interacted with Michael Polanyi, so let's start with Polanyi's chief article devoted to the stratified levels of reality, published in *Science* in 1968.

- This article was reprinted in *Knowing and Being*.
- An earlier version of its ideas was presented a decade earlier in the last chapters of *Personal Knowledge*
- and in *The Study of Man*. Polanyi developed his concept of stratified relations, in part, as a way of thinking through a response to the dialectical materialism of J. D. Bernal and Nikolai Bukharin. Although less frequently remarked upon than personal knowledge or tacit understanding, the irreducible stratified levels of reality were a fundamental part of his philosophy.

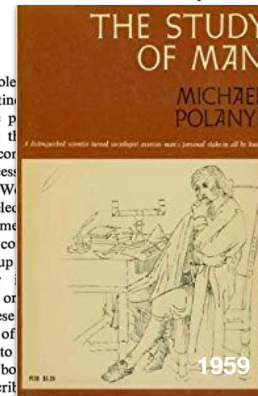
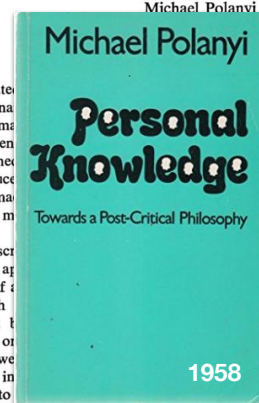
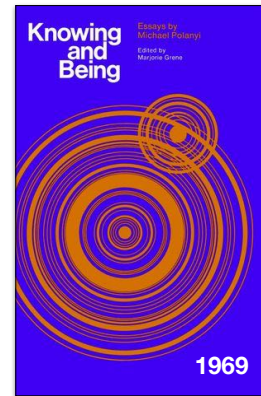
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Michael Polanyi, "Life's Irreducible Structure," *Science* 160 (1968): 1308-1312.



## Life's Irreducible Structure

Live mechanisms and information in DNA are boundary conditions with a sequence of boundaries above them.



whereas the second is of the machine type. By shifting our attention, we may sometimes change a boundary from one type to another.

All communications form a machine type of boundary, and these boundaries form a whole hierarchy of consecutive levels of action. A vocabulary sets boundary conditions on the utterance of the spoken voice; a grammar harnesses words to form sentences, and the sentences are shaped into a text which

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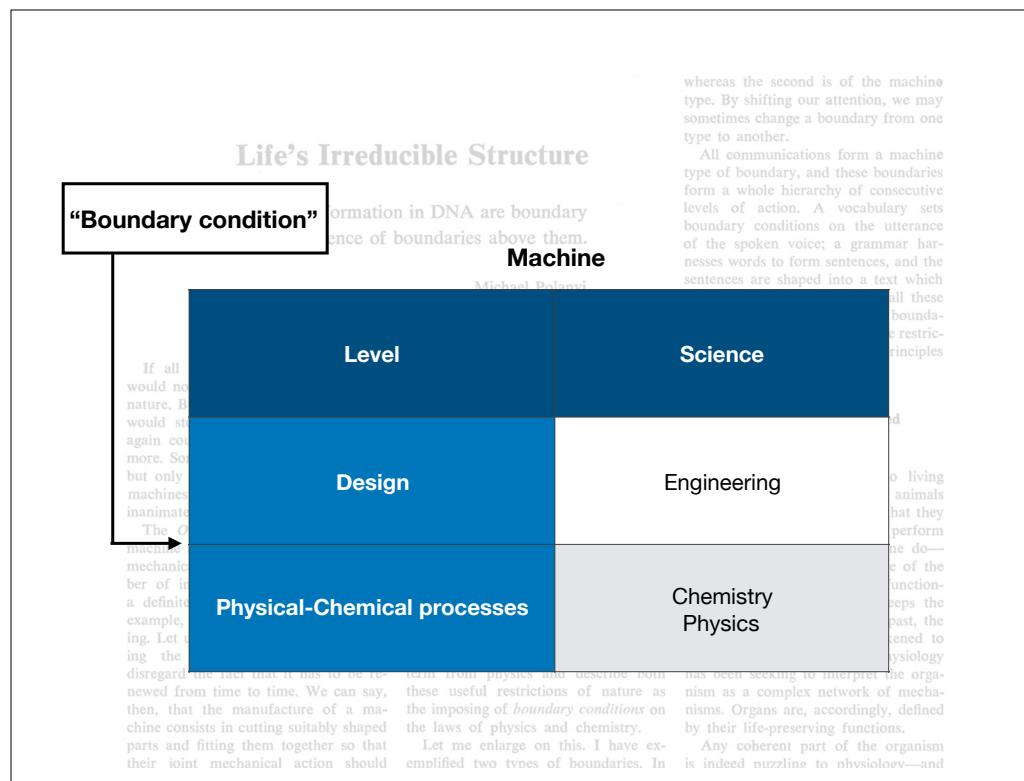
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Polanyi began with the example of a machine, which, he argued, is comprised of two different levels of reality: the lower level of physical and chemical processes studied by chemistry and physics, and the higher level of engineering design, which directs the physical and chemical processes to a higher purpose and meaning.

- The Boundary Condition is the border between the two levels, representing the openness of the lower level to the one above, and the order of the higher level that is passed down to the lower. The boundary signifies that the higher level is not merely a complex form of the lower, but a different kind of order altogether.\*
- Polanyi explains: Quote.

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\* The term "boundary" was used in a similar way by Einstein and Daniel Lamont, for instance.

“Each level relies for its operations on all the levels below it. Each reduces the scope of the one immediately below it by imposing on it a boundary that harnesses it to the service of the next-higher level, and this control is transmitted stage by stage, down to the basic inanimate level.”

“Boundary condition”

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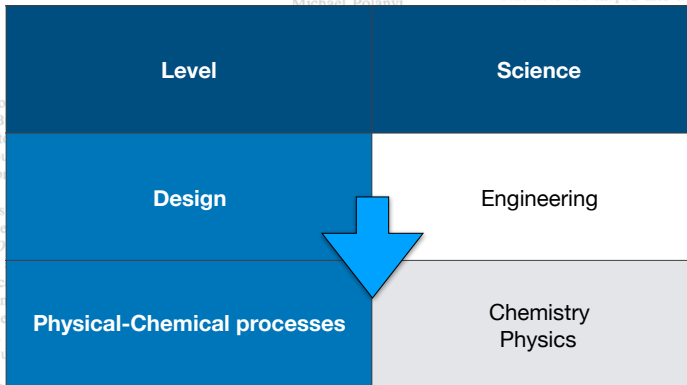
Machine

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“So the machine as a whole works under the control of two distinct principles. The higher one is the principle of the machine’s design, and this harnesses the lower one, which consists in the physical-chemical processes on which the machine relies.”

“Boundary condition”

formation in DNA are boundary  
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Machine

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Level

Science

Design

Engineering

Physical-Chemical processes

Chemistry  
Physics

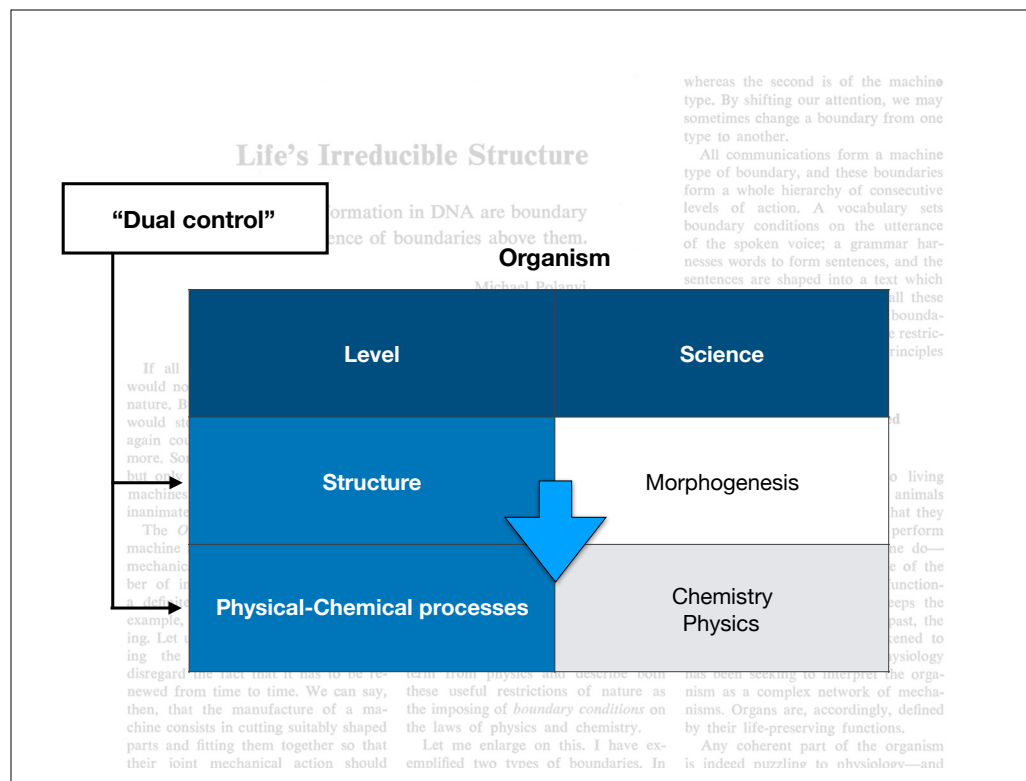
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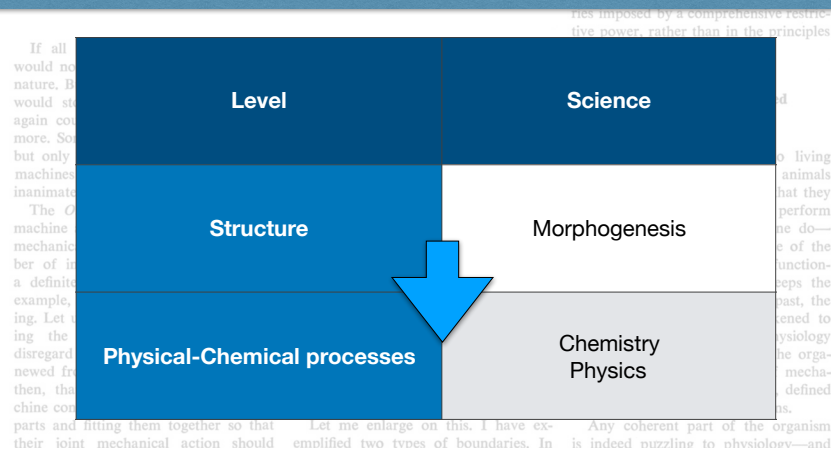
Polanyi continues: (quote). Just as it is false to say that a sewing machine or a printing press are “nothing but” chemical and physical processes, so it takes more than a course in chemistry and a course in physics to understand how they work and the purposes they serve.



After considering a machine, Polanyi next turns to a biological organism, considering it in similar terms.

- By speaking of Dual control, Polanyi means that the order of both levels is satisfied. There is an integrity of the lower level AND there is an integrity of the higher level, both below and above the boundary.

“the organism is shown to be, like a machine, a system which works according to two different principles: its structure serves as a boundary condition harnessing the physical-chemical processes by which its organs perform their functions. Thus, this system may be called a system under dual control. Morphogenesis, the process by which the structure of living beings develops, can then be likened to the shaping of a machine which will act as a boundary for the laws of inanimate nature. For just as these laws serve the machine, so they serve also the developed organism.”



He writes: (Quote)



# Stratified Levels of Natural Order

## Life's Irreducible Structure

Live mechanisms and information in DNA are boundary conditions with a sequence of boundaries above them.

Michael Polanyi

“Evolution may be seen, then, as a progressive intensification of the higher principles of life.”

“hopelessly anthropocentric”  
— Marjorie Grene

the second is of the machine type. Our attention, we may sometimes change a boundary from one type to another.

All communications form a machine type of boundary, and these boundaries form a whole hierarchy of consecutive levels of action. A vocabulary sets boundary conditions on the utterance of the spoken voice; a grammar harmonizes sentences, and the sentences are shaped into a text which

Level
Responsibility
Intelligence/consciousness
Innate behavior
Growth (including animal muscular action)
Vegetative functions
Inanimate nature

For Polanyi, living beings participate in the following levels of order: inanimate nature, vegetative functions, growth (including muscular action in animals), innate behavior, intelligence and consciousness, and responsibility.

- Polanyi asserted that: (quote). Evolutionary theorists have not found Polanyi's views on evolutionary emergence either simple or obvious, however. The renowned philosopher of the life sciences, Marjorie Grene, formerly Polanyi's student, and a staunch defender of Polanyi's *Personal Knowledge*, regarded Polanyi's evolutionary views
- as “hopelessly anthropocentric.” (Nye, p. 273). An immense literature in evolutionary biology and in the philosophy of biology continues to debate Polanyi's ideas.

# Stratified Levels of Natural Order

## Life's Irreducible Structure

Live mechanisms and information in DNA are boundary conditions with a sequence of boundaries above them.

Michael Polanyi

### 1. Irreducibility

If all men were exterminated, this would not affect the laws of inanimate nature. But the production of machines would stop, and not until men arose again could machines be formed once more. Some animals can produce tools, but only men can construct machines; machines are human artifacts, made of inanimate material.

The *Oxford Dictionary* describes a machine as "an apparatus for applying mechanical power, consisting of a number of interrelated parts, each having a definite function." It might be, for example, a machine for sewing or printing. Let us assume that the power driving the machine is built in, and disregard the fact that it has to be renewed from time to time. We can say, then, that the manufacture of a machine consists in cutting suitably shaped parts and fitting them together so that their joint mechanical action should

So the machine as a under the control of two ciples. The higher one is of the machine's design, nesses the lower one, which the physical-chemical p which the machine relies monly form such a two-ture in conducting an ex there is a difference betwe ing a machine and rigging periment. The experimen restrictions on nature observe its behavior under tions, while the construct chine restricts nature in ord its workings. But we m term from physics and these useful restrictions the imposing of boundary the laws of physics and Let me enlarge on this emolified two types of boundaries. In is indeed nuzzling to physiology—and

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**Organisms**

Level
Responsibility
Intelligence/consciousness
Innate behavior
Growth (including animal muscular action)
Vegetative functions
Inanimate nature

Some of the confusion is no doubt due to ramifications of the theory. The first significant ramification is irreducibility:

- Polanyi explains: (quote). To assert different levels of natural order • opposes reductionistic conceptions of reality and of the sciences, as if a higher level is “nothing but” the lower level. No higher level can be reduced to any combination of levels below. There can be no “theory of everything” that reduces all reality to physics, for example. Or, to take another example, the study of brainwaves while listening to music does not explain the person’s experience of music as if the person or mind were nothing but the processes of the brain. To reduce any level of reality to the category of another beneath it amounts to a category mistake. Irreducibility is the essential feature of any view of evolutionary “emergence” consistent with Polanyian ideas. Walter Gulick, long-time president of the Polanyi Society, writes:
- “It is characteristic of all usages of emergence to postulate a coming into existence of something different in kind from what existed before and not causally or logically reducible to the supporting conditions out of which it appeared...” (“Response to Clayton” T&D 29, p. 35).

Irreducibility is difficult to define precisely, and difficult to grasp concretely. The principle of irreducibility is perhaps the most controversial aspect of Polanyi’s model of stratified levels of natural order.

## Stratified Levels of Natural Order

### Life's Irreducible Structure

Live mechanisms and information in DNA are bound by boundary conditions with a sequence of boundaries above and below.

Michael Polanyi

## 1. Irreducibility

If all men were exterminated, this would not affect the laws of inanimate nature. But the production of machines would stop, and not until men arose again could machines be made any more. Some might say that machines are human artifacts, made of inanimate material.

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So the machine is under the control of principles. The higher order of the machine's design necessitates the lower order of physical-chemical principles which the machine commonly form such a nature in conducting a there is a difference in conducting a machine and experiment. The experimental restrictions on nature observe its behavior in nature, while the machine restricts nature's workings. But we term from physics these useful restrictions the imposing of boundaries on the laws of physics. Let me enlarge on the emolified two types

"The theory of boundary conditions recognizes the higher levels of life as forming a hierarchy, each level of which relies for its workings on the principles of the levels below it, even while it itself is irreducible to these lower principles."

"the operations on a higher level cannot be accounted for by the laws governing its particulars on the next-lower level."

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## Stratified Levels of Natural Order

### Life's Irreducible Structure

Live mechanisms and information in DNA are bound by conditions with a sequence of boundaries above

Michael P.

## 1. Irreducibility

If all men were exterminated, this would not affect the laws of inanimate nature. But the production of machines would stop, and not until men arose again could there be more. Some machines are human artifacts, made of inanimate material.

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Walter Gulick  
*Tradition & Philosophy*  
29 (2002-2003)

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## Stratified Levels of Natural Order

### Life's Irreducible Structure

Live mechanisms and information in DNA are bound by conditions with a sequence of boundaries above

Michael P.

#### 1. Irreducibility

If all men were exterminated, this would not affect the laws of inanimate nature. If all machines were destroyed, machines would not arise again. Machines could be formed once more. Some animals can produce tools, but only men can construct machines; machines are human artifacts, made of inanimate material.

The *Oxford Dictionary* describes a machine as "an apparatus for applying mechanical power, consisting of a number of interrelated parts, each having a definite function." It might be, for example, a machine for sewing or printing. Let us assume that the power driving the machine is built in, and disregard the fact that it has to be renewed from time to time. We can say, then, that the manufacture of a machine consists in cutting suitably shaped parts and fitting them together so that their joint mechanical action should

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"Control of a system by irreducible boundary conditions does not interfere with the laws of physics and chemistry."

After irreducibility, a second ramification is Integrity. Each separate level of order makes for an interesting study in itself. Any higher level *relies* upon the order of the lower level.

- Quote. Higher ordering principles are *added onto* the laws of the lower level, rather than interfering with them.
- Integrity also means that Lower levels appear complete in their own terms. The chemical analysis of the paper with the poem was complete, with the ingredients adding up to 100%. The poem was not detected, yet the results were consistent with the presence of ink. To the prepared mind, a lower level may suggest the existence of a higher level, but higher levels cannot be recognized in terms of the lower.

# Stratified Levels of Natural Order

## Life's Irreducible Structure

Live mechanisms and information in DNA are bound by the same conditions with a sequence of boundaries above and below.

Michael B. Smart

Chemistry

Carbon %
Hydrogen %
Oxygen %
Total: 100%

A Red, Red Rose

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# Stratified Levels of Natural Order

## Life's Irreducible Structure

Live mechanisms and information in DNA are boundary conditions with a sequence of boundaries above them.

Michael Polanyi

1. Irreducibility
2. Integrity
3. Open order

If all men were exterminated, this would not affect the laws of inanimate nature. But if machines arose again could machines be formed once more. Some animals can produce tools, but only by using tools already made by machines. Life is a machine made of inanimate material.

The *Oxford Dictionary* describes a machine as "an apparatus for applying mechanical power, consisting of a number of interrelated parts, each having a definite function." It might be, for example, a machine for sewing or printing. Let us assume that the power driving the machine is built in, and disregard the fact that it has to be renewed from time to time. We can say, then, that the manufacture of a machine consists in cutting suitably shaped parts and fitting them together so that their joint mechanical action should

So the machine as a whole is under the control of two principles. The higher one is of the machine's design, and it enforces the lower one, which is the physical-chemical process. In such the machine relies on the laws of physics and chemistry. It only form such a two-fold nature in conducting an experiment. There is a difference between a machine and a living organism. The experimenter imposes restrictions on nature in order to observe its behavior under conditions, while the construction of a machine restricts nature in its workings. But we must term from physics and chemistry these useful restrictions as the imposing of *boundary* conditions. Let me enlarge on this. I have emolified two types of boundaries. In

the second is of the machine type of boundary, and these boundaries form a whole hierarchy of consecutive levels of action. A vocabulary sets boundary conditions on the utterance of the spoken voice: a grammar harmonizes sentences, and the sentences are shaped into a text which

## Organisms

Level
Responsibility
Intelligence/consciousness
Innate behavior
Growth (including animal muscular action)
Vegetative functions
Inanimate nature

Third, the principle of open order means that the order of any lower level is open to control by a higher level of order. For example, the poem in a sense controlled the amount of ink on the paper. Or, to take the example of an organism, the lower biological and chemical levels are open to the level of muscular action, which organizes and acts through them to achieve results that they could not have produced on their own. In turn, muscular action is open to control by the higher orders of behavior and consciousness.

# Stratified Levels of Natural Order

## Life's Irreducible Structure

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## Organisms

Michael Polanyi

### 1. Irreducibility

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### 2. Integrity

The *Oxford Dictionary* describes a machine as "an apparatus for solving mechanical problems, each having a definite function." It might be, for example, a machine for sewing or printing. Let us assume that the power driving the machine is built in, and disregard the fact that it has to be renewed from time to time. We can say, then, that the manufacture of a machine consists in cutting suitably shaped parts and fitting them together so that their joint mechanical action should

So the machine as a whole is under the control of two principles. The higher one is of the machine's design, which necessitates the lower one, which is the physical-chemical process in which the machine relies. They form such a two-tier structure in conducting an experiment. There is a difference between a machine and a rigid instrument. The experiment has restrictions on nature, while the construction of a machine restricts nature in its workings. But we must term from physics and these useful restrictions the imposing of boundaries on the laws of physics and nature. Let me enlarge on this. It is indeed puzzling to physiologists—and

Level
Responsibility
Intelligence/consciousness
Innate behavior
Growth (including animal muscular action)
Vegetative functions
Inanimate nature

Finally, the 4th principle is Integration.

- Integration is the act of coordinating the stratified levels. This is harder than it looks, because the description of any lower level does not point explicitly to the existence of a higher level. The higher is more than the sum of the lower; to reach it requires not analysis, but an integrative act which may be "beyond our power." Or, more optimistically, we may unexpectedly discover, as we correlate the levels, a surprising degree of coherence. Integration involves discovery of a hidden reality.
- Polanyi explains: QUOTE. Integration requires the exercise of what Polanyi called tacit knowing, for we always know more than we can explicitly say, as we shift our focus between different kinds of order. We shift our focus by discerning semantic relations between the levels, as when we shift from attending to the shape of the letters on the paper to focus on the meaning of the poem. Polanyi later pointed to the way an explicit focal level is supported by a tacit subsidiary level as his most original contribution to philosophy (Greene, 168). TFT seems to have agreed, as he repeatedly emphasized these aspects of integration.

— — — — —  
 "The integration of items of a lower level so as to predict their possible meaning in a higher context may be beyond the range of our integrative powers."

## Stratified Levels of Natural Order

### Life's Irreducible Structure

Live mechanisms and information in DNA are bound by conditions with a sequence of boundaries above

Michael P

1. Irreducibility
2. Integrity
3. Open order
4. Integration

If all men were exterminated, this would not affect the laws of inanimate nature. Machines, however, arose again could machines be formed once more. Some animals can produce tools, but only by using tools. The machine, however, is a machine, and it is inanimate material. The *Oxford Dictionary* describes a machine as "an apparatus for solving mechanical problems, each having a definite function." It might be, for example, a machine for sewing or printing. Let us assume that the power driving the machine is built in, and disregard the fact that it has to be renewed from time to time. We can say, then, that the manufacture of a machine consists in cutting suitably shaped parts and fitting them together so that their joint mechanical action should

So the machine is under the control of principles. The higher order of the machine's design necessitates the lower order of the physical-chemical processes which the machine must follow. It is only form such a machine that there is a difference between a machine and an experiment. The experiment is a restriction on nature, while the machine restricts nature's workings. But we term from physics these useful restrictions the imposing of boundaries on the laws of physics. Let me enlarge on

"The higher comprehends the workings of the lower and thus forms the meaning of the lower. And as we ascend a hierarchy of boundaries, we reach to ever higher levels of meaning."

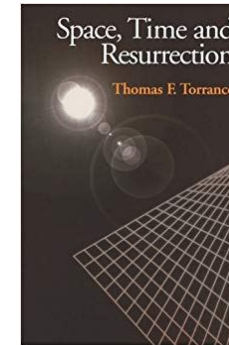
"When examining any higher level, we must remain subsidiarily aware of its grounds in lower levels, and turning our attention to the latter, we must continue to see them as bearing on the levels above them."

Finally, the 4th principle is Integration.

- Integration is the act of coordinating the stratified levels. This is harder than it looks, because the description of any lower level does not point explicitly to the existence of a higher level. The higher is more than the sum of the lower; to reach it requires not analysis, but an integrative act which may be "beyond our power." Or, more optimistically, we may unexpectedly discover, as we correlate the levels, a surprising degree of coherence. Integration involves discovery of a hidden reality.
- Polanyi explains: QUOTE. Integration requires the exercise of what Polanyi called tacit knowing, for we always know more than we can explicitly say, as we shift our focus between different kinds of order. We shift our focus by discerning semantic relations between the levels, as when we shift from attending to the shape of the letters on the paper to focus on the meaning of the poem. Polanyi later pointed to the way an explicit focal level is supported by a tacit subsidiary level as his most original contribution to philosophy (Greene, 168). TFT seems to have agreed, as he repeatedly emphasized these aspects of integration.

— — — —  
"The integration of items of a lower level so as to predict their possible meaning in a higher context may be beyond the range of our integrative powers."

## How is the Resurrection related to the natural order and other sciences?



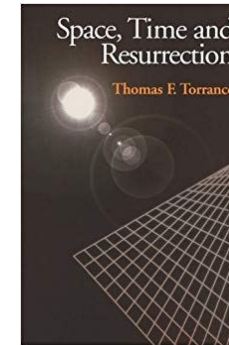
“the various sciences themselves, ranging from physics and chemistry to the humanities and theology can be regarded as constituting a hierarchical structure of levels of inquiry which are open upwards into wider and more comprehensive systems of knowledge but are not reducible downwards.” (p. 188)

Level
Theology
Humanities
Biology
Chemistry
Physics

Turning now, from Polanyi, to STR: (quote). This sounds a lot like Polanyi, right?

- How is the Resurrection related to the natural order and other sciences? To answer this question, TFT employed a concept of stratified levels of natural order, both in his creational theology AND in his theology of the Resurrection. In addition to Polanyi, Torrance drew upon Einstein and Daniel Lamont and others, yet the influence of Polanyi is unmistakable; sometimes he even adopted Polanyi’s vocabulary.

## How is the Resurrection related to the natural order and other sciences?



“the various sciences themselves, ranging from physics and chemistry to the humanities and theology can be regarded as constituting a hierarchical structure of levels of inquiry which are open upwards into wider and more comprehensive systems of knowledge but are not reducible downwards.” (p. 188)

### Level

Theology

Humanities

Biology

Chemistry

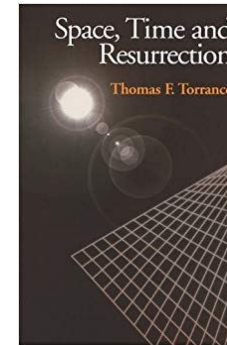
Physics

In the context of this quotation, TFT enumerates at least five levels, to give us an idea of the range he has in mind: Physics, Chemistry, Biology, the Humanities, and Theology. These comprise different but interrelated levels of contingent order.

-----

The laws of physics and chemistry, for example, can be harnessed by living organisms, to produce effects in biology that would never be predictable on the basis of physics and chemistry alone. DNA in the cell, for example, functions in a manner that is consistent with the laws of chemistry, but the cell functions within the larger organism in a manner that requires more than physics and chemistry to understand.

## How is the Resurrection related to the natural order and other sciences?



### 1. Irreducibility

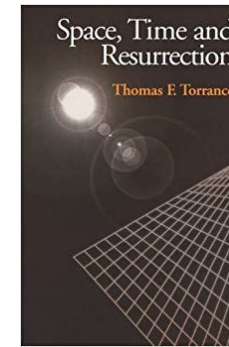
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Level
Theology
Humanities
Biology
Chemistry
Physics

As we saw with Polanyi, so TFT affirms a principle of Irreducibility, stating that the levels are “not reducible downwards.”



1. Irreducibility
2. Integrity



Level
Theology
Humanities
Biology
Chemistry
Physics

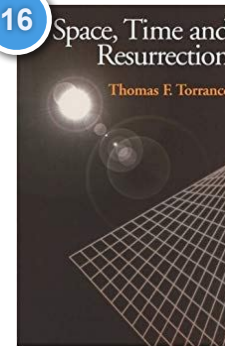
TFT likewise affirms the integrity of each kind of order. The natural order of a given level, with its lawful regularities, is not set aside or violated, nor found to be incomplete by *gaps* on its own level. The chemical analysis yields 100% composition, with no percentile of ingredients left out.

•Quote.

- Consider Torrance’s principle of “Kata physin.” Kata physin means “according to the nature of.” The method in any field must be appropriate to the kind of order of that field.
- Another way to put it is “ontology determines epistemology”; that is, the being or nature of something determines how it may be known. A consequence of this is that there’s no single scientific method.
- (Arrows fly in). Each science has its distinctive methodology – kata-physin, according to the nature of its own subject matter. • Biology is more than physics. • Literature is more than biology. • God is not discovered in a test tube. Integrity means that no discipline can dictate its methods to another.

“While each science is governed by its own distinctive laws, these leave undefined a number of boundary conditions which may be controlled by the operations of a science governed by its own distinctive laws on a higher level. While such a science on a higher level relies on the laws governing the science on a lower level, without infringing them, for the fulfilment of its own operations, these operations are not explainable in terms of the laws governing the science on the lower level.” (p. 189)

16



1. Irreducibility
2. Integrity

“kata physin”  
*according to the nature of*  
*ontology determines epistemology*

Level
Theology
Humanities
Biology
Chemistry
Physics

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•Quote.

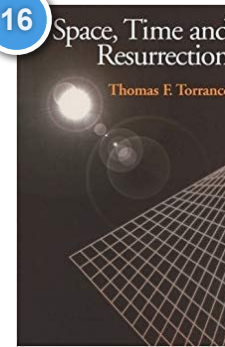
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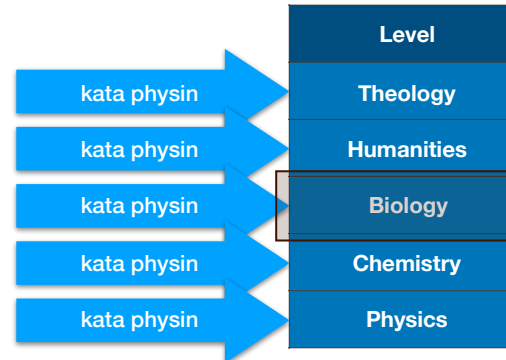
16

Space, Time and  
Resurrection

Thomas F. Torrance



1. Irreducibility
2. Integrity



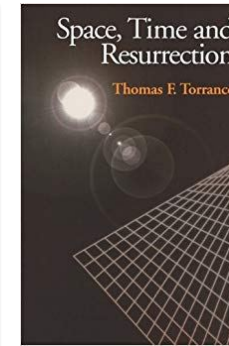
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*Kata physin:*

“From this point of view the emphasis of the early Church upon *physis* (the real nature of things, or simply ‘reality’) and upon thinking *kata physin* (in accordance with the real nature of things), or what we might call ‘*cataphysic* thinking’, is entirely understandable, for it meant the rejection in the most downright way of all thinking in terms of abstract ‘possibilities’ in favour of thinking in terms of concrete realities or actualities. That is to say, early Christian theologians applied to God the same principle which the Alexandrian scientists employed when they allowed the real nature (*physis*) of what they were investigating to determine the proper way in which to think about it, for that was, they held, the only true or real way to think scientifically (*epistēmonikōs*).” (p. 80)



Level

Theology

Humanities

Biology

Chemistry

Physics

In STR, Torrance explains: (quote)

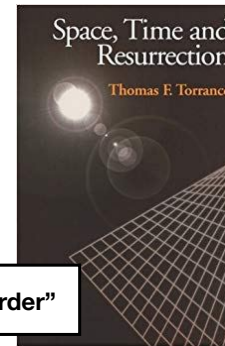
In response to Heinrich Scholz, Karl Barth rejected the traditional role of natural theology as a preamble to faith. Barth did so to preserve a kata-physin method in theology. For Barth and for TFT, each level of order requires its own distinctive methodology, kata physin. The starting point for theology is the resurrection of Christ. The resurrection is also the starting point for natural theology, which we may call creational theology to distinguish it from natural theology in its traditional conception.

## How is the Resurrection related to the natural order and other sciences?

1. Irreducibility
2. Integrity
3. Open order

≠ Mechanism  
≠ Determinism

"Contingent order"



Level

Theology

Humanities

Biology

Chemistry

Physics

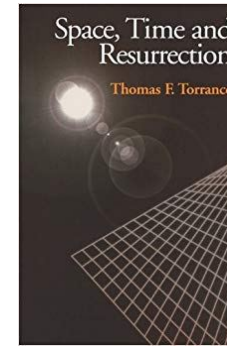
Open upwards

TFT also affirms the principle of open order

- opposed to mechanism and determinism. The laws of nature do not function in a closed system. Reality is open to higher meanings and direction.
- When looking at any given level, it is contingent order, which must be known via its own distinctive kata physin methodologies, as we have seen. When asking how it is contingent,
- we are challenged to search upward through an open boundary to ascertain its relations with the order of higher levels. Each level opens upward to a higher level. Each level is open, not self-explanatory, but indeterminate when considered on its own. The higher level provides a higher dimension of order and meaning.

## How is the Resurrection related to the natural order and other sciences?

1. Irreducibility
2. Integrity
3. Open order
4. Integration



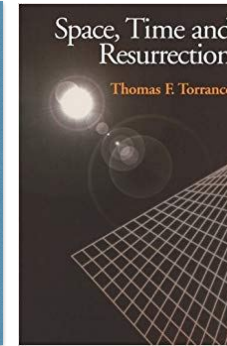
Level
Theology
Humanities
Biology
Chemistry
Physics

And finally, TFT affirms the principle of Integration: This principle challenges the idea that different sciences have little or nothing to do with one another. Rather, when focusing on any specific level, we remain subsidiarily aware of the other levels, and bring that knowledge tacitly to bear.



The broad effect of this is to get rid of the kind of segregation that arises between branches of human knowledge when each science, or group of sciences, is regarded as constituting a closed and exclusive system on its own, and to reveal the lines of an inner semantic structure which coordinates and holds together all levels and areas of knowledge within the one universe of human inquiry.” (p. 189)

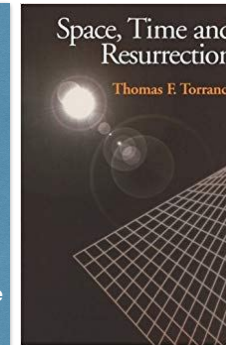
1. Irreducibility
2. Integrity
3. Open order
4. Integration



Level
Theology
Humanities
Biology
Chemistry
Physics

Torrance writes: (quote).

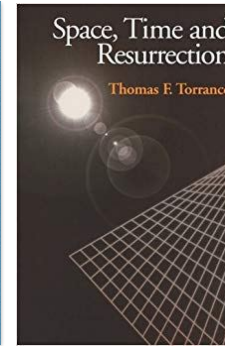
“There are then in our various levels of inquiry or layers of knowledge certain ‘boundary conditions’ (to use Einstein’s expression) where each one is coordinated with a higher system, in terms of which it becomes explicable and intelligible. It is in this way that the various sciences are coordinated with each other through functioning conjunctively on different levels at the same time. While each science is governed by its own distinctive laws, these leave undefined a number of boundary conditions which may be controlled by the operations of a science governed by its own distinctive laws on a higher level. While such a science on a higher level relies on the laws governing the science on a lower level, without infringing them, for the fulfilment of its own operations, these operations are not explainable in terms of the laws governing the science on the lower level. Thus, if we take chemistry and biology as our examples, chemistry may be coordinated with biology through boundary conditions where its own laws are left indeterminate or open to biology, and biology is coordinated with chemistry in such a way that it relies on the laws of chemistry for the fulfillment of its own multivariable organismic operations which nevertheless cannot be explained through reductive analysis in terms of the principles of chemistry. The broad effect of this is to get rid of the kind of segregation that arises between branches of human knowledge when each science, or group of sciences, is regarded as constituting a closed and exclusive system on its own, and to reveal the lines of an inner semantic structure which coordinates and holds together all levels and areas of knowledge within the one universe of human inquiry.” (p. 189)



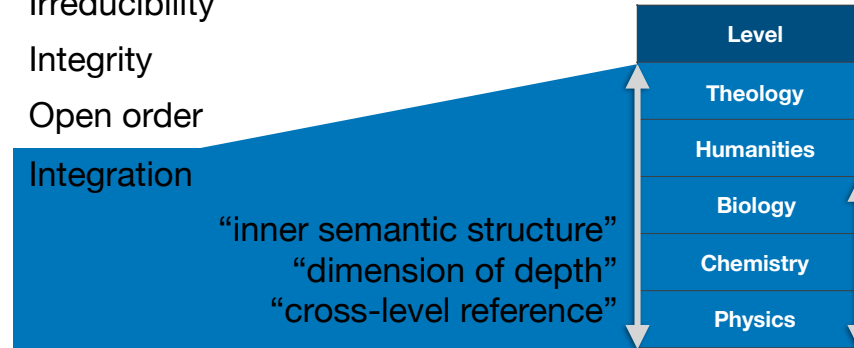
Level
Theology
Humanities
Biology
Chemistry
Physics

The passage in context speaks repeatedly of the coordination of the different levels:

The broad effect of this is to get rid of the kind of segregation that arises between branches of human knowledge when each science, or group of sciences, is regarded as constituting a closed and exclusive system on its own, and to reveal the lines of an inner semantic structure which coordinates and holds together all levels and areas of knowledge within the one universe of human inquiry.” (p. 189)



1. Irreducibility
2. Integrity
3. Open order
4. Integration



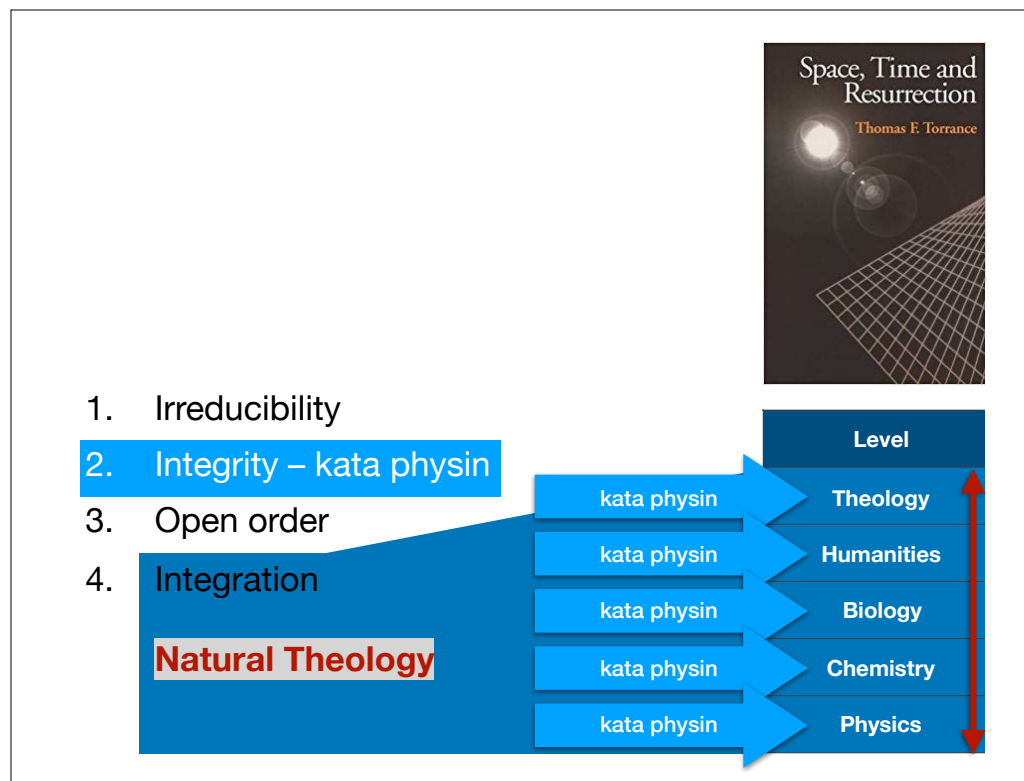
—(same quote; do not read it again)—

Integration rejects the idea that theology and the natural sciences have little or no relation; rather the entire field of sciences has an “inner semantic structure” that requires a “dimension of depth”<sup>\*</sup> to comprehend, by means of profound dialogue and arduous “cross-level reference.”

- The task of integration is to discern the relations between stratified levels of contingent order. Elucidating those proper relations between the sciences, including but not limited to theology, forms the heart of Torrance’s so-called “reconstructed natural theology”...
- or philosophy of science, if the higher levels are bracketed off.

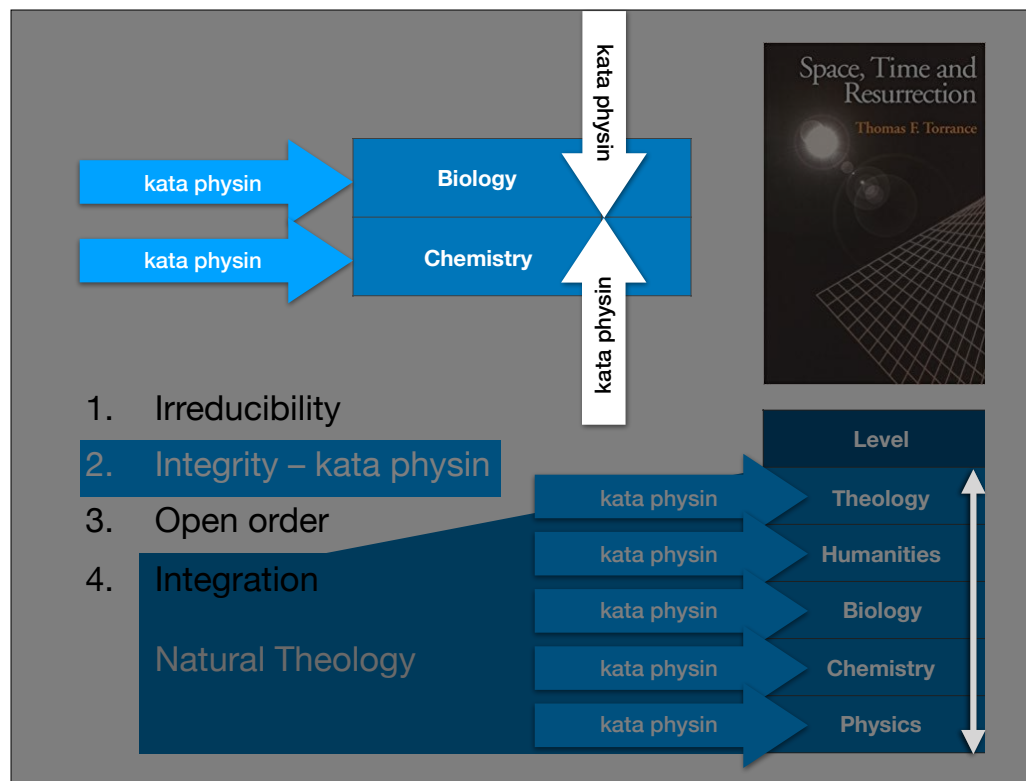
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<sup>\*</sup>By “dimension of depth,” TFT means an open concept; cf. TS p. 23.



Because of traditional definitions of “natural theology,” TFT is sometimes understood as being inconsistent in holding to BOTH

- a “reconstructed natural theology” AND
- a *kata physin* methodology in theology. Such critiques may be addressed by this model, which affirms
- under #2, Integrity, the horizontal *kata physin* methodology of every science, including theology, AND
- which conceives the vertical task of integration, #4, as the heart of Torrance’s so-called natural theology (or better, creational theology).



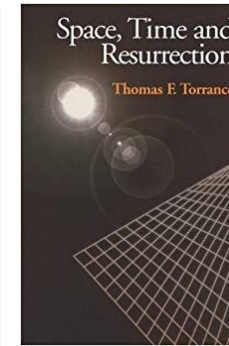
What makes multi-disciplinary integration compatible with disciplinary integrity is that two or more *kata physin* disciplines, such as biology and chemistry, may come to be seen, dynamically and *a posteriori*,

- to share a *kata physin* boundary in common. The boundary is what makes integration possible, to coordinate disciplines without an improper incursion upon one or the other. This is what makes multidisciplinary collaboration in a research university possible as well. However, identifying such a *kata physin* boundary can only be achieved *a posteriori*, through rigorous dialogue, in a specific cultural place and time. The expectation that adherence to disciplinary integrity, and the act of integration across various disciplines, are in fact compatible in this way, is borne out in the history of science by studies of disciplinary formation (such as biochemistry and molecular biology, at the boundary of chemistry and biology). This expectation was also deeply rooted in centuries of Scottish realism and in the multidisciplinary traditions of Scottish Universities (but that is another story\*).

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\*See JBU talk on interdisciplinary connections, where each discipline is seen *a posteriori* to share a *kata physin* boundary in common, <https://kerrysloft.com/art-music-lit-2/the-nature-of-the-christian-university/>

“For example, in our investigation of nature we frequently come across a set of circumstances or events which do not seem to make sense for we are unable to bring them into any coherent relation with one another, but then our understanding of them is radically altered when we consider them from a different level, for from that point of view they are discerned to form a distinct, intelligible pattern. This can happen when an additional factor is included at the original level which helps us solve the puzzle, but often the all-important additional factor must be introduced from a higher level, which means that the coherent pattern of the circumstances or events we are studying is reached only through a dimension of depth involving cross-level reference. ” (p. 188)



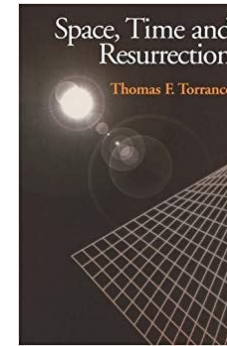
Level
Theology
Humanities
Biology
Chemistry
Physics

So kata-physin boundaries may be hierarchical, between different levels. Torrance explains: (quote). This is the process of integration.



## How is the Resurrection related to the natural order and other sciences?

1. Irreducibility
2. Integrity
3. Open order
4. Integration

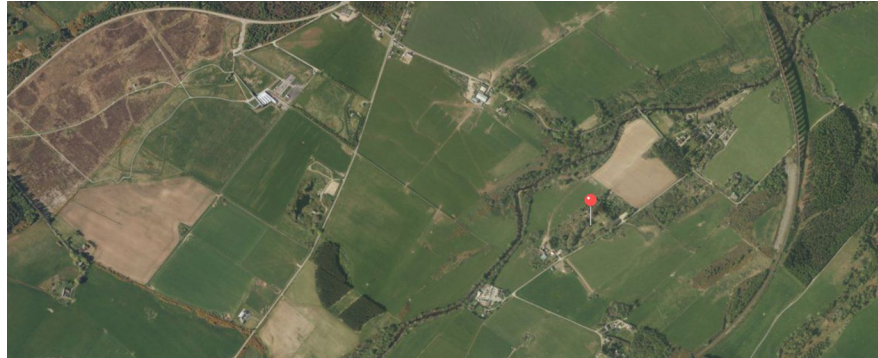


Level
Theology
Humanities
Biology
Chemistry
Physics

So what has this to do with the Resurrection? For TFT, everything.

“From an airplane we can see the traces of prehistoric sites which, over the centuries, have been unnoticed by people walking over them; indeed, once he has landed, the pilot himself may no longer see these traces.”

Michael Polanyi



Polanyi used an airplane analogy to describe the task of integration:

- “From an airplane we can see the traces of prehistoric sites which, over the centuries, have been unnoticed by people walking over them; indeed, once he has landed, the pilot himself may no longer see these traces.”

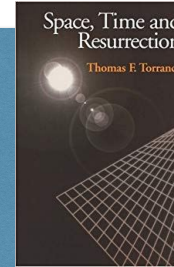
TFT echoed Polanyi’s airplane analogy, but applied it to the Integration that results from grasping the Resurrection:

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Photo may be recognizable to some participants.

“Engineering operations rely upon and do not infringe but transcend the principles of physics and chemistry; instead of being explainable in terms of them, engineering operations exercise control over them through the boundary conditions where they are left undefined, in such a way that patterns, artefacts, happenings, etc., are imposed upon nature beyond anything that nature is capable of producing merely in accordance with its own laws. It is the introduction of an entirely new factor, or set of factors, which brings about such astonishing transformations within nature as we have, for example, in an aeroplane.

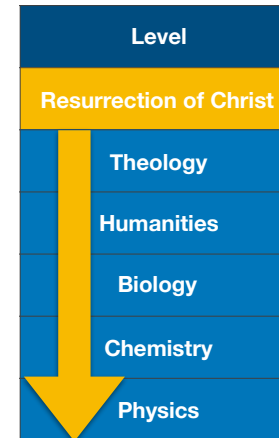
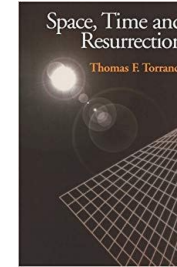
This provides us at least with an intelligible analogy in helping us to understand the resurrection within the space-time structures of our world....” (p. 190)



(quote) The Resurrection affects nature in a manner similar to the engineer who creates the airplane. It turns out that a lump of clay dug out of the ground can fly.

TFT describes the Resurrection using the terminology of the stratified levels: boundary conditions, dual control, and integration, opening upward but not reducible downward...

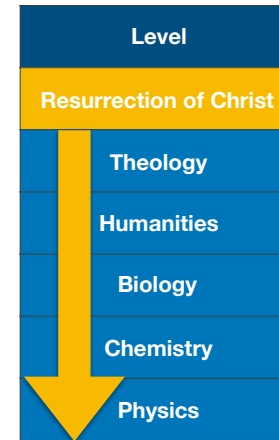
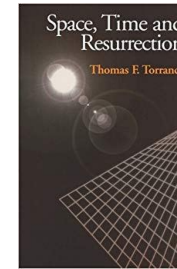
“As acts of God, however, they are finally explicable only from grounds in God, and are therefore ultimates which are not open to complete formalization, or therefore verification, within the natural order of things in which they nevertheless share. Within that order they constitute the ‘boundary conditions’, to borrow a term from Einstein and Polanyi, where the natural order is open to control and explication from a higher and wider level of reality, in a way similar to that in which the various levels with which we operate in any rigorous science are each open to the meta-level above it. This participation of the incarnation and resurrection in the natural order of things, however, must not be understood as an interruption of the natural order or an infringement of its laws, but rather the contrary. As acts of God who is the creative Source of all order in space and time, they are essentially ordering events within the natural order, restoring and creating order where it is damaged or lacking, and it is in terms of that giving of order that they constitute the relevant boundary conditions within the natural order where it is open to the transcendent and creative reality of God.” (p 22-23)



## QUOTE.

- It's as if the human nature of Christ in the Incarnation and Resurrection created a new level of reality, a supreme kind of order, in light of which we need to rethink all of the others, for they have all been re-engineered on a new basis. The ordering effects of the top level, the New Creation in the resurrected humanity of Christ, reconstructs all the others.

“That God the transcendent Creator of the universe and the infinite Source of all its structure and order should thus become one of us and one with us in the birth, life, passion and resurrection of Jesus Christ in such a way as to effect a renewing of the creation and the setting of it on a new basis in which it is eternally bound up with the life of God himself, makes our minds reel with its immeasurable significance; but what is particularly staggering is the fact that it gives Jesus Christ a place of cosmic significance, making him, man of earth as he the incarnate Son of God is, the point of supreme focus for the whole universe of space and time, by reference to which all its meaning and destiny are finally to be discerned” (pp. 21-22).



Torrance concludes: Quote.

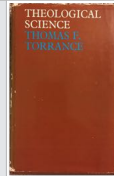
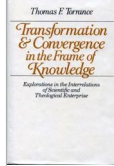
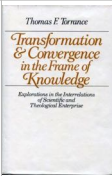
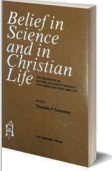
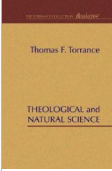
## How is the Resurrection related to the natural order and other sciences?



Instead of a "hopelessly anthropocentric evolutionism" (Greene), STR offers the hope of the Resurrection, a Christo-centric vision anchored in the risen humanity of Jesus, which even now is present with us, in a relational space and time, reordering all of creation.



## T.F.T. & Michael Polanyi

1963	"The Problem of Theological Statement Today"	First citation	
1969	<i>Theological Science</i>		
1975	"The Place of Michael Polanyi in the Modern Philosophy of Science," <i>Ethics in Science and Medicine</i>		
1978	"The Open Universe and the Free Society," University of Manchester		
1980	<i>Belief in Science and in Christian Life: The Relevance of Michael Polanyi's Thought for Christian Faith and Life</i>		
1997 - 1998	"Michael Polanyi and the Christian Faith," <i>Tradition &amp; Discovery</i>		

**1968: TFT joined Académie Internationale de Philosophie des Sciences**

From all this we see that TFT expressed his understanding of the Resurrection in space and time in ways that were illuminated by Polanyi's model of stratified levels.

- Beginning with his first explicit mention of Polanyi in 1963, TFT cited Polanyi continually in his later books. Here are just a few examples.
- Torrance edited a volume devoted to Polanyi, *Belief in Science and in Christian Life*,
- and published an article on Polanyi's Christian faith in the journal of the Polanyi Society.
- Alister McGrath documents that they became personal friends after Torrance was elected to membership in the International Academy of the Philosophy of Sciences in 1968 (Académie Internationale de Philosophie des Sciences). A further sign of their mutual friendship and trust is that Polanyi appointed TFT as executor of his literary estate.

— — — —

- "The Problem of Theological Statement Today," First citation of Polanyi, address at University of Tübingen.
- *Theological Science*. First significant engagement with Polanyi.
- Thomas F. Torrance, "The Place of Michael Polanyi in the Modern Philosophy of Science," Presented to a seminar on Polanyi at the session of The American Academy of Religion, Chicago, November, 1975. Comparison of Polanyi with Einstein, Popper, Bohr and Gödel. Reprinted in T&C.
- "The Open Universe and the Free Society," Delivered at the University of Manchester at the inauguration of the Michael

## T.F.T.'s use of Polanyi: Illumination, not Foundation



TFT ignored

TFT & Polanyi equated

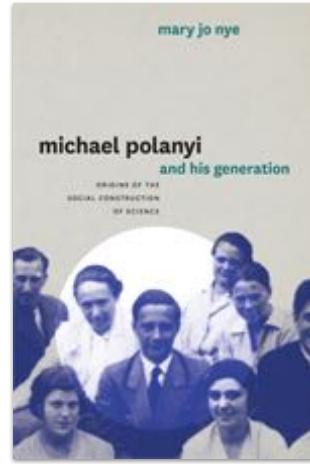
- Chronology
- Similarity ≠ influence
- Many sources

Because of this sustained interaction between TFT and Polanyi, anyone interested in Polanyi might also wish to give attention to TFT,

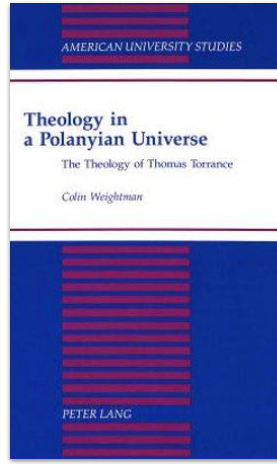
- but he is not mentioned in Mary Jo Nye's acclaimed recent biography of Polanyi – except incidentally in a single footnote.
- Going to the other extreme, Colin Weightman interpreted Torrance's theology as little more than a wholesale appropriation of Polanyi, their views largely equated except for some places where TFT failed to understand Polanyi.
- McGrath persuasively counters Weightman's account on several grounds, beginning with chronology. TFT did not encounter Polanyi until after publications appeared which contained the germ of ideas he would later express in Polanyian language, such as the personal character of knowledge or the overcoming of dualisms through a realist, *kata physin* epistemology.
- When Weightman encounters ideas in TFT that are similar to Polanyi, he assumes influence. Yet in many cases those ideas were developed independently. Theological understanding of the Resurrection, and especially of the Trinity, were TFT's chief resources for his thinking about creation.
- TFT drew from many sources. For example, Torrance drew upon Kierkegaard and Martin Buber's I-Thou understanding of personal knowledge, and upon Kurt Gödel and Einstein's view of the open and stratified structure of reality, prior to his use of Polanyi for similar purposes.

\* McGrath, pp. 202-203, 228-230ff. See also Colyer, How to Read T. F. Torrance, pp. 332-333.

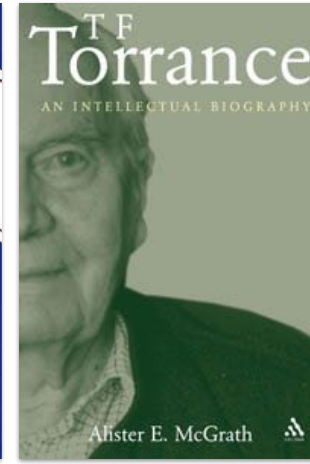
## T.F.T.'s use of Polanyi: Illumination, not Foundation



TFT ignored



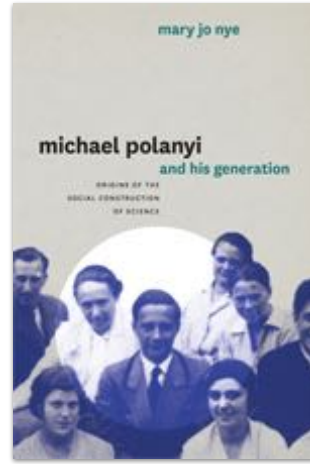
TFT & Polanyi equated



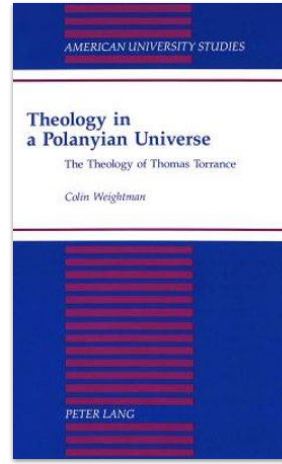
- Chronology
- Similarity ≠ influence
- Many sources
- Charitable sensibility

- Torrance practiced a charitable sensibility in his writings, often voicing his differences elliptically, without naming the hidden author he disagreed with, or graciously omitting to mention areas of disagreement. This is evident in his charitable reading of Barth's views on natural theology, or in his disagreement with Zizoulas' views of the Trinity, and we might add, on some of Polanyi's views on religion or evolution. TFT's resourceful and creative use of Polanyi owes as much to TFT as to Polanyi. In this section, we have been looking at Polanyi through TFT's eyes.

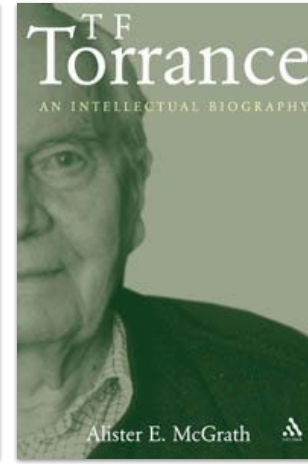
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TFT ignored



TFT & Polanyi equated



- Chronology
- Similarity ≠ influence
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- Illumination ≠ foundation

So while TFT insisted one should not base a creational theology upon current models in philosophy or any other field, as a foundation, one may use those models to illuminate theological understanding. McGrath cautions that it would be a mistake to assume that Torrance appropriated Polanyi wholesale, or depended upon Polanyi for the origin of his insights. Yet Torrance certainly found Polanyi's writings helpful to illuminate what he already wanted to say, particularly on the Resurrection.

- Quote: "It needs to be made clear from the outset that Torrance himself regards his use of Polanyi as a means of developing and strengthening his own fundamental theological ideas, and is emphatic that those ideas are not *grounded* in Polanyi's writings. Torrance certainly uses Polanyian notions – selectively and critically, it must be noted – in exploring the implications of some of those fundamental ideas, and enjoys pointing out convergence at points of significance. Yet he does not see this as entailing any form of total commitment to Polanyi's general methods or assumptions. Appreciative of Barth's strictures concerning the danger of making theology dependent upon anthropology, Torrance distinguishes between what we might term 'foundational' and 'illuminative' roles for philosophies such as Polanyi's." McGrath, p. 229.

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Alister McGrath, p. 229

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Did the Resurrection change the order of nature?

Questions?

Introduction

Space and Time

Divine Freedom and Contingent Order

**Stratification of Reality**

Conclusion

So that's Stratification of Reality. In STR, assuming an open and relational view of space and time, and envisioning multiple levels of contingent order, helps us comprehend how Torrance understood the Resurrection to profoundly change the order of nature without, however, violating natural laws.

• Questions? • BREAK •



## Did the Resurrection change the order of nature?

Introduction	
Space and Time	
Divine Freedom and Contingent Order	
Stratification of Reality	
Conclusion	3 reflections 5 case studies

START: Let's conclude with 3 reflections, and 5 case studies that apply the creational theology we've seen in STR.

STR is theology, not creational theology per se, but because of its focus on the Resurrection and Ascension, STR is an ideal place to begin as we learn to practice thinking theologically about the creation.

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TFT extended his theology to draw out applications to many areas of creational theology as diverse as the nature of the unborn child, the nature of juridical law, etc. He teaches us how to think theologically about the created order. These few brief examples may suggest how we might think theologically in the manner of STR and so extend STR to apply to other areas of discussion in creational theology today.

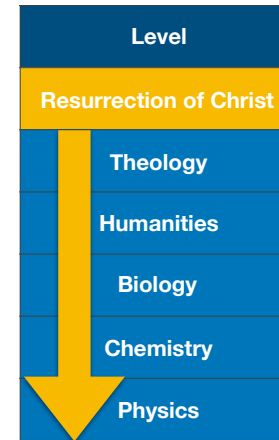
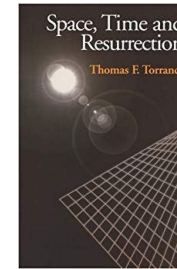
## Reflections



The Resurrection is the natural starting point for creational theology

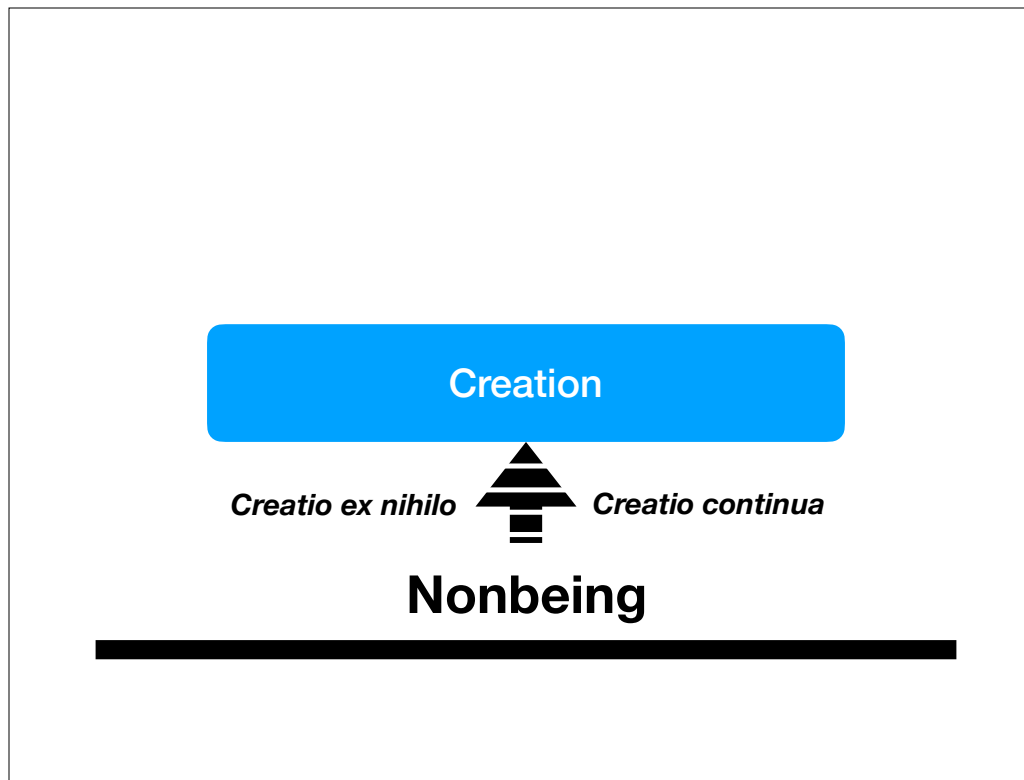
First reflection: The Resurrection is the natural (*kata-physin*) starting point in *natural* theology as well as in theology proper. The Creation and New Creation must not be separated in our thinking from the Resurrection. We seek to understand creation through the Incarnation, not vice versa.

“That God the transcendent Creator of the universe and the infinite Source of all its structure and order should thus become one of us and one with us in the birth, life, passion and resurrection of Jesus Christ in such a way as to effect a renewing of the creation and the setting of it on a new basis in which it is eternally bound up with the life of God himself, makes our minds reel with its immeasurable significance; but what is particularly staggering is the fact that it gives Jesus Christ a place of cosmic significance, making him, man of earth as he the incarnate Son of God is, the point of supreme focus for the whole universe of space and time, by reference to which all its meaning and destiny are finally to be discerned” (pp. 21-22).

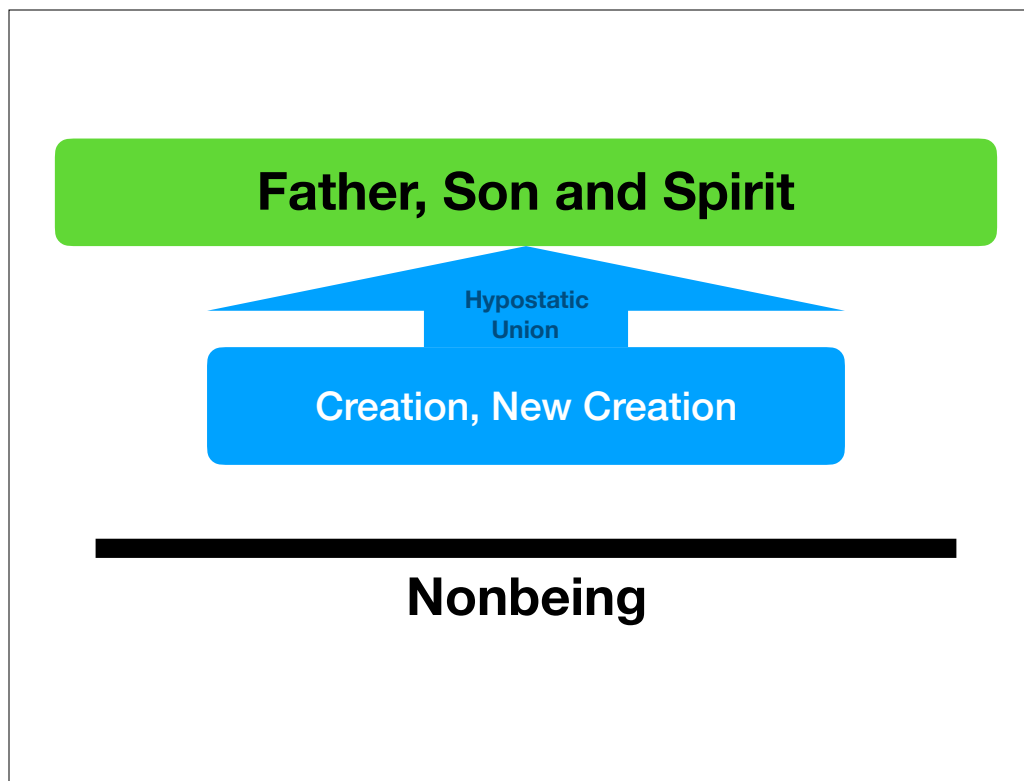


We saw this slide earlier, when Torrance said: Quote.

The Resurrection established a new level of created reality, a supreme kind of order, in light of which all of the others have been set on a new basis. The ordering effects of the top level, the New Creation in the resurrected humanity of Christ, are reconstructing all the others.



For contrast, let's back up to the traditional doctrine of creation, which tells us that God brought creation into being from nothing. Even now, God still holds all things together and sustains them in being. Yet only God has being in himself, so therefore the creation, considered on its own, is constantly threatened with falling back into disorder and nonbeing. It would be progressively disordered and ultimately annihilated were it not for the sustaining creation of God, in an ongoing, continuing creation (*creatio continua*).



Yet in the Incarnation the Eternal Son became flesh, and assumed our human nature. That hypostatic union of the divine and human natures of Christ continues in the Resurrection, so that the new creation in him is now oriented toward and established in the Triune reality, being, and communion. The ordering power of the Resurrected humanity of Christ establishes the creation in union with him, and orients creation toward participation in the ultimate source of all order, the Triune communion of love.

- Non-being is no longer an option; it is walled off by the Resurrection of Christ. Nature is transformed; because of Immanuel in the Incarnation and Resurrection, it is set on an entirely new basis, the risen humanity of Jesus Christ. We who affirm the Resurrection in space and time can no longer talk of creation without Christ. Creation and New Creation cannot be separated from the Resurrection. For the Christian, Creation/Incarnation/Resurrection/Ascension/Advent may be distinguished but not separated.

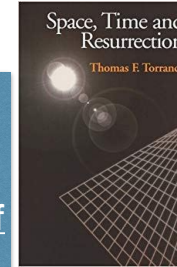
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Homoousion: oneness in being of the Father, Son, Spirit

Hypostatic Union: oneness of the Person of Jesus: Divine and Human natures; Eternal Son of God and Incarnate Son of Man.

## The New Creation

“But in his own resurrection Jesus had healed and redeemed our creaturely existence from all corruption and privation of being, and every threat of death or nothingness, so that in him space and time were recreated or renewed. We have no adequate language to describe this, and can speak of it only in apocalyptic language, that is in language that breaks down in its very using, but which must break down if it really is to point us to this new reality beyond, which cannot be captured or enclosed in the language of this fallen world.” (p. 127)

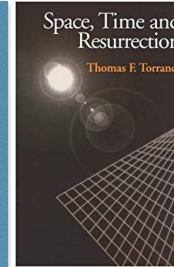


TFT writes: quote.

This re-creation and setting of reality upon a new basis in the Resurrection is the redemption of space and time. Torrance elaborates with respect to what this means specifically for time: (next slide)



“The kind of time we have in this passing world is the time of an existence that crumbles away into the dust, time that runs backward into nothingness... As happening within this kind of time, and as event within this kind of history, the resurrection, by being what it is, resists and overcomes corruption and decay, and is therefore a new kind of historical happening which instead of tumbling down into the grave and oblivion rises out of the death of what is past into continuing being and reality. This is temporal happening that runs not backwards but forwards, and overcomes all illusion and privation of being. This is fully real historical happening, so real that it remains real happening and does not slip away from us, but keeps pace with us and outruns us as we tumble down in decay and lapse into death and the dust of past history and even comes to meet us out of the future. That is how we are to think of the risen Christ Jesus.” (pp. 88-89)



Quote.

This is the key to what Torrance means by the new creation, and the redemption of time. The Spirit that once hovered over the waters now moves within all creation, breaking in with Resurrection time. So the Resurrection is the natural (kata-physin) starting point for creational theology.

— — — —

“it is necessary to see that the resurrection means the redemption of space and time, for space and time are not abrogated or transcended. Rather are they healed and restored, just as our being is healed and restored through the resurrection.” P. 90.

Footnote: “D. M. MacKinnon makes the point that although in one sense the resurrection is in time, it 'possesses also a relation to the eternal as ultimate and unique as that of the universe to its creation. Indeed', he adds 'what I would be prepared to argue is that here for the Christian is focused the very relation of the temporal to the eternal itself. So that we would not be wrong if we saw creation itself through this event, which is more than event'. Op. cit., p. 64.”

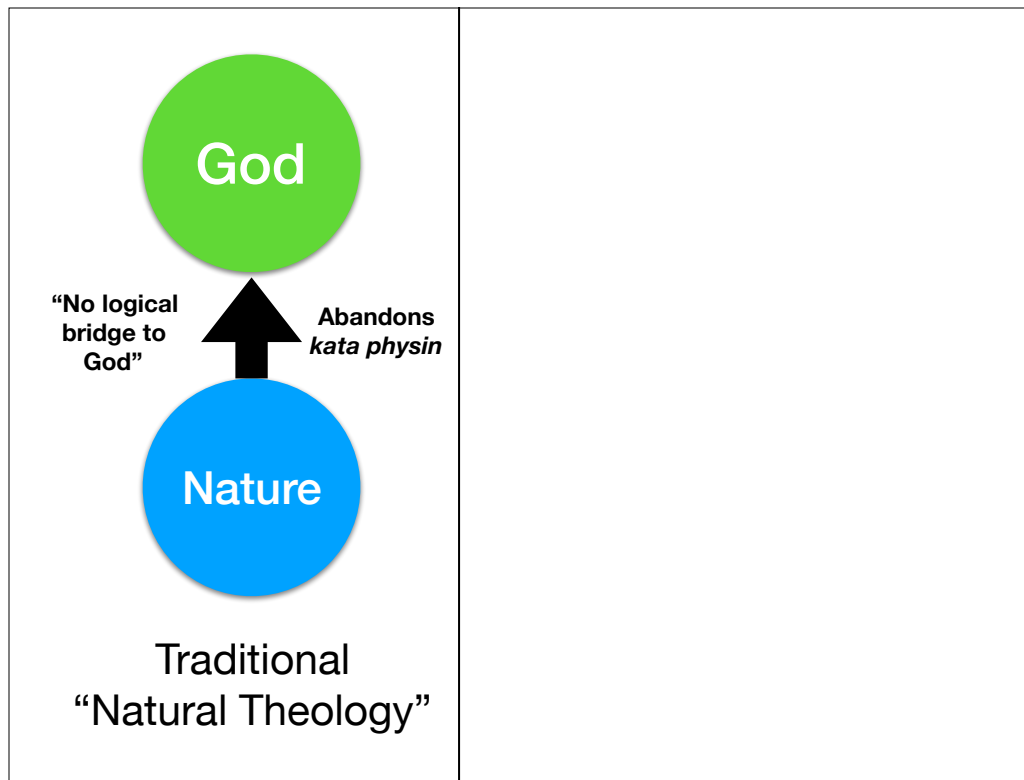
“The resurrection of the man Jesus, and his exaltation to the right hand of the Father, mean the taking up of human time into God. In Christ the life of human being is wedded to eternal life. The ascension also means that this time of the new creation in Christ is hidden from us, and, as it were, held back until in the mercy of God Jesus Christ comes again to judge and renew all his creation.” P. 98.

## Reflections

		The Resurrection is the natural starting point for creational theology
		A Resurrection-based, Trinitarian natural theology offers theologians and scientists a rigorous, mutually-beneficial dialogue

If the first reflection is that the Resurrection is the natural (kata physin) starting point for creational theology, then

- the second reflection is that Torrance's Resurrection-based, Trinitarian creational theology offers theologians and scientists a rigorous, mutually-beneficial dialogue. At first this might seem counterintuitive...



Wouldn't a traditional natural theology, which starts with evidence drawn from nature, allow a scientist to reason strictly from their own science to a creator and some form of theism? Isn't this the kind of dialogue scientists expect and need from theologians? To practitioners of traditional natural theology, any other option seems like a dead end, a form of fideism (faith without reason), which would cut off all meaningful conversation with scientists.

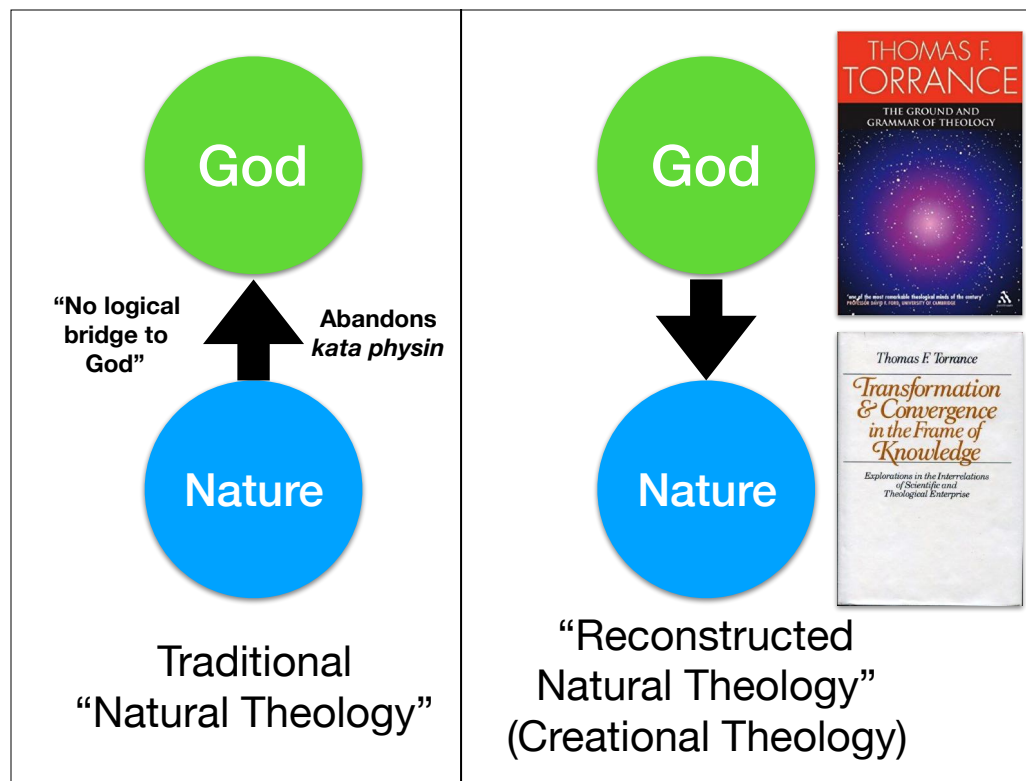
- On the other hand, Torrance argued that traditional natural theology itself is a dead end, not only because there is "no logical bridge to God," but fundamentally because it abandons *kata physin* or scientific knowing, and so becomes destructive to both science and theology.

- The alternative option, a "reconstructed natural philosophy" or creational theology, in which one believes *in order* to understand, makes constructive dialogue possible. Torrance wrote explicitly about its benefits to scientists and theologians alike
- in books and articles such as *The Ground and Grammar of Theology*, and *Transformation and Convergence in the Frame of Knowledge*. Torrance's creational theology would be another presentation in itself...

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— Integration.



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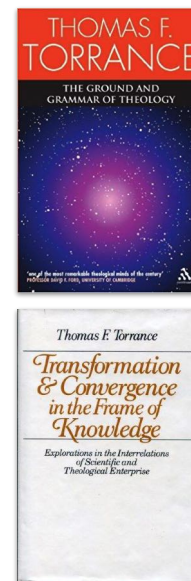
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## Mutually-beneficial dialogue

- Open and relational character of reality, including space/time.
- Onto-relational character of reality.
- Contingent order.
- Stratification of reality.
- Irreducibility. Contra determinism, mechanism.
- Integrity: Contra scientism, hegemony by other disciplines.
- Integration: empirical realism, multi-disciplinary inquiry.
- Realist epistemology: *Kata physin*.
- Knowing as inherently personal and ethical.
- Overcoming dualisms (cosmological and epistemological) & “cultural splits.”
- “Ultimate” and “penultimate” beliefs (required for, but not established by, natural science):
  - Contingent intelligibility
  - Contingent freedom
  - Significance for humans, freedom and love



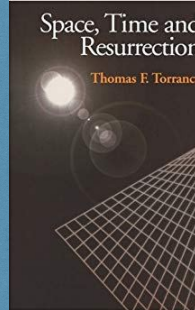
but some of those benefits are listed on this slide. We have glimpsed many of them in STR. A Resurrection-based, Trinitarian creational theology insists upon the open and relational character of reality, including space and time; onto-relations, that the relations of a thing are part of its nature and it cannot be known apart from those relations; contingent order; the stratification of reality; irreducibility; the integrity of each scientific discipline with its own *kata physin* methods, against scientism and any hegemony or incursion by other disciplines; integration, as a legitimate act of multi-disciplinary inquiry; a realist epistemology (*kata physin* again), in which knowing is an inherently personal and ethical act, requiring continual “repentant thinking.” Theology and science together can overcome epistemological and cosmological dualisms and repair cultural splits. Theology can reinforce scientific convictions on ultimate and penultimate beliefs, such as the amazing intelligibility of nature, for every day, every scientist assumes more than can be proved. Or the contingent freedom of nature, which constantly surprises us. And theology helps scientists preserve space for human significance, freedom and love on a personal level. These are just a few of the topics on which creational theology offers scientists much to talk about that is mutually beneficial.

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\*See JBU talk on interdisciplinary connections, where each discipline is seen *a posteriori* to share a *kata physin* boundary in common, <https://kerrysloft.com/art-music-lit-2/the-nature-of-the-christian-university/>

## Mutually-beneficial dialogue

“It will be through dialogue at the deepest level between Christian theology and natural science, in which each remains faithful to the nature and character of its own field of inquiry, and in recognition that both operate within the same field-structures of space and time as the bearers of all rational order in the universe, that interpretation and intelligible appropriation of the message of the resurrection may take place.”  
(p. 45)



Torrance writes:

Creational theology does not mean disengagement from dialogue with the natural sciences, but rather offers a basis for a more profound dialogue than is possible with traditional conceptions of natural theology.

“I would like to return to the question I have been trying to answer in connection with my membership in two international academies devoted to theology and science. It is the question whether there is a way of bringing scientists and theologians together in which rigorous science and rigorous theology can enter into a serious dialogue with one another without betrayal of their respective convictions. While we do not and may not try to build theology on science, any more than we build science on theology, there is nevertheless a deep level of conceptual interconnection between the two, clarification of which can help both theology and science to be faithful to the distinctive nature of the realities with which they are concerned. Dialogue with one another within the overlap of their inquiries in space and time may help scientists to shed dubious theological ideas that they may have unwittingly picked up in the history of thought, and may help theologians to shed discarded scientific ideas which they also may have picked up from the past. Hence, rightly pursued, this kind of dialogue involves a process of mutual purification and increasing rapprochement. When we theologians engage in it this way we become better equipped to preach the gospel of the incarnation and atonement in the scientific world in which we live.”

"Incarnation and Atonement in the Light of Modern Scientific Rejection of Dualism," 1992

In another article, Torrance describes this mutually-beneficial dialogue:

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Thomas F. Torrance, "Incarnation and Atonement in the Light of Modern Scientific Rejection of Dualism," in *Preaching Christ Today: The Gospel and Scientific Thinking* (Grand Rapids, Michigan: W. B. Eerdmans, 1994), 41-71; #1994-571b



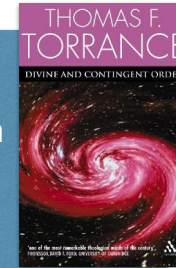
## Reflections

		The Resurrection is the natural starting point for creational theology
		A Resurrection-based, Trinitarian natural theology offers theologians and scientists a rigorous, mutually-beneficial dialogue
		Union with Christ entails Re-creation from within

The third reflection:

Union with Christ entails that the kind of New Creation we are contemplating must be a re-creation from within space and time. Just as in the Incarnation, Jesus transformed human nature from within, so in the same way, we participate in the Resurrection of Christ as the Spirit is working to heal, re-order, and transform creation from within. In one sense, the re-ordering of creation comes from outside, as this re-engineering is not the emergence of something Nature could achieve on its own. But in a more profound sense, the re-creation comes from within, for God is creating not from nothing, *ex nihilo*, but re-creating through the risen humanity of Jesus Christ. The transformation through Christ in the Spirit is a creature-affirming, personalizing process, which establishes rather than diminishes the creature. Not a heavy hand, by decree or law, nor dehumanizing. Not an imposition from above, but a re-creation of order from within. Grace in action is re-ordering our world, gently, patiently, from the bottom up, from the inside out.

“In fulfilment of the divine purpose of salvation the incarnation of God in our world involved such an entry into our fallen and lost condition that God placed himself under the power of evil in order to break it, and took our pain and hurt and suffering into himself in order to quench them in his divine serenity, thus bringing peace to his creation. This movement of God’s holy love into the heart of the world’s evil and agony is not to be understood as a direct act of sheer almighty power, for it is not God’s purpose to shatter and annihilate the agents and embodiments of evil in the world, but rather to pierce into the innermost centre of evil power where it is entrenched in the piled-up and self-compounding guilt of humanity in order to vanquish it from within and below...”



TFT writes:

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Thomas F. Torrance, *Divine and Contingent Order* (Oxford; New York: Oxford University Press, 1981), 136.



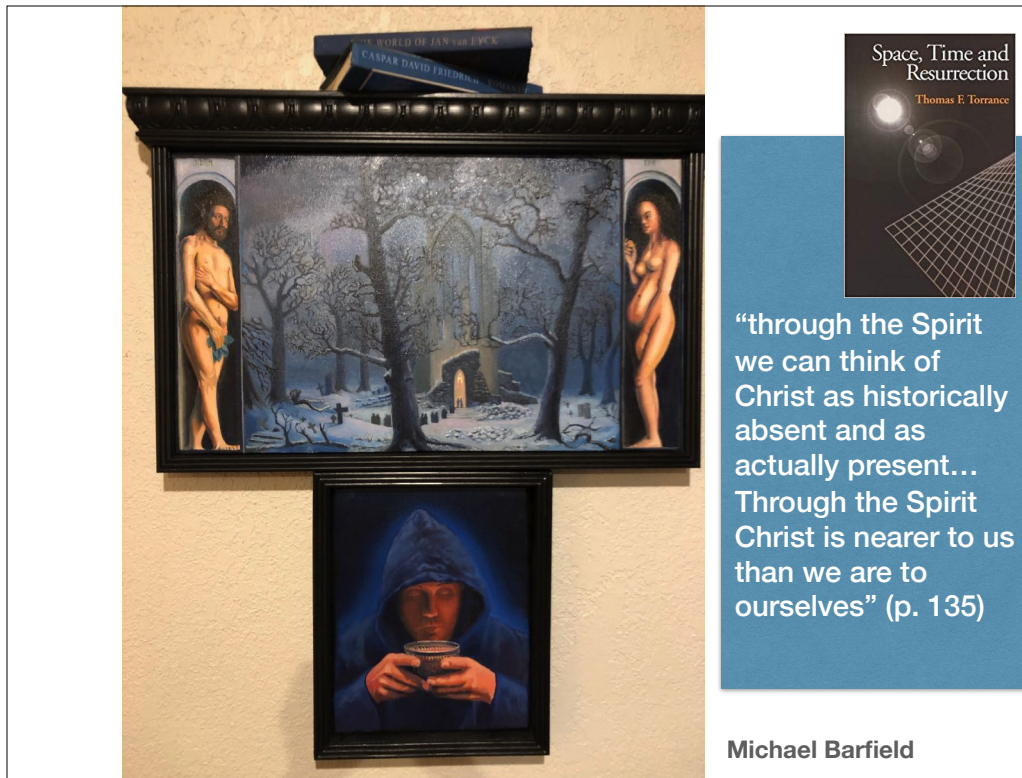
Jan Van Eyck and his brother Hubert created the Ghent altarpiece, the “Adoration of the Lamb,” which was completed by 1432.

- After the fall of Adam and Eve,
- redemption has come. This is one of the earliest landscape paintings drawn with naturalistic lighting and perspective.



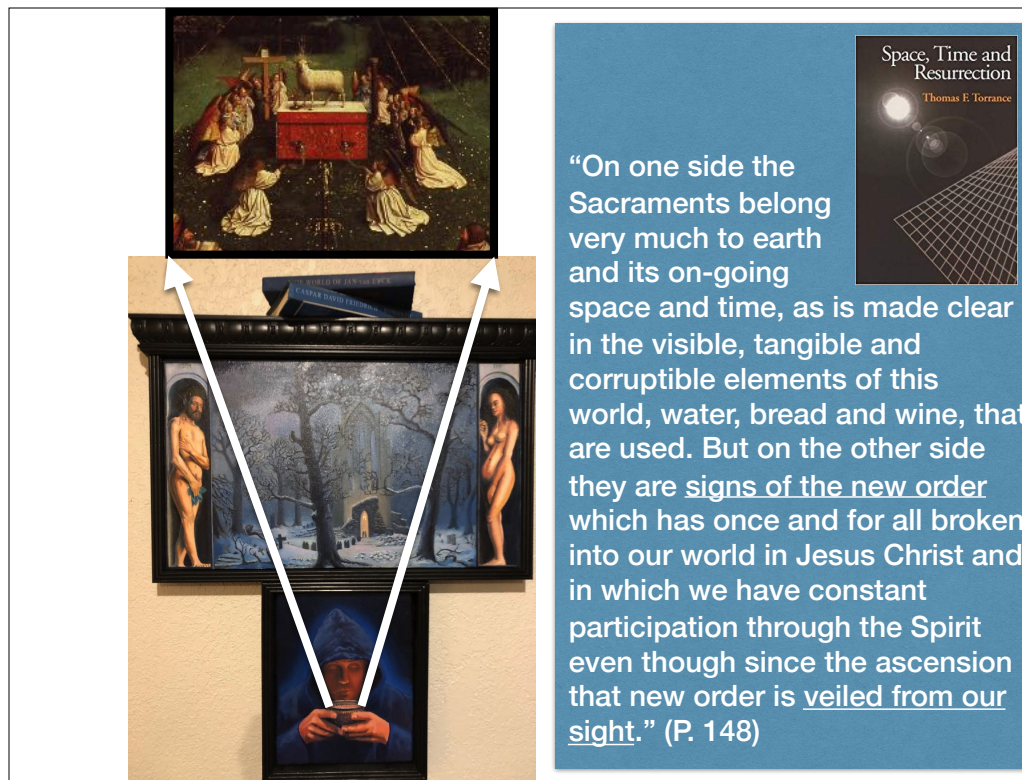
The earthly landscape depicts a heavenly reality: Jesus rules on the throne, not as the Lion but as the risen Lamb that was slain.





In this contemporary work, the artist incorporates the fall of Adam and Eve from Van Eyck. Yet instead of the heavenly landscape of Van Eyck,

- the artist substitutes an earthly landscape after the manner of Caspar David Friedrich. On earth, things do not appear to the eyes as they do in heaven, for the risen Lamb is at work, renewing his church, hiddenly, beneath surface appearances. We see this in the Eucharist, intruding the new creation into this present world.
- TFT writes: “through the Spirit we can think of Christ as historically absent and as actually present... Through the Spirit Christ is nearer to us than we are to ourselves” (p. 135)



#### Quote

- (White lines of open perspective.) There is a sacramental relation between this world and the ascended Christ through the Spirit.

## Reflections

		The Resurrection is the natural starting point for creational theology
		A Resurrection-based, Trinitarian natural theology offers theologians and scientists a rigorous, mutually-beneficial dialogue
		Union with Christ entails Re-creation from within

So that's three reflections, on (READ).

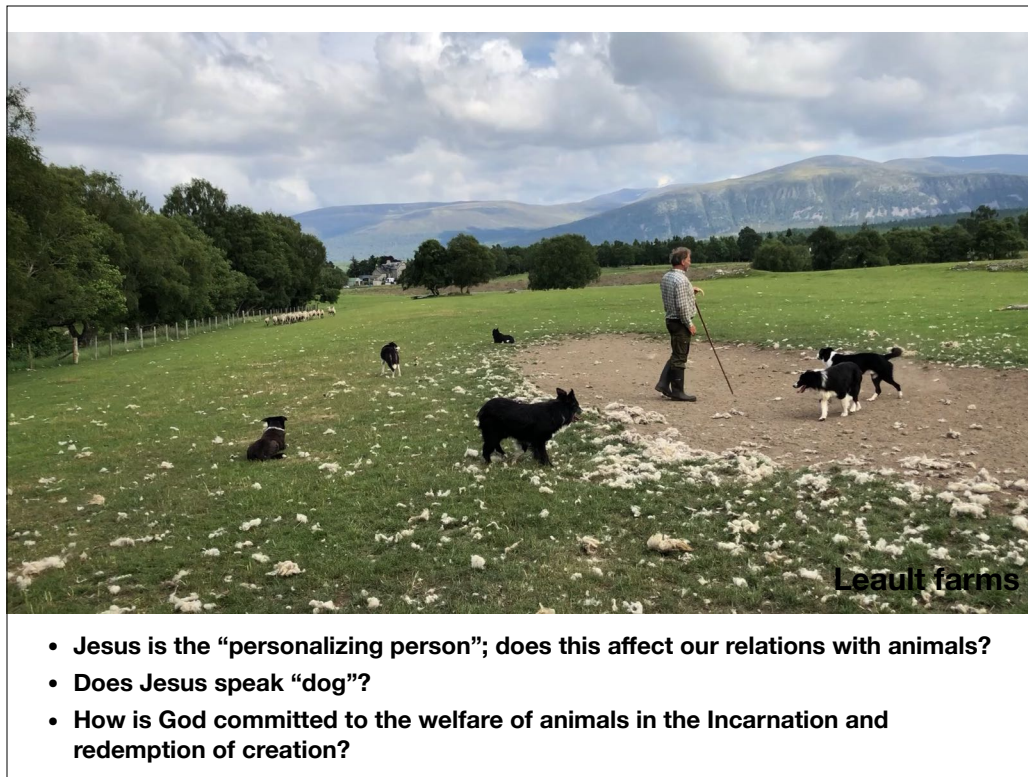


## Extensions



How might we extend or apply the creational theology of STR? Let's take a look at five short case studies.

- The first is Animals.



Does the Resurrection implicate animals? Does the Spirit even now move in our animals?

- According to TFT, Jesus is the “personalizing person.” As Jesus reorders and restores our personhood, does his personalizing of us affect the animals with whom we are in intimate relation?

If Jesus the Living Logos of God speaks the language of every tribe and nation,...

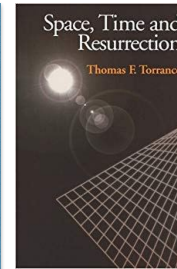
- does Jesus speak “dog” at least as well as the sheep farmer here?

Have you experienced an occasion when an animal, likely a dog or horse in human relationship, seemed to know exactly who was in need, and responded to them? Do you know someone who uses, owns or trains a therapy dog? (QUERY) I’ve heard TFT enjoyed horses, and would love to hear more.

- In the Incarnation, how has God committed himself to the welfare of animals as part of the redemption of creation?

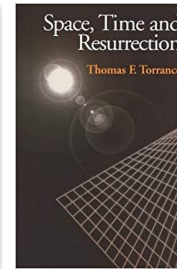
#### THE COSMIC RANGE OF ESCHATOLOGY

“He who was made flesh is the Creator Logos by whom all things were made and in whom all things are upheld. When he became incarnate, and divine and human natures were united in his one person, his humanity was brought into an ontological relation with all creation. So far as our humanity is concerned that means that all men are upheld, whether they know it or not, in their humanity by Jesus Christ the true and proper man, upheld by the fulfilment and establishment of true humanity in him, but also through his work in the cross and resurrection in which he overcame the degenerating forces of evil and raised up our human nature out of death and perdition. But the range of Christ's mighty acts in incarnation, reconciliation and resurrection apply to the whole universe of things, visible and invisible...



In speaking of the “cosmic range of eschatology,” TFT writes: quote.

The whole of creation falls within the range of his Lordship, as he works out his purpose by bringing redemption together with creation, and actualizing the holy will of the Father in everything. Eschatology has here a teleological relation to the whole realm of created existence, and leads into the doctrine of 'the new heaven and the new earth'. God does not abandon his creation when he has saved man, for all creation, together with man, will be renewed when Christ comes again. Since he is the first-born of the new creation, the head in whom all things, visible and invisible, are reconciled and gathered up, the resurrection of Christ in body becomes the pledge that the whole physical universe will be renewed, for in a fundamental sense it has already been resurrected in Christ." (pp. 154-155)



TFT continues: Read quote.

TFT frequently articulated a conception of humanity as the priest of creation, mediating the order of the Incarnation and giving voice to creatures. If creatures participate in our reality while our reality is participating in the re-ordering of the Resurrection, to what extent is this an “already and not yet” relationship? Might animals participate in the eschatological future through their relationship with humans, particularly in the church?

— —

Therapy dogs; not unlike Lewis.

## Extensions

	Animals
	Astrobiology

The second possible application is Astrobiology, the Extra-Terrestrial Life debate.

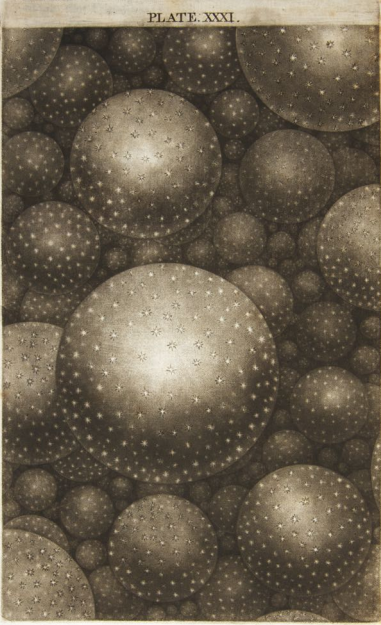


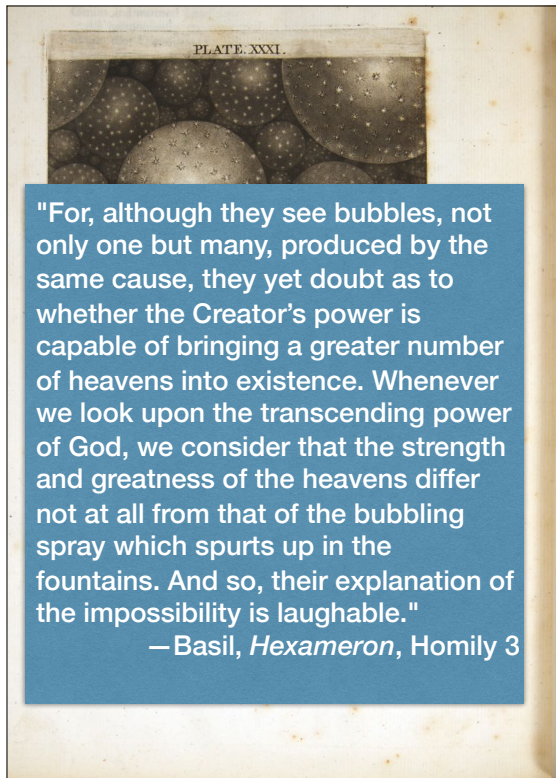
PLATE XXXI.

**Thomas Wright**  
*An Original Theory or New Hypothesis  
of the Universe* (1750)

Divine Freedom	Ascension
Plurality of Worlds?	Multiple Incarnations?

Let's consider two questions: Plurality of Worlds and Multiple Incarnations. Over the centuries, it has not been unusual for those who uphold divine freedom to hold that we must consider it possible that God might have created a plurality of worlds. But for those who considered this possibility, did they think that Jesus might become incarnate in any of those other worlds?





"For, although they see bubbles, not only one but many, produced by the same cause, they yet doubt as to whether the Creator's power is capable of bringing a greater number of heavens into existence. Whenever we look upon the transcending power of God, we consider that the strength and greatness of the heavens differ not at all from that of the bubbling spray which spurts up in the fountains. And so, their explanation of the impossibility is laughable."  
— Basil, *Hexameron*, Homily 3

Divine Freedom	Ascension
Plurality of Worlds? YES	Multiple Incarnations?

- Basil, *Hexameron*

Let's go to the 4th century for our first example. Against Aristotle and others, who argued that other worlds are impossible, Basil argued that God could make a plurality of worlds if he wants to:

•Quote

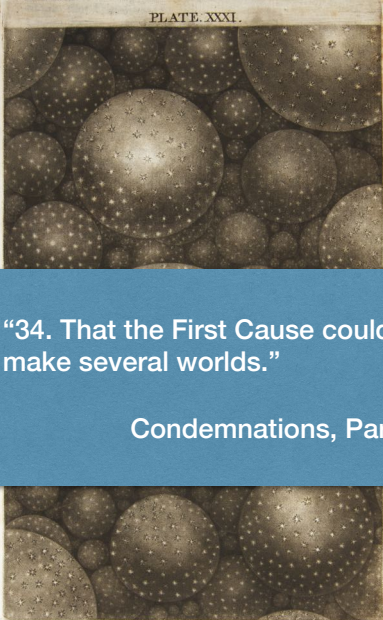
In other words, Basil denied any element of necessity in the natural order, affirming the contingency of creation. To be clear, Basil did not argue that multiple worlds do exist, but he insisted they are possible. For Basil, the most important question was not how many worlds there are, but whether nature is contingent rather than necessary.

— — — —

Basil Hexameron, Homily 3, p. 40; cf. p. 6. "Essential to [Basil's] cosmological outlook lies the Christian concept of the radical contingency of the universe and its rational order. And central to all that is the conception, so impossible for the ancient Greeks, of the contingent nature of the human mind created by God out of nothing but given a unique relation to his own transcendent Mind through grace. The incorporation of those ideas in Basil's Hexameron played a very important role, not only in challenging the intellectual foundations of the classical outlook upon the world of visible and invisible reality, but in helping to transform the Greek mind in a way that has left its mark upon the very basis of western culture." Thomas F. Torrance, *The Christian Frame of Mind*, p. 5.



PLATE XXXI.



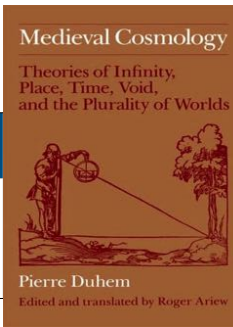
“34. That the First Cause could not make several worlds.”

Condemnations, Paris, 1277

**Divine Freedom**

Plurality of Worlds?  
YES

Medieval Cosmology  
Theories of Infinity, Place, Time, Void, and the Plurality of Worlds  
Pierre Duhem  
Edited and translated by Roger Ariew

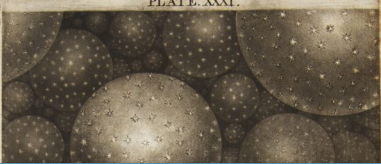


- Basil, *Hexameron*
- 1277 – Paris Condemnations

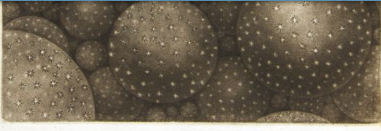
Now fast forward to 1277, when Stephen Tempier, Bishop of Paris, condemned 219 propositions in natural philosophy that restricted divine freedom. Thereafter, at least in Paris, no scholar could teach necessitarianism. One of the condemnations prohibited faculty from advocating Aristotle's conclusion

- that the First Cause could NOT make more than one world.
- Pierre Duhem, in the book by him mentioned earlier, regarded the affirmation of divine freedom expressed in these condemnations as the “birth certificate of modern science.”

PLATE XXXI.



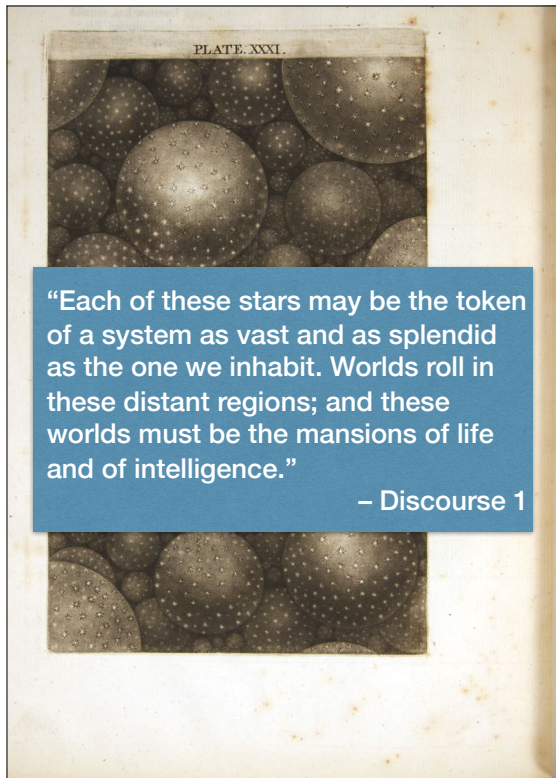
“As to the question whether Christ by dying on this Earth could redeem the inhabitants of another world, I answer that he is able to do this even if the worlds were infinite, but it would not be fitting for him to go into another world that he must die again.”



Divine Freedom	Ascension
Plurality of Worlds? YES	Multiple Incarnations? NO

- Basil, *Hexameron*
- 1277 – Paris Condemnations
- William of Vorilong, d. 1464

In the 15th century, William of Vorilong turned to the question of multiple Incarnations: (Quote)



Divine Freedom	Ascension
Plurality of Worlds? YES	Multiple Incarnations? NO

- Basil, *Hexameron***
- 1277 – Paris Condemnations**
- William of Vorilong, d. 1464**
- Thomas Chalmers, 1815**

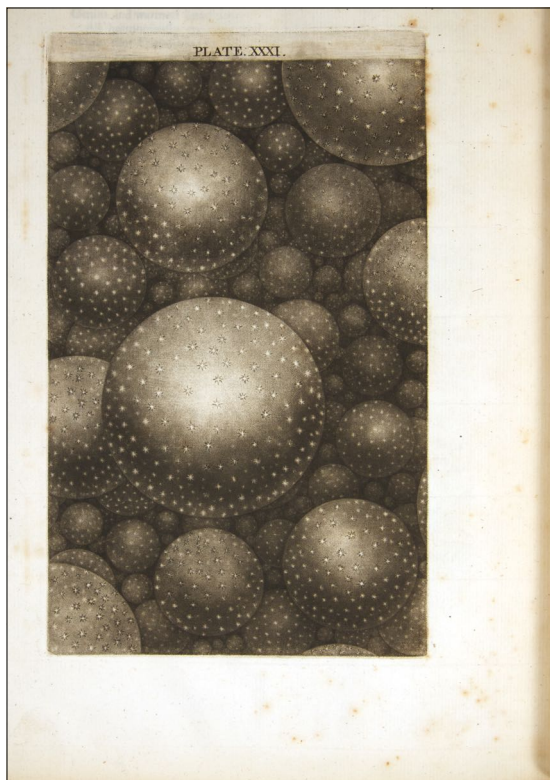
*A Series of Discourses on the Christian Revelation Viewed in Connection with the Modern Astronomy (1815)*

“Each of these stars may be the token of a system as vast and as splendid as the one we inhabit. Worlds roll in these distant regions; and these worlds must be the mansions of life and of intelligence.”

– Discourse 1

Skipping to the 19th century, we come to Thomas Chalmers' *A Series of Discourses on the Christian Revelation Viewed in Connection with the Modern Astronomy* (published in 1815).

- [Read quote] According to Chalmers, sin may have corrupted only the Earth, alone among all the far regions of the heavens. Perhaps extraterrestrials already know him. Or, if they do not, they are redeemed by Christ's acts on Earth.
- Chalmers described clusters of stars innumerable, which appear to us as cloudy nebulae, much as depicted in Wright's plate from 65 years earlier.

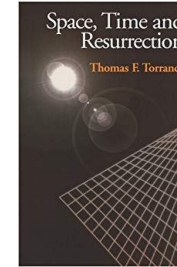


Divine Freedom	Ascension
Plurality of Worlds?	Multiple Incarnations? NO

- Basil, *Hexameron*
- 1277 – Paris Condemnations
- William of Vorilong, d. 1464
- Thomas Chalmers, 1815
- Thomas F. Torrance...

And finally, Thomas Torrance. I don't know if he explicitly addressed the two questions of the plurality of worlds or multiple incarnations — (QUERY) if you do, please let me know. Yet his understanding of the Ascension, and the hypostatic union of Jesus divinity and humanity, both seem to me to argue against multiple Incarnations. Consider the Ascension:

“The withdrawal of Christ from visible and physical contact with us in our space-time existence on earth and in history means that Jesus Christ insists in making contact with us, not first directly and immediately in his risen humanity, but first and foremost through his historical involvement with us in his incarnation and crucifixion. That is to say, by withdrawing himself from our sight, Christ sends us back to the historical Jesus Christ as the covenanted place on earth and in time which God has appointed for meeting between man and himself. The ascension means that our relation to the Saviour is only possible through the historical Jesus, for the historical Jesus is the one locus within our human and creaturely existence where God and man are hypostatically united, and where man engulfed in sin and immersed in corruption can get across to God on the ground of reconciliation and atonement freely provided by God himself. The ascension thus means that to all eternity God insists on speaking to us through the historical Jesus.” (p. 133)

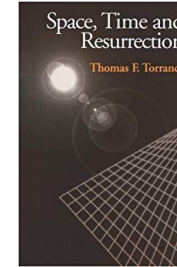


Read quote.

On the following page, TFT continues:



“Thus the ascension means that we cannot know God by transcending space and time, by leaping beyond the limits of our place on earth, but only by encountering God and his saving work within space and time, within our actual physical existence... The ascension, on the contrary, sends us back to the incarnation, and to the historical Jesus, and so to a Word and Act of God inseparably implicated in our space and time. It sends us back to a Gospel which is really accessible to frail creatures of earth and history, and a Gospel that is relevant to their bodily existence day by day in the structures and coherences of space and time. Thus all true and proper knowledge of God is mediated through the historical Jesus Christ. Now that God has taken this way of revealing himself to us in and through the incarnation of his Word in the space-time existence and structure of Jesus Christ, he has set aside all other possibilities for us, no matter how conceivable they were *a priori*.” (p. 134)



(quote)

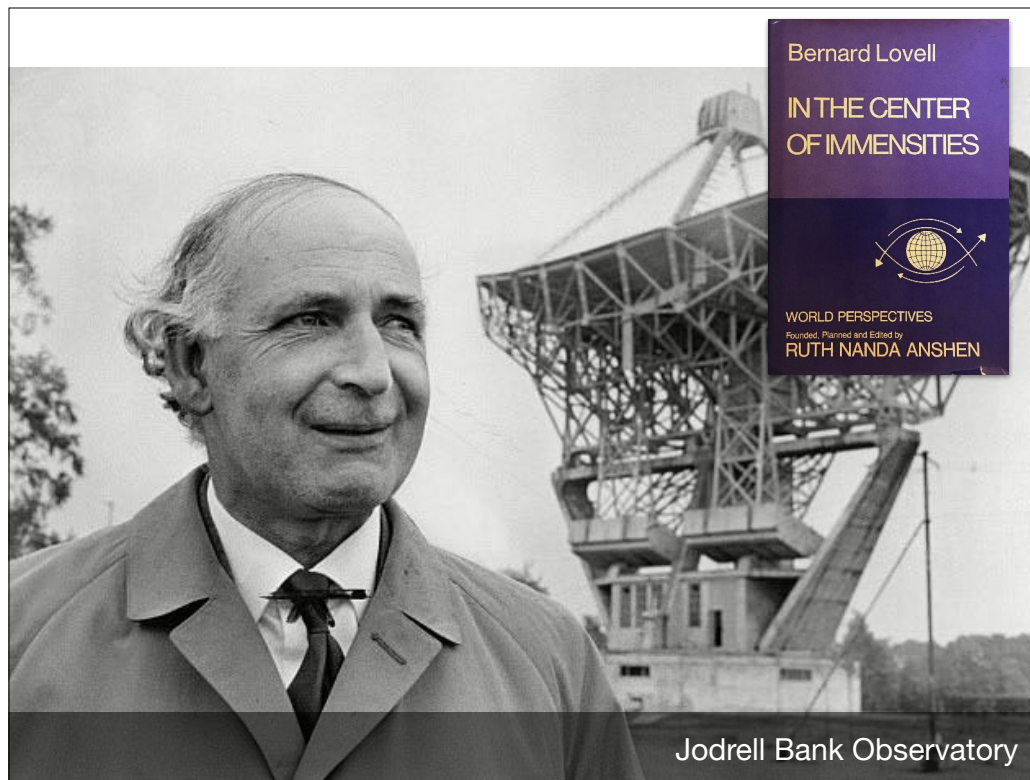
Do the Ascension, and the hypostatic union, make the Incarnation on Earth absolutely unique, in such a way as to preclude multiple incarnations on other worlds? I would guess that if Torrance engaged this issue, he would have come down on the side of those who say that, if ET exists, and if they're fallen, then it's up to us to marshall all our rocketry in the service of evangelism and as soon as possible to take them the good news of the Parousia of Christ.

## Extensions

	Animals
	Astrobiology
	Anthropic Principle

Our third extension is the Anthropic principle.





Bernard Lovell was knighted in 1946 for building the Jodrell Bank Observatory, which at the time featured the largest radio telescope in the world. He served as its director from 1945 to 1980. In 1969, TFT dedicated *Theological Science* to Lovell, crediting Lovell with stimulating him to think more deeply about scientific method.

- One of many of Lovell's books, *In the Center of Immensities*, appeared in 1978.

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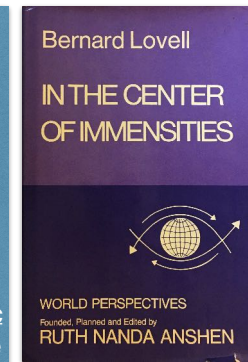
"This volume is dedicated to Bernard Lovell, as he was then, who put to me the initial questions as to scientific method in theology which led me to examine more carefully the nature of the theology as a science, and to select this theme for the Hewett Lectures." (Preface, p. xviii.)

BL married Mary Joyce Chesterman (d. 1993).

“There are, indeed, profound problems concerned with the presence of man in the Universe which envelop the localized problem of the emergence of life on Earth... We have attempted to describe the early stages of the expansion of the Universe but the *description* in terms of nuclear physics and relativity is not an *explanation* of those conditions. Formidable questions arise and it is not clear today where the answers should be sought; indeed, even the scientific description of these queries produces the remarkable idea that there may not be a solution in the language of science. Why is the Universe expanding? Furthermore, why is it expanding at so near the critical rate to prevent its collapse?

The query is most important because minor differences near time zero would have made human existence impossible...”

Bernard Lovell  
*In the Center of Immensities* (1978)



Lovell wrote: (quote)

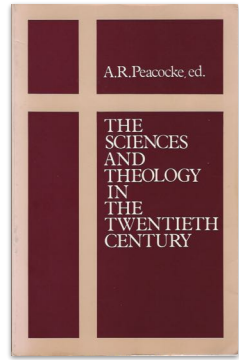
Science seems to point to a boundary condition beyond itself when it pursues questions such as the presence of human life in the universe. Torrance picks up on this, writing...

— — — —

Bernard Lovell, p. 122. 1978

On the boundary line of higher levels of order?

Not necessity but contingent order?



“...the contingent nature of the universe challenges science to reckon with it no longer as a negligible factor in rigorous scientific understanding and interpretation of the natural order... the orderly connections which it seeks to trace within the universe cannot be followed through scientifically to any final end, for they break off at the limits of space and time, but that nevertheless... they refer our thought meta-scientifically... to an ultimate intelligible ground on which all orderly connections within the universe must depend...

The problem of natural science... [is that it] runs the risk of lapsing into an empiricist rationalism in which contingency is abjured and genuine empirical science is pushed aside.”

T. F. Torrance

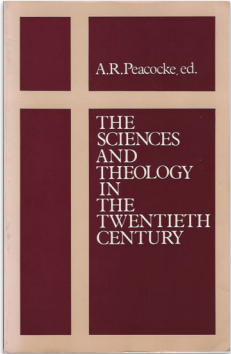
“Divine and Contingent Order”

*The Sciences and Theology in the 20th Century* (1981)

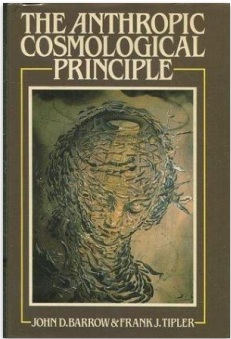
Quote.

Here Torrance suggests that the theologian can stand beside the scientist and encourage the scientist not to shirk from, or abjure, the contingent character of the natural order.

- John Barrow and Frank Tipler, in their classic statement *The Anthropic Cosmological Principle*, consider the same uncanny coincidences as Lovell, such as the rate of expansion of the universe, which were necessary for life to emerge on earth. But in contrast to Lovell and Torrance, Barrow and Tipler shy away from the universe as contingent order.



Lovell / Torrance	Barrow / Tipler
Weak Anthropic Principle (WAP)	Strong Anthropic Principle (SAP)
Contingent order	Necessary order
Singularity, One contingent universe	No singularities, Necessary Multi-verses



The problem of natural science... [is that it] runs the risk of lapsing into an empiricist rationalism in which contingence is abjured and genuine empirical science is pushed aside.

T. F. Torrance

“Divine and Contingent Order”  
*The Sciences and Theology in the 20th Century* (1981)

Whereas they might characterize Lovell and Torrance as holding a Weak Anthropic Principle, which acknowledges the apparent contingency and singularity of the universe,

- Barrow and Tipler argue for what they call the Strong Anthropic Principle, according to which it was *necessary* for life to emerge. The same kind of necessitarian thinking as in the SAP is also evident in Multi-verse cosmologies. Are the SAP and Multi-verse cosmologies legitimate theories, or are these scientists
- pushing aside “genuine empirical science,” in order to abjure the contingent character of natural order?
- Lovell, Torrance, and Christian cosmologists like John Polkinghorne or David Wilkinson, hold any anthropic principle as contingent order, which in terms of its own level might have been otherwise, not as necessary. Natural science mutely points to a higher level.

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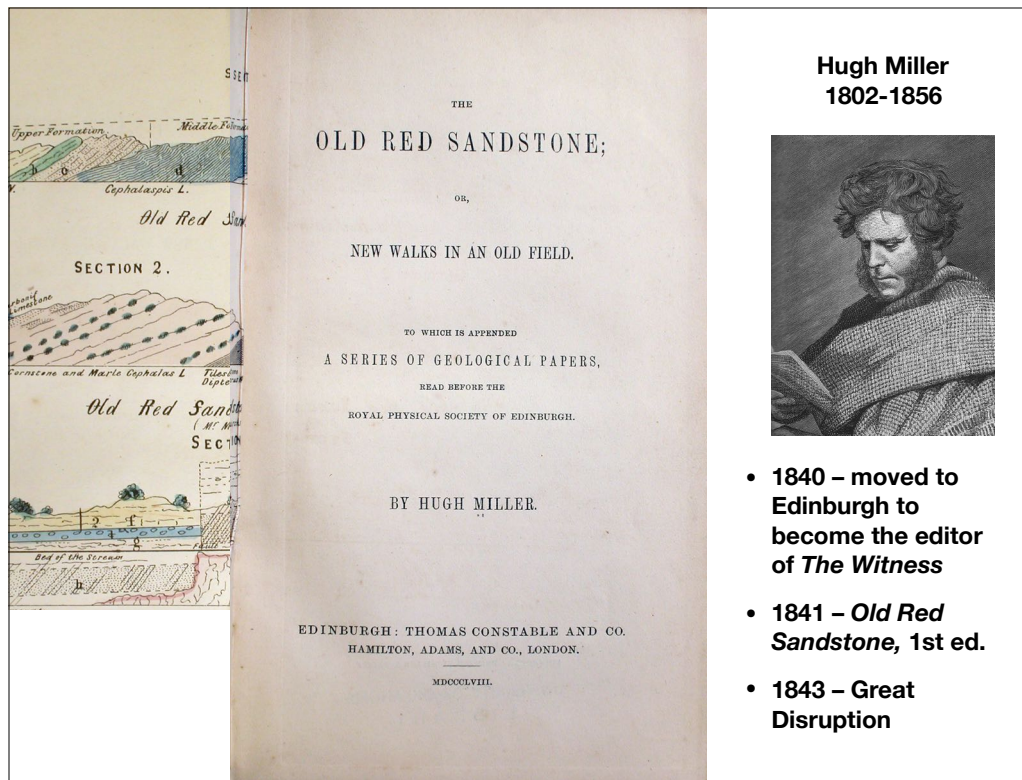
pp. 85-86, 87. In talking with David O., a world renowned historian of the contingent order of Earth history, he challenged my faith as a Christian by asking why he would need to believe in God to be a good geologist or historian. I answered something to the effect that scientists need to be in dialogue with Christians to be reminded that order is contingent, and might have been otherwise, an insight hard won in historical geology which he personally prized. Theology is an ally for anyone who wishes to protect contingent order against the main currents of necessitarian thought in which contingency is pushed aside.

## Extensions

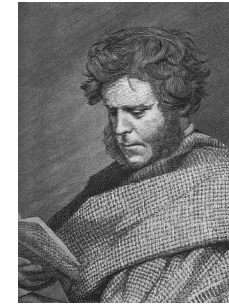
	Animals
	Astrobiology
	Anthropic Principle
	Geology and Evolution

For our 4th application, a few comments on geology and evolution. Geology makes an interesting illustration for TFT's views on space and time. I don't know why he didn't write about it, given Scotland's place in the history of geology. (QUERY) If you know that he was interested in geology in any way, please talk with me.





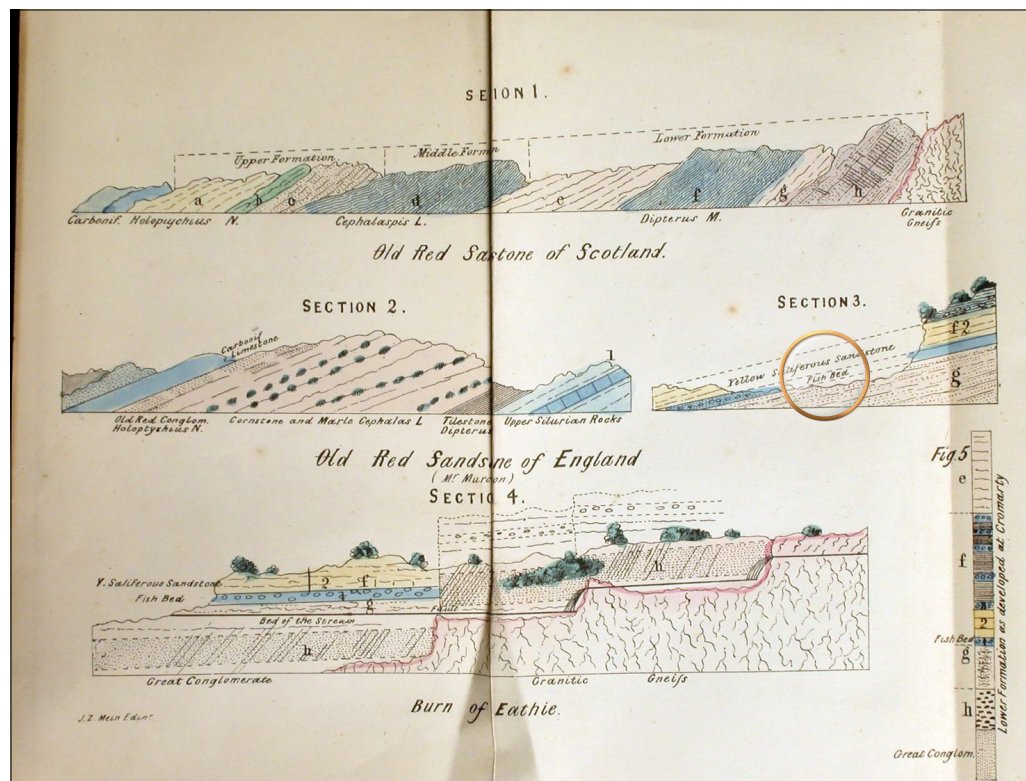
**Hugh Miller  
1802-1856**



- 1840 – moved to Edinburgh to become the editor of *The Witness*
- 1841 – *Old Red Sandstone*, 1st ed.
- 1843 – Great Disruption

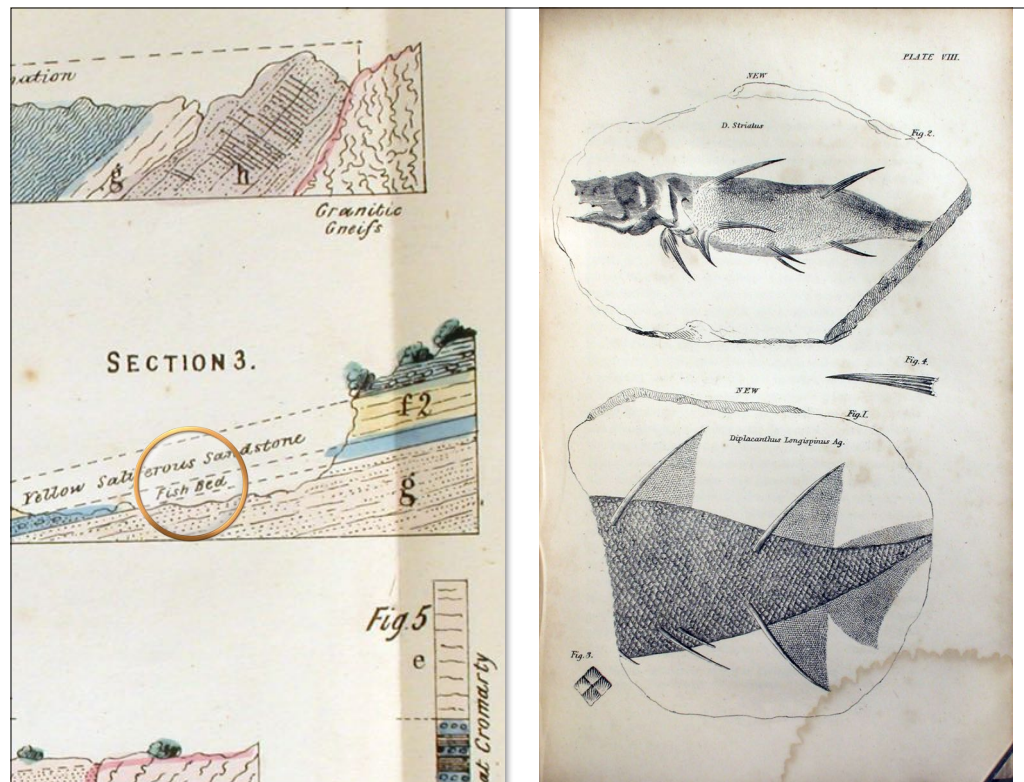
Let's take just one example. Hugh Miller, born a stonemason in Cromarty on the Black Isle, was a gifted storyteller. He is known as one of the most popular writers on geology in the 19th century. Miller moved to Edinburgh at Chalmers' invitation in 1840 to become editor of *The Witness*, an Evangelical paper which supported the Disruption and the formation of the Free Church. *The Old Red Sandstone*, shown here, was published the following year.





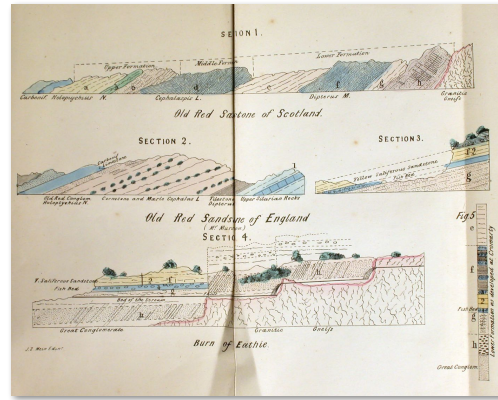
First, let's apply what we learned in part one about the two views of space and time. The container view of absolute space and time began to break down with the emergence of historical geology, a couple generations before James Clerk Maxwell.

- Let's take as an example the geological formation that contains this Fish bed.



This formation is not simply a container for fish; rather, the fish bed formation expresses the life-setting of the specific fish found within it. The geometrical attributes of a formation are entirely secondary to its representation of a specific place at a particular time. A historical geologist like Hugh Miller looks past the geometrical structure of the formation to apprehend the long-ago event when fish still swam in the warm shallow seas of the Old Red Sandstone. This characteristic is often still true of geologists today: where others see only rocks, the geologist “sees” long ago events, continents separated by seas that have since vanished, or towering mountains becoming worn down into plains.

## Relational space and time



**HISTORICAL GEOLOGY**  
Formations as places and times;  
distinguished by fossils they contain,  
appreciated as actual events

## Container space and time

Phanerozoic (Visible Life)	Cenozoic (Recent Life) (Age of Mammals)	Quaternary	Holocene	0.01
			Pleistocene	1.6
		Tertiary	Pliocene	5.3
			Miocene	23.7
			Oligocene	36.6
	Eocene		57.8	
			Paleocene	66.4
	Mesozoic (Middle Life) (Age of Reptiles)	Cretaceous		144
		Jurassic		208
		Triassic		245
		Permian		266
		Pennsylvanian		320
	Paleozoic (Ancient Life)	Mississippian		360
		Devonian		408
Silurian			438	
Ordovician			505	
Cambrian			570	
Proterozoic (Early Life)				
Hadaean/Achean		Oldest Known Life		2500
		Oldest Known Rocks		3900
		Age of the Earth		4600

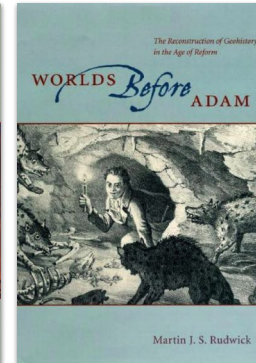
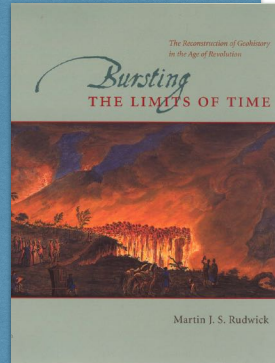
**STRUCTURAL GEOLOGY**  
Formations as 3-D structures;  
defined by age

Unlike the structural geologist, who sees the rocks as abstracted on a geological timeline, described in numerical dates in millions of years before the present,

- a historical geologist sees the rocks as an event, or an unrepeatable series of unique events, localized in place and time.
- So geology illustrates our discussion in Part 1 of relational vs. container conceptions of space and time.

Tradition:	Divine freedom / love	Divine wisdom
Regularities:	<b>Contingent order:</b> Might have been otherwise; Intelligible in retrospect	Necessity
Rare or unique events, singularities:		Chance
Methodologies:	Empirical component essential	Causal reasoning, logical demonstration

Michael Foster  
Francis Oakley  
Amos Funkenstein  
Margaret Osler  
John Henry  
David Oldroyd  
Martin J. S. Rudwick



Contingent order, our Part 2, also applies to geology. Historians of geology like David Oldroyd and Martin Rudwick have addressed the development of contingent order in geology and so we may list them along with the other historians of science mentioned earlier. No one has written on contingent order in geology more clearly than Martin Rudwick, who is doubtless the most distinguished living historian of geology. Rudwick's larger account of the development of "geohistory" is a two-volume work, *Bursting the Limits of Time* (on the generation of Cuvier) and *Worlds Before Adam* (on the generation of Lyell). Rudwick defines "geohistory" in terms of contingent order:

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BLT and WBA both published by Chicago University Press (2005, 2008)

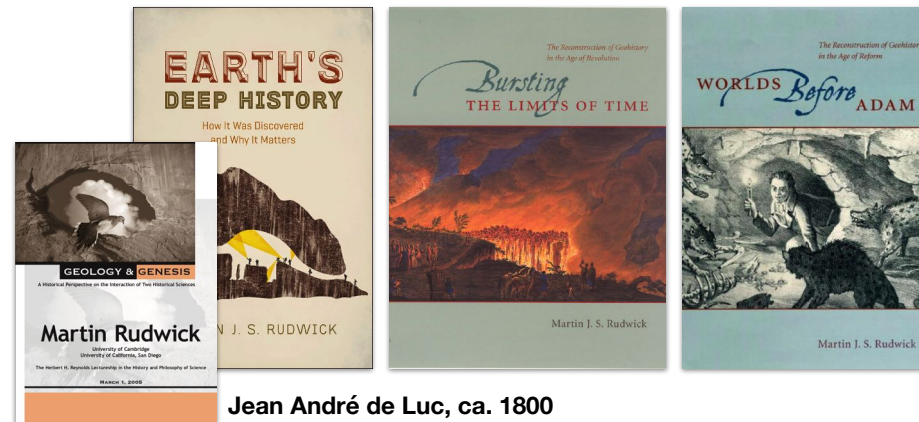
- *Geology and Genesis* (Baylor University, 2005; download: <https://www.baylor.edu/content/services/document.php/30846.pdf>)



“I shall argue that what was involved in the reconstruction of geohistory, far more importantly than any occasional and local conflict with religious beliefs, was a new and surprising conception of the natural world. Rather than being essentially stable and bound by unchanging “laws of nature”—ever since an initial act of creation, or else from uncreated eternity—one major part of nature, the earth itself, came to be seen as a product of nature’s own history. Furthermore, geohistory turned out to be as contingent, as unrepeatable, and as unpredictable (even in retrospect) as human history itself. This book, then, is about the *historicization* of the earth itself during the age of revolution. It can hardly be emphasized too strongly that this was a radically new feature on the conceptual landscape of the natural sciences: understanding and explaining the natural world began to be seen to entail its contingent past history as much as its directly observable present.”

Rudwick, *Bursting the Limits of Time*

Tradition:	Divine freedom / love	Divine wisdom
Regularities:	<b>Contingent order:</b> Might have been otherwise; Intelligible in retrospect	Necessity
Rare or unique events, singularities:		Chance
Methodologies:	Empirical component essential	Causal reasoning, logical demonstration



*Earth's Deep History* is a more concise account. Note the title is “deep history,” for geohistory sees time as relational, in contrast to merely “deep time,” which sees time as a container.

- Let’s take, as an example, Rudwick’s discussion of the theological context of the geological ideas of Jean André de Luc, circa 1800, which Rudwick described in *Geology and Genesis*, the Herbert Reynolds lecture given at Baylor University in 2005. Rudwick here considers the role played by belief in divine freedom for the discovery of contingent geohistory: QUOTE.

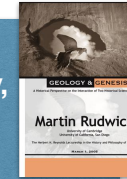
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BLT and WBA both published by Chicago University Press (2005, 2008)

- Geology and Genesis* (Baylor University, 2005; download: <https://www.baylor.edu/content/services/document.php/30846.pdf>)



“The impact of de Luc’s theistic commitments can be seen in the radical contingency that he attributed to earth history, and which he grounded in God’s ultimate role as creator of everything. As de Luc conceived it, earth history at every stage could have taken another course, with a different outcome, without of course abrogating the ordinary laws of nature. It followed that the sequence of events could not, even in principle, be inferred from the ahistorical laws of physics, as both Hutton and Buffon implied: there was too much contingency in earth history, as in human history, for any such determinism. Rather than imposing top-down some grand conclusion of what “must” have happened, based on unchanging laws of nature, it was necessary, in de Luc’s view, to assemble bottom-up the evidence of nature’s documents and archives, which showed what in fact had happened. So the new way of analyzing the physical traces of earth history, applying the methods of reconstruction being used for human history (including biblical scholarship) was not just an effective heuristic but was rooted in an ultimately divine reality.”



(quote)

Evangelicals like De Luc and Hugh Miller often embraced a view of the Earth’s contingent history, in contrast to the deterministic developmental scenarios of materialists and the steady-state views of deists.

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In this light, it is interesting that Charles Darwin, although of course no evangelical himself, developed his sensibility about the history of nature through his experience as a historical geologist, in stark contrast to the deistic sensibility of his grandfather Erasmus.

Tradition:	Divine freedom / love	Divine wisdom
Regularities:	<b>Contingent order:</b> Might have been otherwise; Intelligible in retrospect	Necessity
Rare or unique events, singularities:		Chance
Methodologies:	Empirical component essential	Causal reasoning, logical demonstration

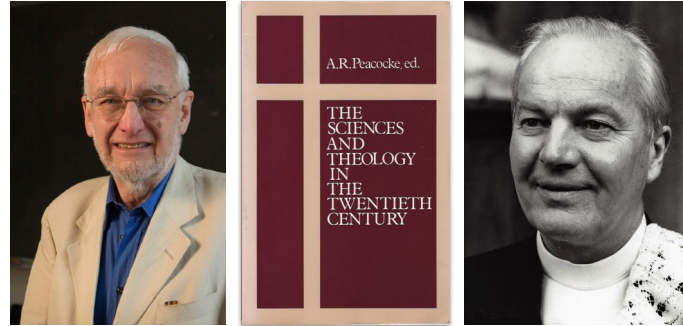
“Evolution does not have a predictable and determinate course of a kind that can be known by *a priori* and deductive methods. The metaphysical assumptions underlying this style of evolutionary science can be traced back to a voluntarist interpretation of the biblical worldview. Although theological language has dropped out of scientific discourse, contemporary styles of science are historically linked to the dialectic of the absolute and ordained powers of God. The interplay between necessity and contingency in the world is now constructed entirely in naturalistic terms, but it grew from roots embedded in an earlier, theological understanding.”

DIVINE WILL  
AND THE  
MECHANICAL  
PHILOSOPHY  
*Gasendi and Descartes  
on Contingency and  
Necessity in the Created  
World*  
MARGARET J. OSLER

Osler concludes her illuminating study of contingent order, in the last paragraph, with a striking application to Darwin’s *Origin of Species*, that could just as well apply to Rudwick’s account of early geology:  
(p. 236)

**Oxford International Symposium, 1979**  
(at Christ Church, held in memoriam Michael Foster)

**“Divine and Contingent Order”**



**“Senses of the Natural World  
and Senses of God”**

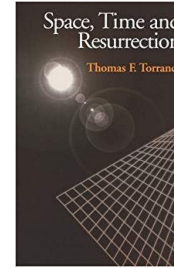
TFT and MJSR both participated in an Oxford International Symposium held at Christ Church in 1979. Both contributed to the volume of proceedings from that conference, published in 1981. As we have noted, TFT’s paper was an essay on contingent order. The topic was certainly a focal point of discussion, for the conference was called in tribute to Michael Foster. In a personal communication, MJSR does not now recall conversation with TFT at that conference. (QUERY) If anyone knows of TFT’s recollections of this conference, please let me know. If they did not interact in some way, it’s one of the great missed opportunities of intellectual history in the 20th century.

## Extensions

	Animals
	Astrobiology
	Anthropic Principle
	Geology and Evolution
	Stratification of Reality

For our last extension, let's return to Part 3, the stratification of reality, the various interrelated levels of contingent order.

## Stereoscopic vision

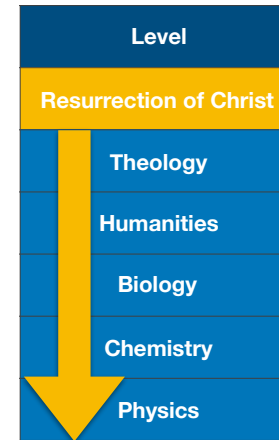
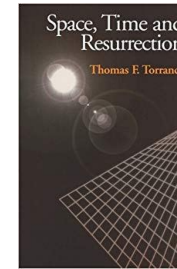


Level
Theology
Humanities
Biology
Chemistry
Physics

Michael Polanyi, and TFT, frequently invoked the analogy of seeing with stereoscopic vision. We saw that, for Torrance, these 5 levels represent a stereoscopic grasp of reality (p. 14). Instead of dual-hole goggles, we need a five-hole eyepiece to view them together. But how many levels might there be? Just 5, or are there others? How large a stereoscope do we need to grasp reality in all its levels of contingent order?

- And how are each of the levels implicated in the Resurrection of Christ?

## Stereoscopic vision



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## “Stratified levels” (many versions)



TFT was interacting with Polanyi and their views are similar. Yet there are many versions of stratified levels of reality:

- TFT's version is not a great chain of being, as surveyed by Arthur Lovejoy. For TFT, Being is equally real at all levels.
- Harold Morowitz, a former editor of the journal *Complexity*, is a biologist at George Mason University. In *The Emergence of Everything* (Oxford, 2002), he offered an introduction to the theory of “emergence” across the disciplines, identifying 28 stages of emergence in evolutionary and human history. Emergence has been used in many different ways, and is often not clearly defined. What distinguishes Polanyi's version of emergence from others are the four ramifications noted earlier, particularly the principle of irreducibility. Morowitz defines emergence as the opposite of reductionism, yet does not mention or cite Polanyi (nor TFT).
- The physicist Heinz Pagels proposed a multi-disciplinary research agenda in complexity theory in *The Dreams of Reason: The Computer and the Rise of the Sciences of Complexity* (1988). Pagels did not engage Polanyi, but spoke of “causal decoupling” in the emergence of intelligence (p. 222-223). Pagels, like Morowitz, dreamed that the sciences of complexity (and emergence) would provide a rational foundation for religious experience. [Polanyi's tacit knowing mentioned on p. 160, but MP not cited, nor TFT.]

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[https://www.edge.org/memberbio/heinz\\_r\\_pagels](https://www.edge.org/memberbio/heinz_r_pagels)

## “Stratified levels” (many versions)

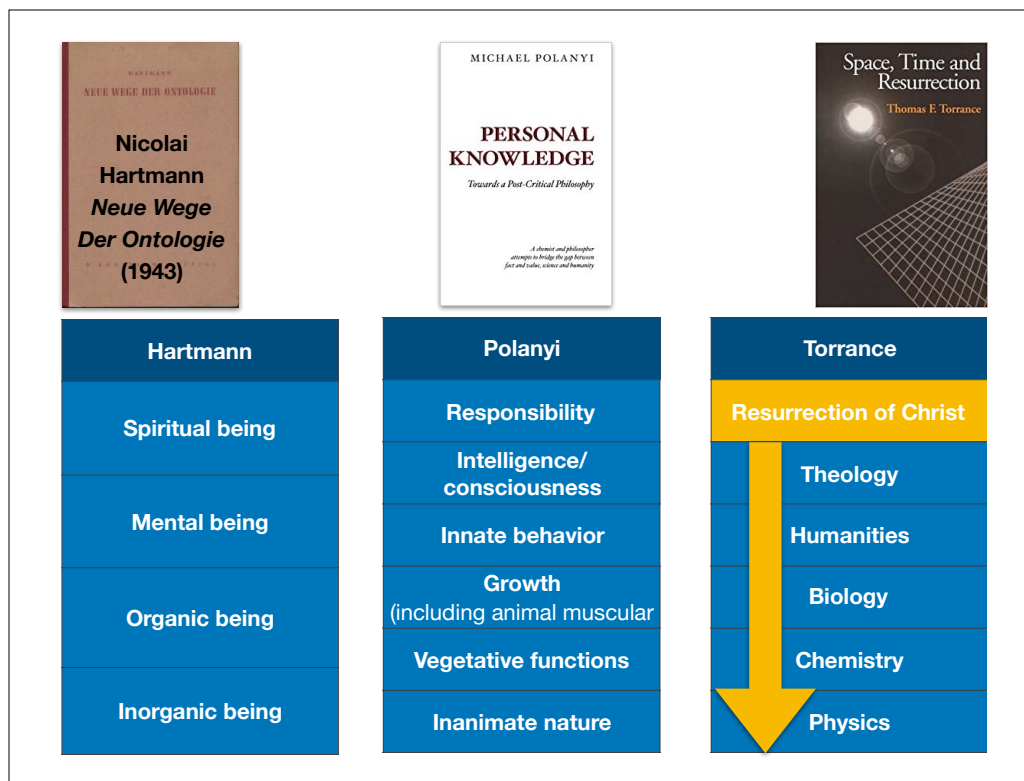


*All That Is*, edited by Philip Clayton, contains essays by Arthur Peacocke and others about Peacocke’s conception of emergence. For Peacocke, lower levels cause, or bring into being, higher levels, when they cross a given threshold of complexity. Also, for Peacocke, different levels emerge as an interplay between chance and necessity. For TFT, created contingent order is something different altogether from chance and necessity.

- The Intelligent Design movement, as in William Dembski’s recent book, *Being as Communion*, draws upon Polanyi.
- Innumerable articles in *Tradition and Discovery*, the journal of the Michael Polanyi Society, debate the Polanyian stratified levels in the context of emergence, whether of evolution, or society, or mind.\* Comparing some of the similarities and differences among these and other conceptions of “stratified levels” would make for a great paper in History of Science 101, a dissertation, a conference, or a series of books.

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 \*(such as vol. 29, issue 3, for 2002-2003, featuring an article by Philip Clayton, “Emergence, Supervenience, and Personal Knowledge”)

\*\**God After Darwin: A Theology of Evolution* (2000); *Making Sense of Evolution: Darwin, God, and the Drama of Life* (2010).



Just as there are different understandings today of stratified levels, so there were others before Polanyi and Torrance.

- Alister McGrath points out that Nicolai Hartmann, in *New Ways in Ontology* (1943), listed four distinct ontological levels: inorganic being, organic being, mental being, and spiritual being.

## Alister McGrath, “Stratification: Levels of Reality and the Limits of Reductionism”



In Chapter 5 of *The Order of Things*, entitled “Stratification: Levels of Reality and the Limits of Reductionism,” McGrath discusses the stratified levels of reality proposed by Hartmann, Polanyi and Torrance, and the more recent version proposed by

- Roy Bhaskar, which has influenced McGrath’s scientific theology project, as outlined
- in the three-volume series *Nature, Reality and Theory*. McGrath’s work is a remarkable extension of stratified levels. To conclude, however, let’s look at one additional version that may be helpful.


— — — —

Roy Bhaskar, *The Possibility of Naturalism: A Philosophical Critique* (1998).

O my love's like a red, red rose,  
 That's newly sprung in June;  
 O my love's like the melody  
 That's sweetly played in tune.

As fair art thou, my bonnie lass  
 So deep in love am I;  
 And I will love thee still, my love  
 Till a' the seas gang dry.

Till a' the seas gang dry, my dear



Level	Science
Humanities	Poetics, literature, aesthetics
Biology	wood pulp, cellulose, cotton, oak galls
Chemistry	Carbon % Hydrogen % Oxygen % Total: 100%
Geometry	shape of letters

Earlier we considered 4 levels to describe our participation in the reality of a red, red rose.





Imagine that you are giving a beautiful rose to a dear friend. In this event you, your friend, and the rose participate in reality at more than one level. What do you experience? We experience the reality of a rose in many levels of order.



### Stratification of Reality – Levels of Contingent Order

Level/Dimension	Sciences	Rose
Worship	Theology	"Thank you" (praise to God)
Ethical	Ethics	"With all my love"
Juridical	Jurisprudence	"This is your rose"
Aesthetic	Art, Aesthetics	"How beautiful!"
Economic	Economics	"How much does it cost?"
Social	Sociology	"I'll send a rose."
Linguistic	Linguistics, Languages	"My love is like a red, red rose."
Historical-Cultural	History, Engineering	"From my own garden."
Logical	Logic	"It differs by fragrance and
Sensory	Psychology	"mmm" (nose); "ouch!" (finger)
Biotic	Biology	Growing
Compositional	Chemistry	Synthesizing fragrance, O <sub>2</sub>
Physical	Physics	Matter, individuality
Kinematic	Kinematics	Bends in the wind
Spatial	Geometry	Location
Quantitative	Mathematics	How many petals?

This grid adds many more levels! Each level of contingent order is described with reference to the multi-leveled reality of the rose. Some levels are the same as the ones we've seen before, such as the physical, compositional or chemical, the biotic, and theology or worship. A few are different or new.

- For example, the historical-cultural level is an important one. It is the capability to form new things from already existing materials. This results in material and cultural artifacts that alter the conditions of existence in contingent (non-necessary) ways that might have been otherwise. (As any rose gardener knows, the results of horticulture are quite contingent!) Examples of this historical/cultural level of order encompass the fields of engineering, history, historical geology, historical cosmology, etc. (The emerging field of "Big History" attempts to discover correlations between these.)

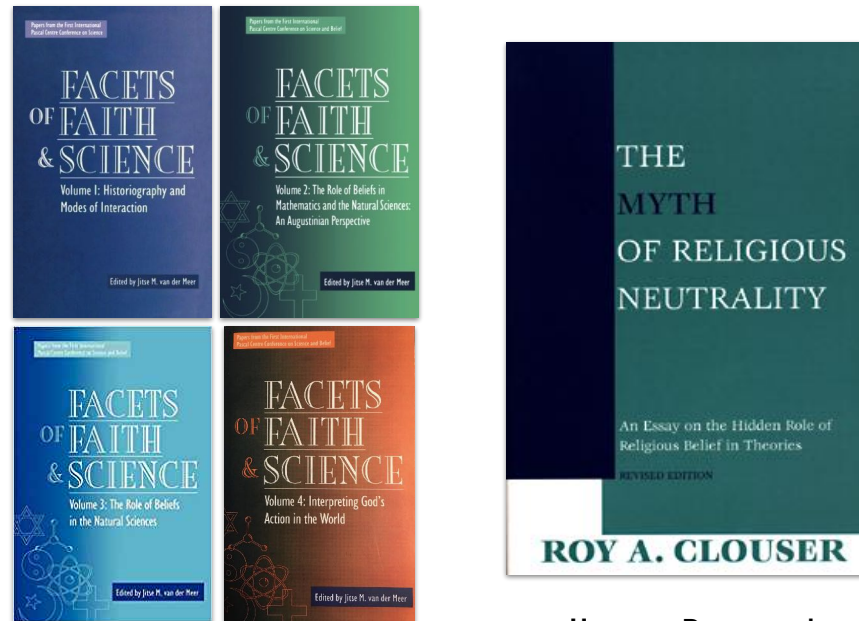
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Adapted from Roy Clouser, Kenn Herman, Shawn Smith, Mike Keas

Want to add a level, combine, or split any of these up? Have at it. What matters is not the specific levels or how we describe them, but that we recognize that each thing or event cannot be reduced to a single kind of order. Reality is rich and multi-dimensional. These levels are aspects of reality discerned by the study of science over its history, not derived *a priori*.

- I've adapted this expanded list of stratified levels from Roy Clouser, from Kenn Herman, and have had many conversations about it with my former colleagues Shawn Smith and Mike Keas.



**Pascal Conference on Science and Religion, Redeemer College, 1992**

**Hermann Dooyewerd**

At the same Pascal Centre conference, back in 1992, where TFT challenged me with Duns Scotus, Roy Clouser presented two papers on this expanded list of stratified levels. They were later published, along with TFT's two keynotes, in the 4 vols of conference papers entitled *Facets of Faith and Science*.

- A thorough articulation of Clouser's stratified list is found in *The Myth of Religious Neutrality*. Clouser is a philosopher in the tradition of the Dutch Neo-Calvinist, Hermann Dooyewerd, although these stratified levels could just as well have been proposed by Polanyi, Hartmann, or Bhaskar, among others. (QUERY) I would very much appreciate hearing from you if you know anything about TFT's conversations at the Pascal conference or elsewhere with Clouser or others in the Dooyewerdian tradition.

### Stratification of Reality – Natural Theology and the task of Integration

Level/Dimension	Sciences	Rose
Resurrection	Beatific vision	Hidden in Christ
Worship	Theology	"Thank you" (praise to God)
Ethical	Ethics	"With all my love"
Juridical	Jurisprudence	"This is your rose"
Aesthetic	Art, Aesthetics	"How beautiful!"
Economic	Economics	"How much does it cost?"
Social	Sociology	"I'll send a message."
Linguistic	Linguistics, Languages	"I'll send a message."
Historical-Cultural	History, Engineering	"I'll send a message."
Logical	Logic	"I'll send a message."
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**"theological geometry"**

For Torrance, a "proper" natural theology is not a conceptual system independent of theology, a preamble to faith, antecedent to actual knowledge of God. Rather, we have seen that Torrance's "reconstructed natural theology" explores the "inner semantic structure" of interrelations between disciplines. This grid then represents a proper creational theology which "constitutes [what TFT called] the epistemological structure of our knowledge of God" (p. x). In the preface to STR, TFT stated that he intended to offer

- a "theological geometry" in which the account of the resurrection is not abstracted from the field-structures of space and time. This depiction of stratified levels may serve as a picture of that "theological geometry."

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Remember Polanyi's words: "When examining any higher level, we must remain subsidiarily aware of its grounds in lower levels, and turning our attention to the latter, we must continue to see them as bearing on the levels above them."

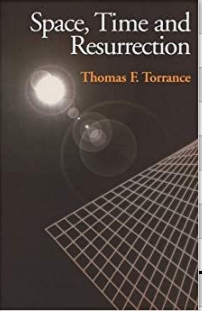
### Stratification of Reality – Creational Theology and the task of Integration

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No matter how we define the stratified levels, the resurrected, ascended and advent humanity of Christ has

- cosmic import for human and physical existence in space and time. (arrow wipes in)
- Torrance writes: Quote

## Stratification of Reality – Creational Theology and the task of Integration

Level/Dimension	Sciences	Rose
Resurrection	Beatific vision	Hidden in Christ
Worship	Theology	"Thank you" (praise to God)
Ethical	Ethics	"With all my love"
Ju	<p>"It was not just a miracle within the creation, but a deed so decisively new that it <u>affected the whole of creation</u> and the whole of the future. The resurrection of Jesus Christ has creative and constitutive character, and as such cannot but transform our understanding of the <u>whole relation of God to the universe</u> of things visible and invisible, present and future." (p. 36)</p> 	
Ac		
Ec		
Sc		
Li		
Hi		
Lo		
Se		
Bi		
Compositional	Chemistry	Synthesizing fragrance, O <sub>2</sub>
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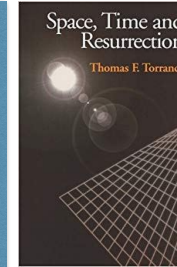
No matter how we define the stratified levels, the resurrected, ascended and advent humanity of Christ has

- cosmic import for human and physical existence in space and time. (arrow wipes in)
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“Such a resurrection of the incarnate Word of God within the creation of time and space which came into being through him is inevitably an event of cosmic and unbelievable magnitude. So far as the temporal dimension of creation is concerned, it means that the transformation of all things at the end of time is already impinging upon history, and indeed that the consummation of history has already been inaugurated. And so far as the spatial dimension of creation is concerned, it means that the new creation has already set in, so that all things visible and invisible are even now in the grip of the final recreation of the universe. The resurrection of Jesus heralds an entirely new age in which a universal resurrection or transformation of heaven and earth will take place, or rather has already begun to take place, for with the resurrection of Jesus that new world has already broken into the midst of the old.”

(p. 31)



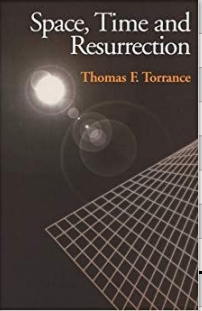
Torrance continues: (quote)

This is the redemption of time we spoke of earlier.

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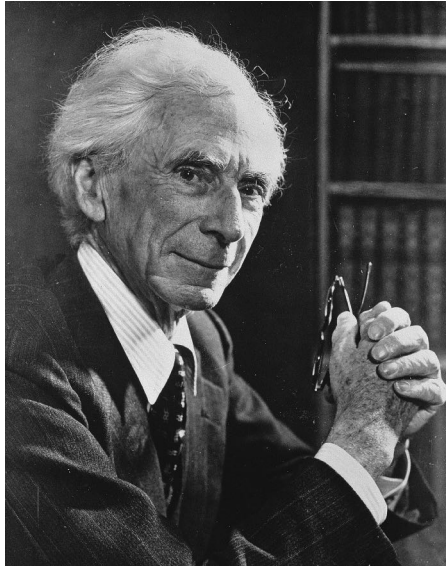
Authoritative signs, acts of healing and forgiveness, no longer prominent, as they provided an urepeatable foundation for the Church as the Body of Christ. (P. 149). “The ascension means that Christ holds back the physical transformation of the creation to the day when he will return to make all things new, and that meantime he sends the Church to live and work in the form of a servant within the measures and limits of the on-going world of space and time.” (P. 149). No prosperity gospel, but the way of the cross.

### Stratification of Reality – Creational Theology and the task of Integration

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Resurrection	Beatific vision	Hidden in Christ
Worship	Theology	"Thank you" (praise to God)
Ethical	Ethics	"With all my love"
<p>                     Ju "There is no point in playing down the staggering                      Ae significance of the incarnation and resurrection.                      Ec God the Creator of the universe, transcendent over                      Sc all time and space, has himself become a creature                      Li within time and space, the man Jesus Christ, and                      Hi precisely as such, 'within the measures and limits'                      Lo of our human historical existence, he is at work in                      Se immeasurable love defeating the forces of darkness,                      Bi irrationality and evil within creaturely being where                      they are despotically entrenched." (p. 21)                 </p> 		
Compositional	Chemistry	Synthesizing fragrance, O <sub>2</sub>
Physical	Physics	Matter, individuality
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Grasping the Resurrection in terms of a relational understanding of space and time, across all the stratified levels of contingent order, requires the most profound act of integration imaginable:

- (quote). The Resurrection institutes a “new divine order which could not be derived or inferred from anything conceived by man before” (p. 18). We are confronted with this new reality, which requires “repentant rethinking.” The Resurrection forces us to what Torrance calls a “seismic restructuring” of our knowledge (p. 17).



**Bertrand Russell**

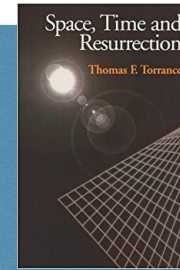
“All the labour of the ages, all the devotion, all the inspiration, all the noonday brightness of human genius, are destined to extinction in the vast death of the solar system... all these things, if not quite beyond dispute, are yet so nearly certain that no philosophy which rejects them can hope to stand. Only within the scaffolding of these truths, only on the firm foundation of unyielding despair, can the soul's habitation henceforth safely be built.”

— Bertrand Russell  
“A Free Man's Worship”  
*Why I am not a Christian*  
(1957)

Without that repentant rethinking, and seismic restructuring; were it not for risen and ascended Christ even now already at work re-engineering the natural order, we might be consigned to despair about our future, like Bertrand Russell...

- (Quote) Russell cannot imagine how a lump of clay might be made to fly.

“Meantime in all its waiting and expectation the Church is commanded by its Lord to lift up its head in thanksgiving and joy, for its redemption draws nigh. The Church of the risen Lord has no right to be a prophet of gloom or despair, for this world has been redeemed and sanctified by Christ, and he will not let it go. The corruptible clay of our poor earth has been taken up in Jesus, is consecrated through his sacrifice and resurrection, and he will not allow it to sink back into corruption. Hence the whole creation groans and travails waiting for the manifestation of the sons of God, looking forward with eager expectation to the hour of final liberation and renewal in the advent of its risen Saviour.\* The Church must learn to take into its mouth the Good News of the resurrection and new creation, for that must be its primary note, one of limitless joy and thanksgiving.” (p. 105)



TFT counters: (quote)  
On this triumphant note,...

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\*“As H. R. Mackintosh has pointed out, the transformation of nature which St. Paul has in view (Rom. 8: 19ff.), takes in even the irrational creation which will be redeemed from vanity, bondage and corruption...”

## Reflections

		The Resurrection is the natural starting point for creational theology
		A Resurrection-based, Trinitarian natural theology offers theologians and scientists a rigorous, mutually-beneficial dialogue
		Union with Christ entails Re-creation from within

With those three reflections...

## Extensions

	Animals
	Astrobiology
	Anthropic Principle
	Geology and Evolution
	Stratification of Reality

And those five applications, ...



Did the Resurrection change the order of nature?

Introduction

Space and Time

Divine Freedom and Contingent Order

Stratification of Reality

Conclusion

We've reached the eschaton of this little talk...

## Did the Resurrection change the order of nature?



1. Encourage everyone to read *Space, Time and Resurrection*
2. Encourage theology students not to find creational theology an obstacle to reading STR
3. STR an intro to creational theology, repays careful study
4. Begin to explore *History of Science 101* for STR and intellectual context for TFT

And I hope we might be more likely to read or re-read *Space, Time and Resurrection*. • Questions?