

Quantum Field Theory, Personhood, and the Trinity: Echoes and Resonances

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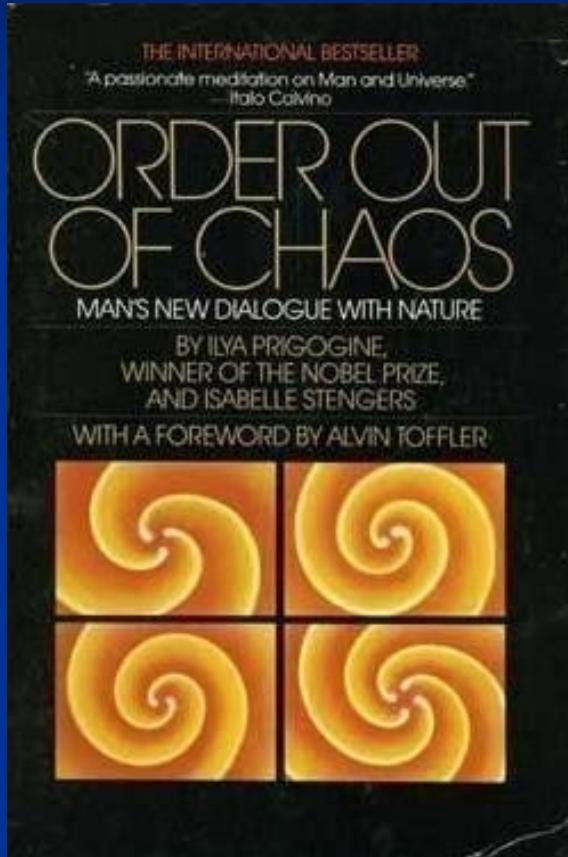
Professor of Physics, TWU

ASA 2107: Exploring New Heights
for Science & Stewardship

Golden, CO – 30 July 2017, 4:45pm

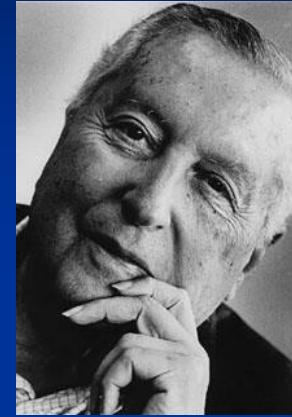


Things and Relations



Bantam, 1984

“For an interaction to be real, the ‘nature’ of the related things must derive from these relations, while at the same time the relations must derive from the ‘nature’ of the things.” (p. 95)



[nndb.com](#)

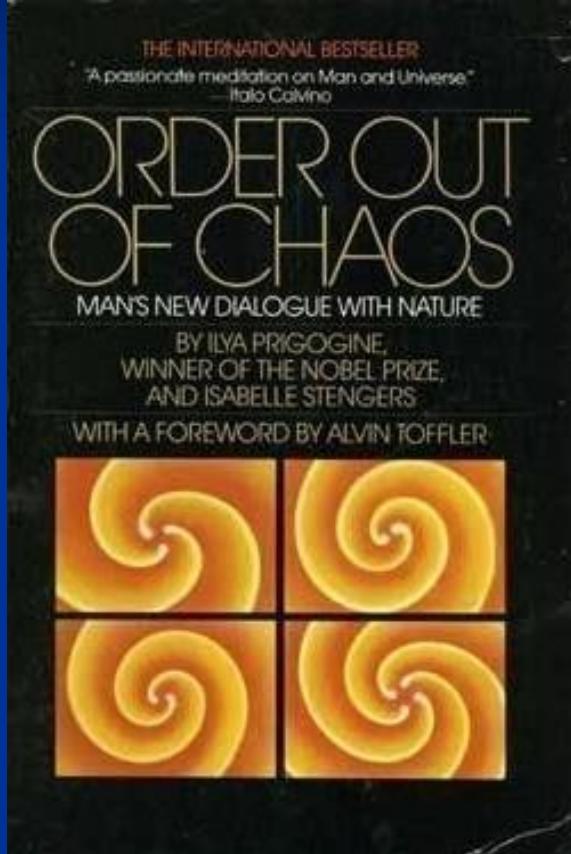
Chemist
Ilya Prigogine

Philosopher
Isabelle Stengers



[sts2016bcn.org](#)

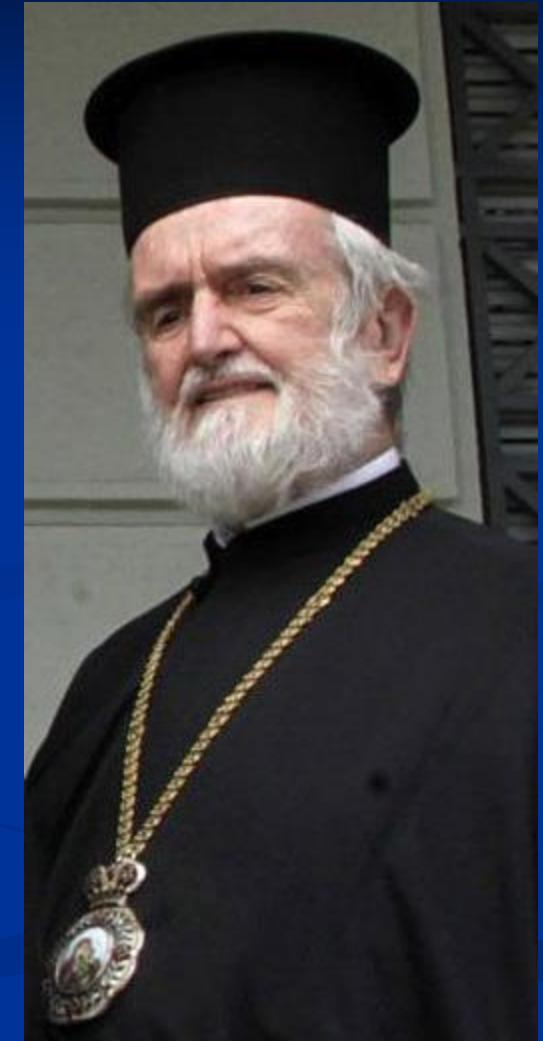
Things and Relations



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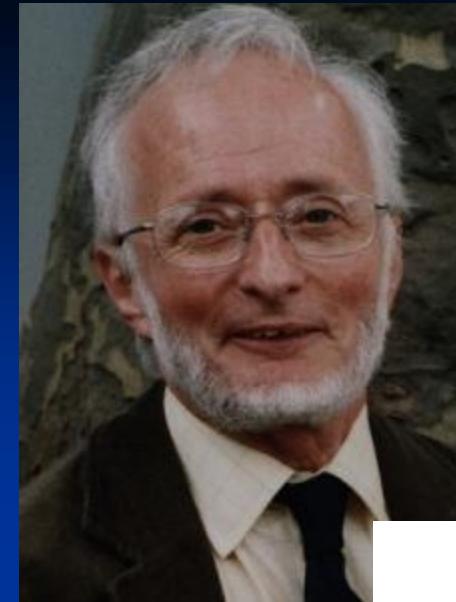
- John **Zizioulas** considers this an echo of Patristic ontology.
- “Relational Ontology: Insights from Patristic Thought,” in John Polkinghorne (ed.), *The Trinity and an Entangled World* (Eerdmans, 2010), p. 152.



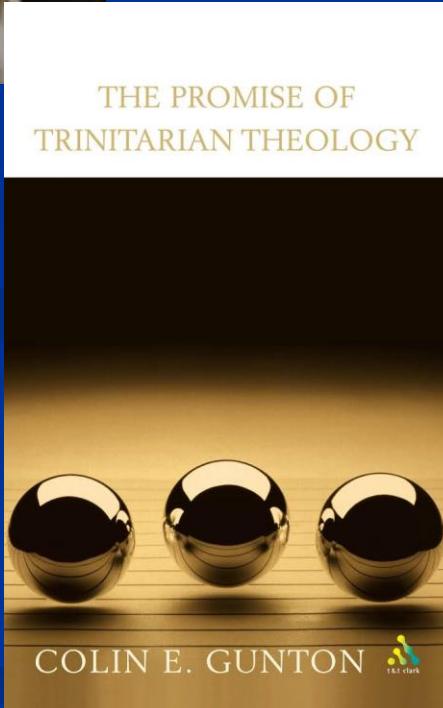
Eurokinissi, Creative Commons

Colin Gunton: A Universe of Dynamic Relations

- “modern field theory...has led...to the conceptual echo of trinitarian theology in relativity theory and its developments...” (p. 151)
- “the physics of relativity...introduces a dynamism into the way things are conceived. There are no unchanging substances which enter into relations – as on the view of Aristotle and Newton alike – but the whole universe becomes conceivable as a dynamic structure of fields of force in mutually constitutive relations...” (pp. 152f.)



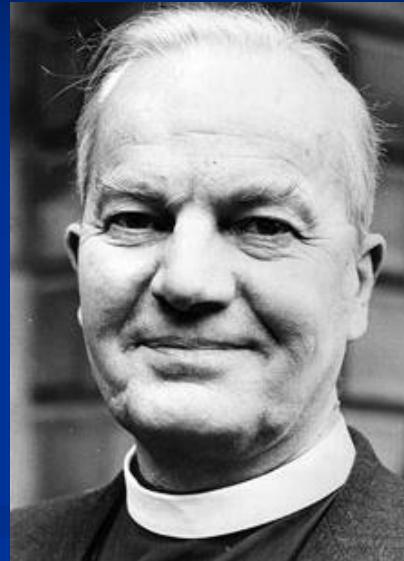
faith-theology.com



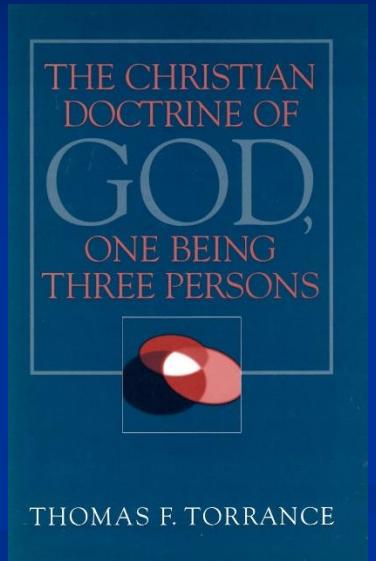
T&T Clark, 1997

Thomas F. Torrance on Perichoresis

- “mutual indwelling of the Father and the Son and the Spirit” (p. 102)
- *peri*: about or around
- *chora*: space or room, or *chorein*: contain, make room, or go forward



moltmanniac.com

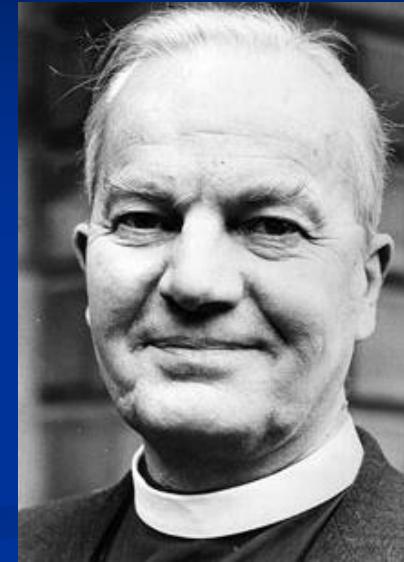


THOMAS F. TORRANCE

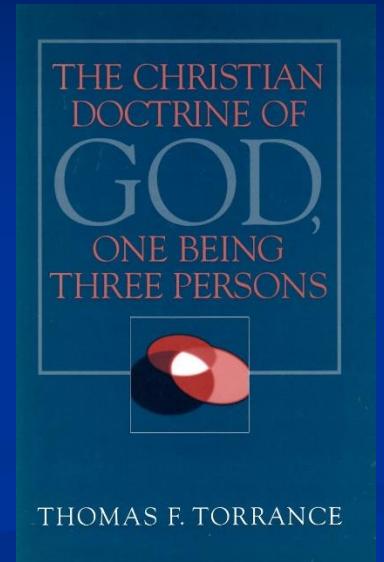
T&T Clark, 1996

Thomas F. Torrance on Perichoresis

■ “*onto-relational* concept of the divine Persons, or an understanding of the three divine Persons in the one God in which the ontic **relations** between them belong to what they essentially are in themselves... Along with this there developed...the new *concept of person*...the relations between persons belong to what persons are.” (p. 102)



moltmanniac.com



THOMAS F. TORRANCE

T&T Clark, 1996

Thomas F. Torrance on Perichoresis

- “The patristic concept of *perichoresis* [expresses] something of the mystery of the Holy Trinity in respect of the coinherent way in which the Father, the Son and the Holy Spirit exist in one another and dwell in one another as one God, three Persons.” (p. 168)
- John’s gospel: “I am in the Father and the Father in me”
- “*perichoresis* has essentially a *dynamic* and not a static sense, with the meaning of mutual indwelling and inter-penetrating one another in [an] onto-relational, spiritual and intensely personal way.” (p. 171)

Quantum Field Theory

- quantum mechanics + special relativity
- the vacuum: a background “sea”
- its excitations are “particles”
- interaction: mediating particles

The First Feynman Diagram: QED



Richard Feynman
aps.org

“Space-Time Approach to Quantum Electrodynamics,” *Physical Review* **76** (1949) 769.

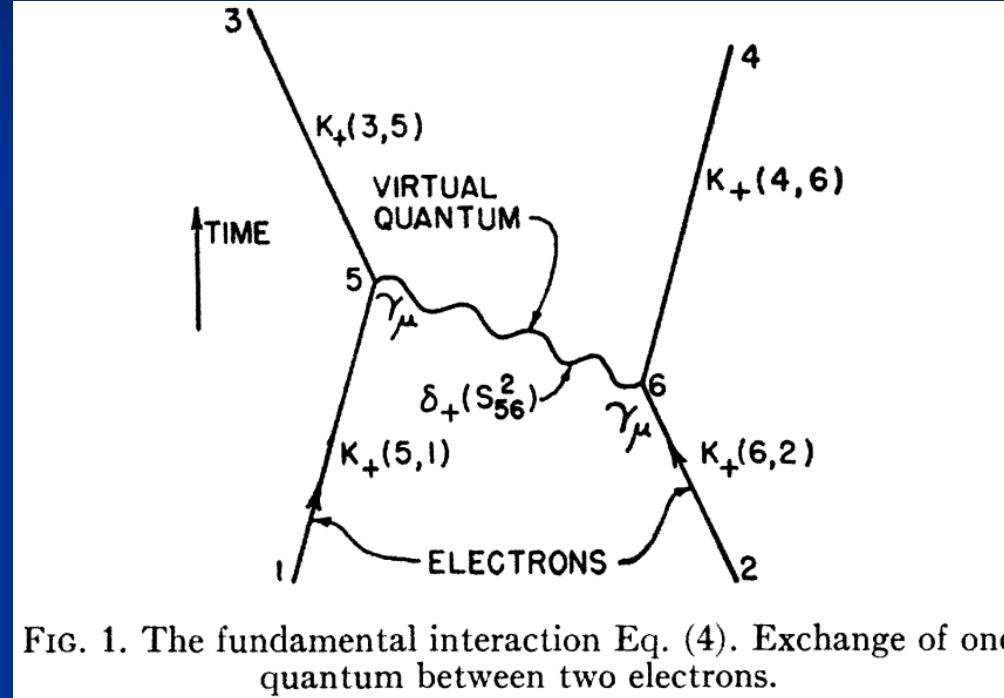
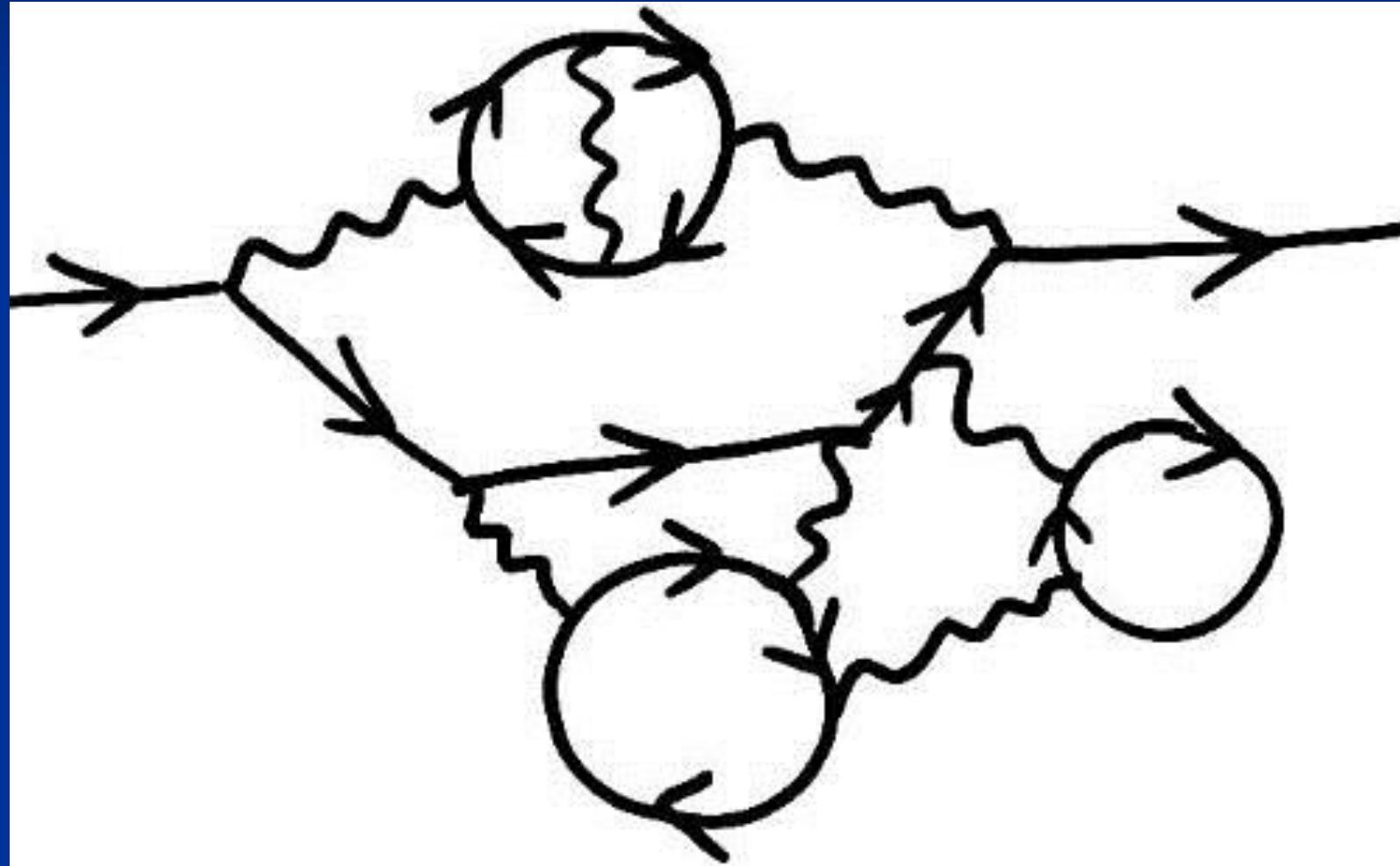


FIG. 1. The fundamental interaction Eq. (4). Exchange of one quantum between two electrons.

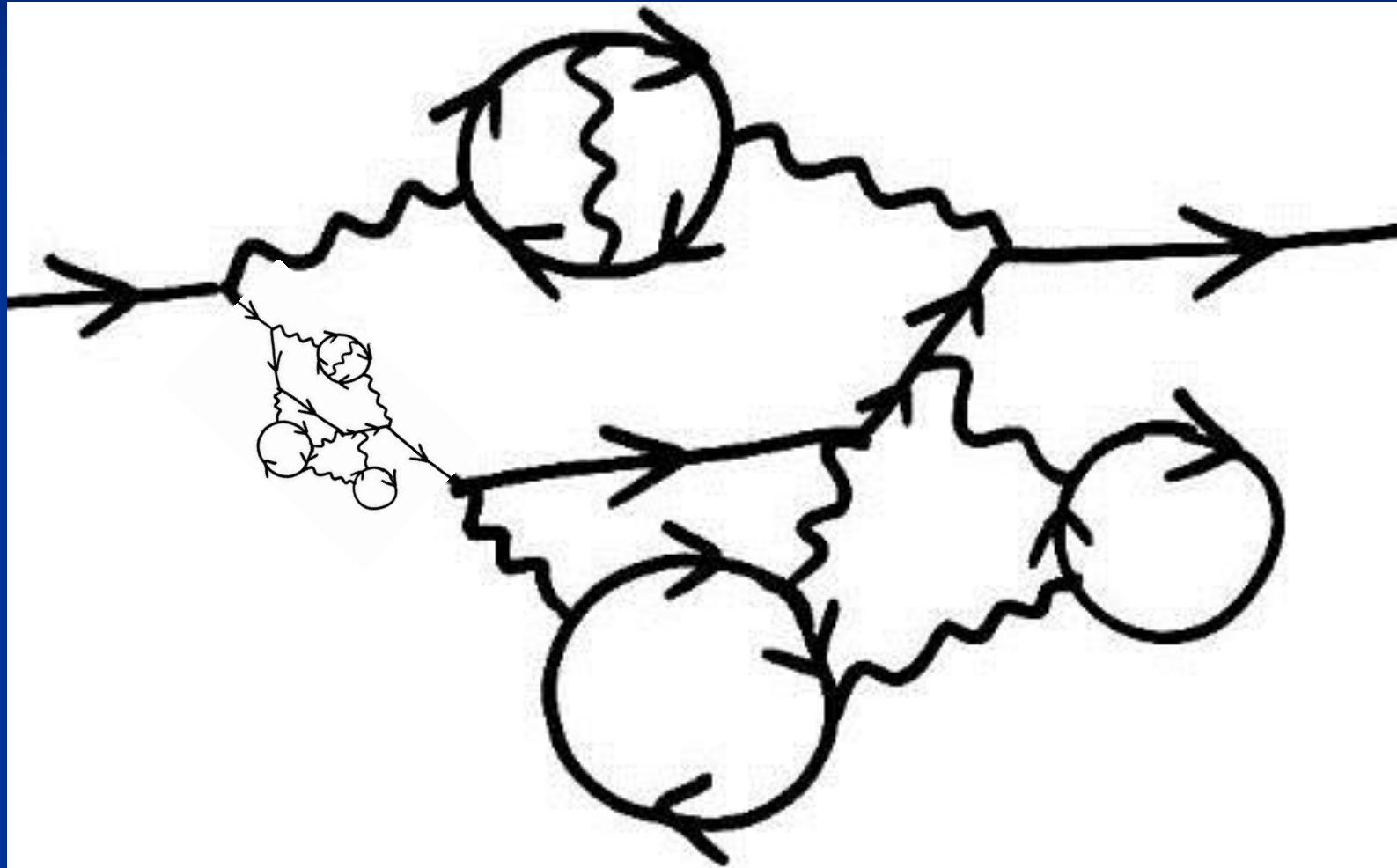
Quantum Field Theory

What is an Electron?



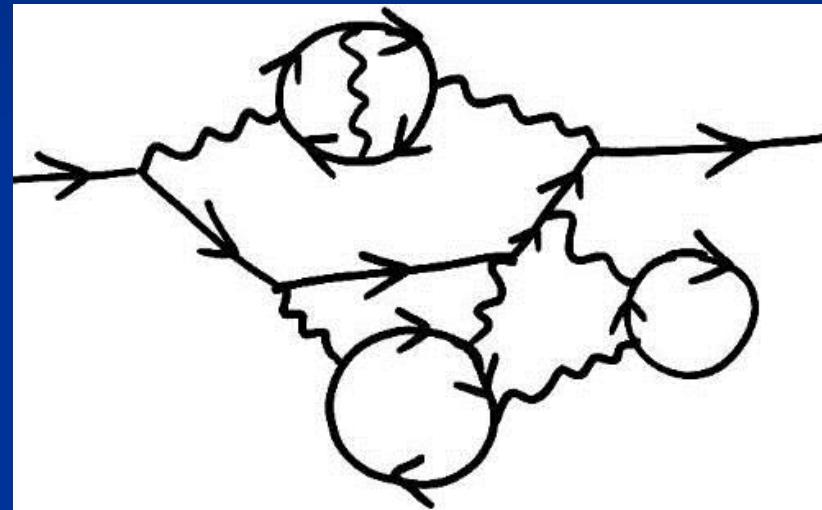
Quantum Field Theory

What is an Electron?



Quantum Field Theory

What is an Electron?



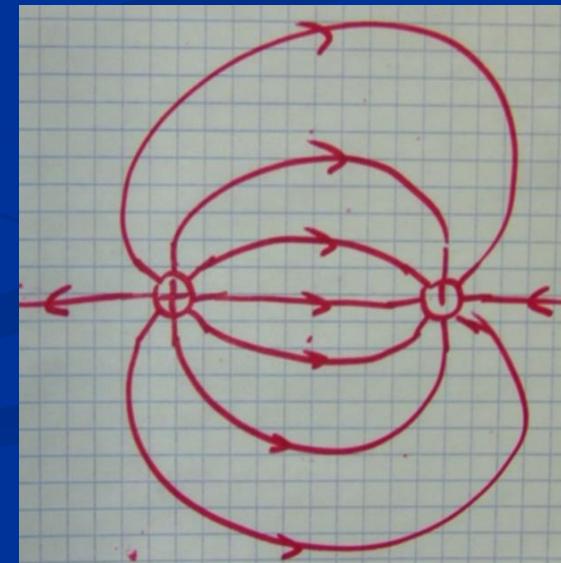
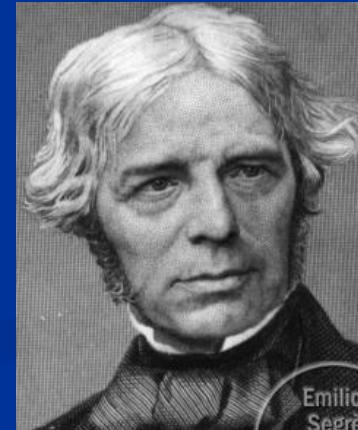
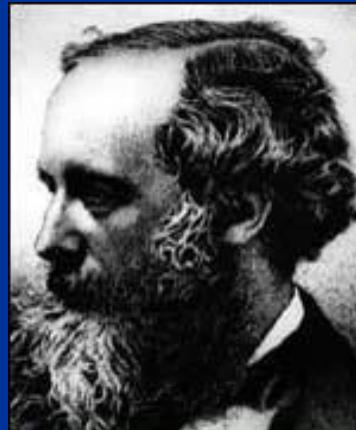
Thing and Law
are entangled

~~God – law – thing~~

God – lawful thing

Torrance on Maxwell on Faraday

- Thomas F. Torrance, *Transformation and Convergence in the Frame of Knowledge* (Eerdmans, 1984): Ch. 6, “Christian Faith and Physical Science in the Thought of James Clerk Maxwell.”
- Maxwell saw that for Faraday “lines of force belonging to bodies were in some sense part of them.” (p. 228)



Torrance on Maxwell...

- “[Maxwell] claimed, ‘in a scientific point of view the *relation* is the most important thing to know’... Relations...belong to reality as much as things do, for the inter-relations of things are, in part at least, constitutive of what they are. Being-constituting relations of this kind we may well speak of as ‘onto-relations’.” (p. 230)

Torrance on Maxwell...

“In the Reformed theological tradition the notion of the person is held to be controlled by the person-constituting and person-intensifying activity of God in the **Incarnation**, such that union with Christ becomes the ground for interpersonal relations in the Church. Relations between persons have ontological force and are part of what persons are as persons – they are real, **person-constituting** relations. That was the theology underlying Clerk Maxwell’s concept of union with Christ and of inter-personal relations in Christ, which it was not his nature to isolate in some compartmentalised way from his understanding of **real, ontological relations in the physical universe.**” (p. 230)

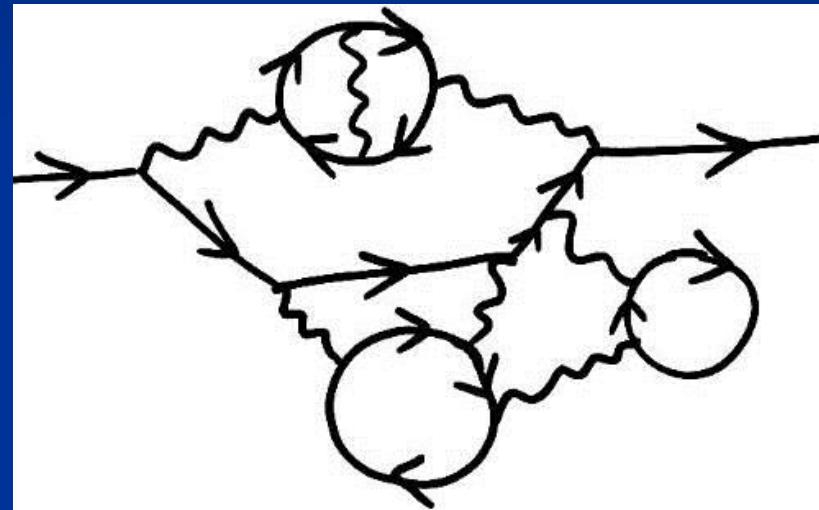
The Field Notion and Christianity

“[For Maxwell,] central to the biblical understanding of the person is the *reality of human relationships as an integral part of what persons really are*. You as a person are not an isolated individual, like the Newtonian particle separated from other autonomous particles [but] are interrelated with others, your parents, your friends, even people with whom you disagree. These *interrelationships constitute the very stuff of personal being*.... This deep appreciation led to Maxwell’s development of the electromagnetic field in order to describe particles as never separable from their interactions.”

- W. Jim Neidhardt, *Perspectives on Science and Christian Faith* 41:3 (Sep. 1989) 137-142. [emphasis in original]

Quantum Field Theory

What is an Electron?



Thing and Law
are entangled

God – lawful thing

Divine and Human Agency

- Lawfulness is integral to thingness
- A multi-aspectual world

A multi-aspectual world

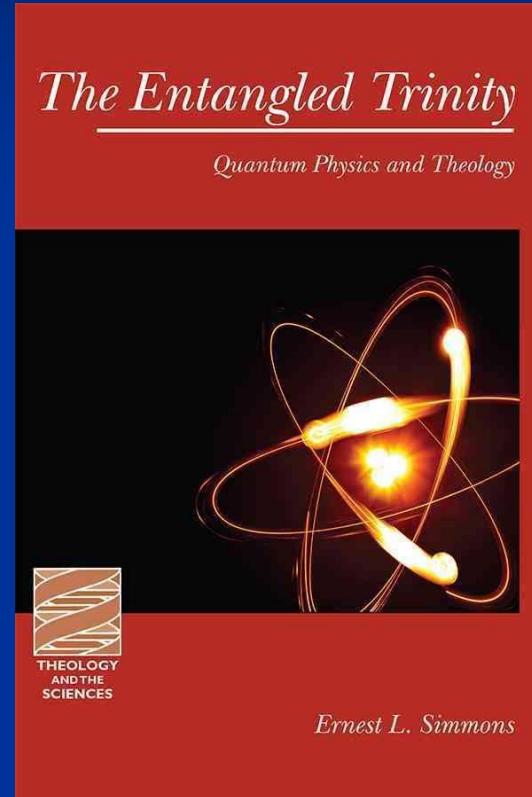
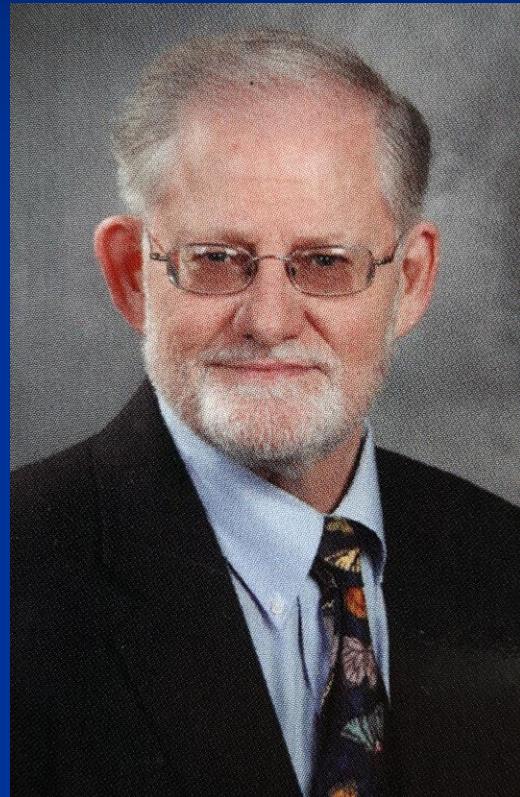
Quantitative	Amount
Spatial	Continuous extension
Kinematic	Movement
Physical	Interaction
Biotic	Generation
Sensitive	Feeling
Analytical	Distinction
Cultural	Formative power; creativity
Lingual	Symbolic meaning
Social	Social interaction
Economic	Resource use
Aesthetic	Harmony
Juridical	What is due
Ethical	Self-giving love
Credal	Vision, commitment

For much more on this, see
kgsvr.net/dooy

Divine and Human Agency

- Lawfulness is integral to thingness
- A multi-aspectual world
- So, is agency...
 - Top-down?
 - Bottom-up?
 - **Coherent!**

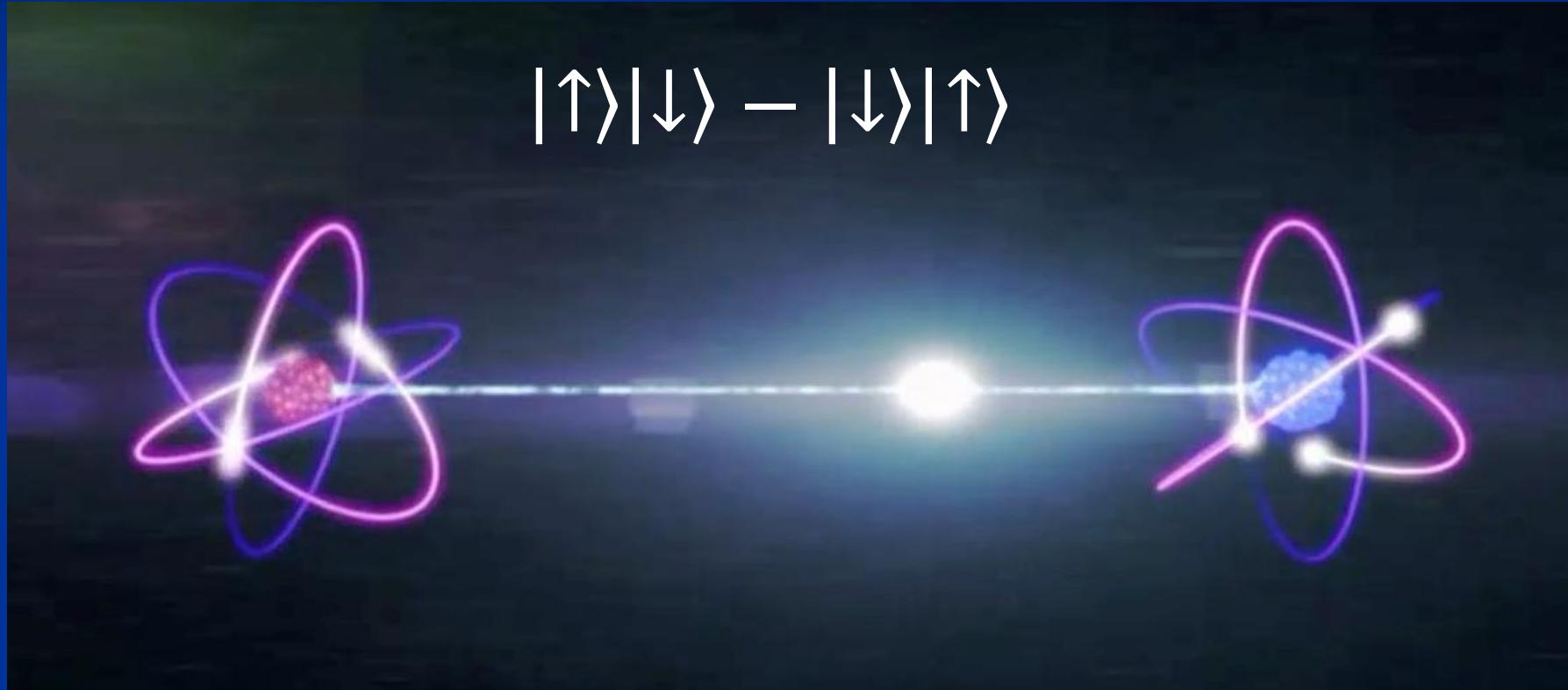
Simmons on Entanglement & Perichoresis



Fortress Press, 2014

Quantum Entanglement

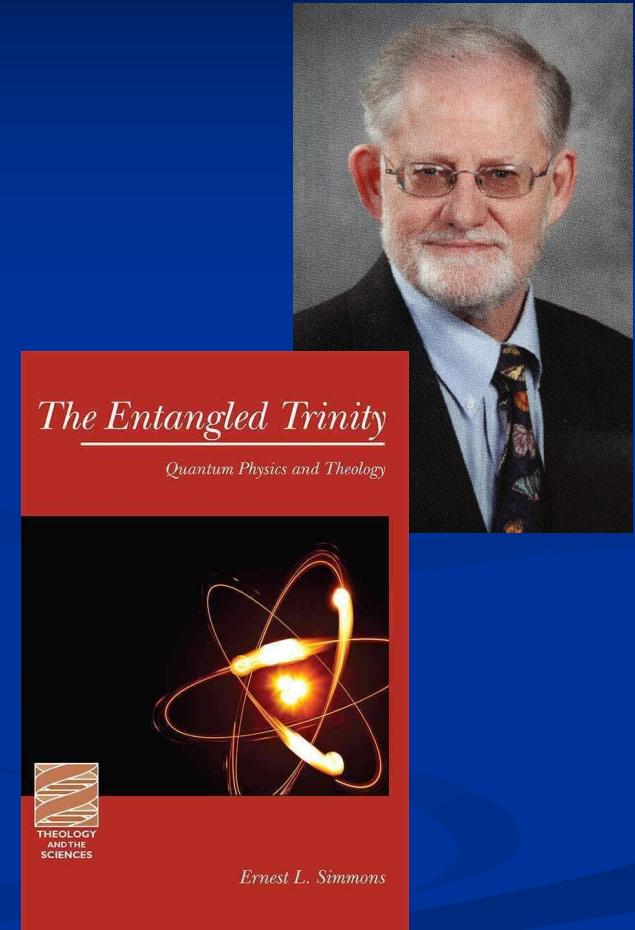
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adapted from blogs.umass.edu/Techbytes/2016/10/18/quantum-computing

Simmons on Entanglement & Perichoresis

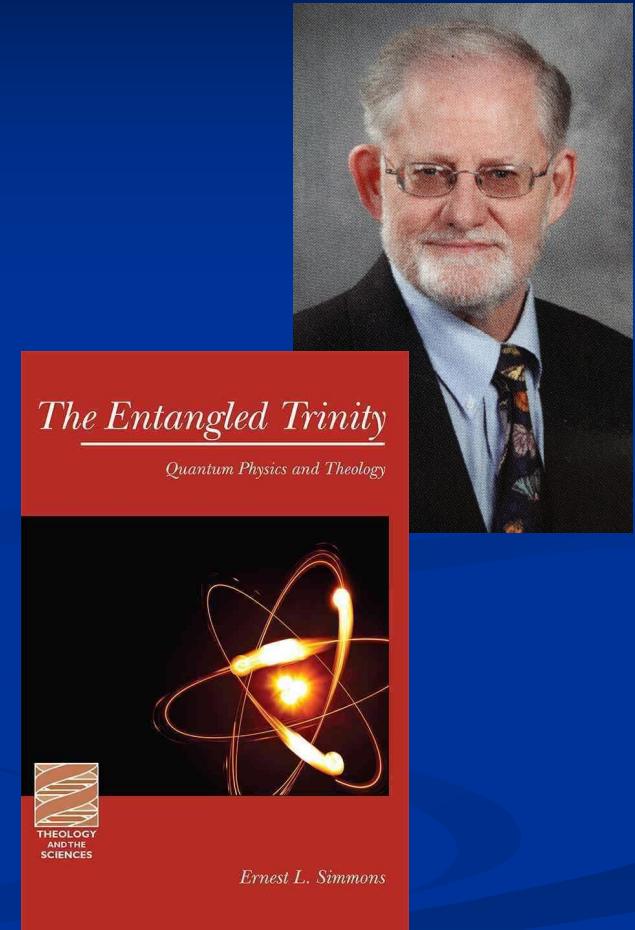
- “Everything is interconnected at the subatomic level.” (p. 147)
- “Particles that are once interrelated can never be fully separated; so too the mutually indwelling activity of the Trinity can never be dismembered.” (p. 144)



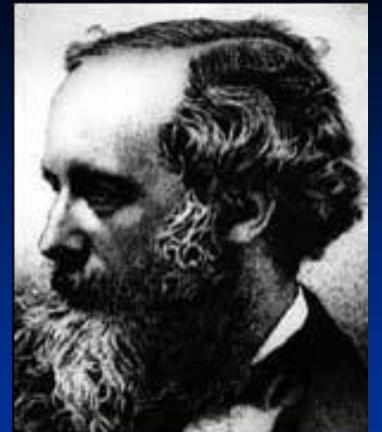
Fortress Press, 2014

Simmons on Entanglement & Perichoresis

- “Perichoresis as entanglement can be understood as the energy of the divine Trinity through which the creation is expressed. The immanent Trinity exists in superposition with the economic Trinity and evolves within the entangled life of God with the creation, thus supporting a panentheistic model of God.”
(p. 144)



Fortress Press, 2014



A prayer of Maxwell

■ “Almighty God, who hast created man in Thine own image, and made him a living soul that he might seek after Thee and have dominion over Thy creatures, teach us to study the works of Thy hands that we may subdue the earth to our use, and strengthen our reason for Thy service; and so to receive Thy blessed Word, that we may believe on Him whom Thou hast sent to give us knowledge of salvation and the remission of our sins. All which we ask in the name of the same Jesus Christ our Lord.”

