John Jefferson Davis

Lessons from the Proton for Trinitarian Theology?

Three Quarks in One Proton
Three quarks for Muster Mark!
James Joyce, *Finnegan's Wake*

This article proposes a new analogy from modern physics[1] for the Trinitarian relationships: one proton composed of three quarks. It is argued that a mereological[2] hypothesis of the "Non-Attribution of Distinctive Properties" (NADP) can be derived from this comparison: Distinctive properties of the parts of a whole, that are essential to the identities of those parts, are not properties that are essential to the identity of the larger, inclusive whole.[3] By way of introduction, biblical and theological justifications are offered for the use of such analogies from the natural world for the Trinity, and historical and scientific background relating to the modern physics of the proton are discussed. The principle proposed above (NADP) will then be explained and illustrated. It will be argued that the one proton/ three quarks comparison and the NADP principle sheds additional light on the "one and threeness" problem of the Trinity, and on the relationship of the identity of the One God of Jewish monotheism to the identities of the three persons of Christian trinitarianism, Father, Son, and Holy Spirit.

Keywords: proton, quarks, Trinity, analogy, vestiges of the Trinity, one and threeness, Non-Attribution of Distinctive Properties (NADP)

1 In an internet search I encountered one discussion of the proton/quark analogy, a blog posting by Kurland, B.,"Three Quarks and the Trinity: Scientific Models for a Mystery," accessed at https://catholicstand.com/three-quarks-and-trinity-scientific-models-for-mystery/ accessed 4 November 2021. In this popular discussion the author, a former physicist and now a convert to Roman Catholicism, discusses the analogy, but then dismisses it, concluding that "… in the end it's not all that useful." This article attempts to show that there is more to be harvested from the analogy than Kurland may have recognized. There was also a brief (5 minutes, 54 seconds) YouTube video, "Trinities of Nature," using the proton/quark comparison, but without attribution to an author, and no serious analysis: https://youtu.be/lgL24XRE8No, accessed 5 November 2021.

2 On mereology, the branch of philosophy on whole-part relationships, see Gruszczynski, R. and Varzi, A.C., "Mereology Then and Now," *Logic and Logical Philosophy* (2015) 24, 409-427, and Varzi, A.C., "Mereology," *Stanford Encyclopedia of Philosophy, https://plato.stanford.edu/entries/mereology/*, accessed October 30, 2021.

3 The acronym NADP stands for the hypothesis of the Non-Attribution of Distinctive Properties (of parts) to an including whole.

1. Introduction

The idea that vestiges of the Trinity (*vestigium trinitatis*) could be discerned in the natural order is an ancient Christian belief, being found in the church fathers. In book six of his treatise on the Trinity, Augustine stated:

So, then, as we direct our gaze at the creator by *understanding the things that are made* (Rom 1:20),

We should understand him as a triad, whose traces [*vestigium*] appear in creation in a way that is fitting.[4]

Augustine found traces of the Trinity in the psychological powers of the human soul, e.g., being, knowing, willing; memory, understanding, and will; lover, the beloved, and their mutual love.[5] Prior to Augustine, Tertullian had found in the natural order several images of God's triadic nature: root, tree, and fruit; fountain, river, and stream; sun, sun's ray, and the highest point of the ray.[6] Other popular illustrations have included ice, water, and steam; the three dimensions of space; past, present, and future; egg shell, egg white, and egg yolk; a three-leaf clover, and so forth. Gregory of Nazienzen used a famous illustration of light from three superimposed suns:

We have one God because there is a single Godhead. Though there are three objects of belief [Father, Son, Spirit] … They are not sundered in will or divided in power … It is as if there was a single intermingling of light, which existed in three mutually connected suns.[7]

Martin Luther believed that "in all creatures there is and may be seen an intimation of the Holy Trinity," citing examples from sun, water, and plants. "God is present in all creatures, even in the tiniest leaf and poppy seedlet."[8]

These church fathers and later Christian writers saw biblical justification for such comparisons, especially in Paul's statement in Rom. 1:19,20 that

"… what may be known about God (*to gnoston tou theou)* is plain to them [the Gentiles], because God has made it plain (*ephanerosen*) to them. For since

4 *De Trin.* 6.12, cited in Robinson, A., *God in the World of Signs*, Leiden: Brill (2010), "Vestiges of the Trinity in Creation," p. 259. Augustine's notion of the *vestigium trinitatis* is affirmed by Aquinas in *Summa Theologiae* 1a, 45, 7.

5 Augustine, *De Trin.* 17, 21.

6 *Against Praxeas* 9, in *The Ante-Nicene Fathers,* vol. III, Roberts, A. and Donaldson, J. (eds), Grand Rapids: Eerdmans (1973), pp. 602-603.

7 Gregory of Nazienzen, *Orations* 31.15.

8 Cited in Barth, K., *Church Dogmatics* I.1, Bromiley, G.W. and Torrance, T.F., Edinburgh: T.&T. Clark (1936, 1975), p. 336. Barth presents an extensive (though not appreciative) survey of the history of the *Vestigium Trinitatis* on pp. 333-347, drawing on Herman Bavinck, *Reformed Dogmatics*, v.2, tr. John Vriend (Grand Rapids: Baker Academic, 2004; orig. 1918), pp. 322-327, "Trinitarian Analogies and Arguments."

the creation of the world God's invisible qualities (*aorata autou*) – his eternal power (*aidios autou dunamis*) and divine nature (theioteis)[9] have been clearly seen (*kathoratai*) , being understood (*noumena)* from what has been made, so that men are without excuse."

Paul is not asserting what in later Western theology from the thirteenth century came to be known as "natural theology." Paul is not teaching that unaided human reason, examining the features of the natural world, can know that there is a wise, powerful, and benevolent deity (though this is in fact the case). The starting point is God's revelation – what God has made plain (*ephanerosen*). Human reason is the receptive instrument, not the ground and foundation of proper knowledge of God.[10]

In his second missionary journey, Paul declared to his Gentile listeners in Iconium and Derbe (Acts 14:15,17) that the God who

"… made heaven and earth and everything in them (*panta ta en* autois) has not left himself without testimony: He has shown kindness by giving you rain from heaven and crops in their seasons: he provides you with plenty of food and fills your hearts with joy.

The kindness and generosity of the one true God, the God of Israel, is demonstrated in the regularity of seasons and weather that provides humanity with food and enjoyment. Such a view of God's general revelation in nature was not original with Paul, of course. He stood in the ancient tradition of Israel's wisdom literature, reflected in texts such as Psalm 19:1 ("the heavens declare the glory of God"), or Prov. 8:27,30, where the personified Wisdom declares that "I was there when he set the heavens in place … Then I was the craftsman at his side." The fingerprints of Wisdom, so to speak, have left their traces on the things God has made.[11]

Admittedly, these biblical texts do not speak explicitly of God's *triune* nature being revealed in the natural order. Nevertheless, they do teach that some par-

9 For a comprehensive review of the history of interpretation of the term *theioteis* (Rom 1:20) and the similar term (*theoteis*) in Col. 2:9, see the classic article of H.S. Nash, "*theioteis – theoteis,* Rom 1.20; Col 2:9," *Journal of Biblical Literature* 18 (1899): 1-34. Nash concludes that the two terms are basically synonyms, without a clear distinction between "divinity" (Rom. 1:20) and "deity" (Col. 2:9) as came to be commonly supposed in the history of interpretation.

10 Rom. 1:19,20 is a statement about God's *general revelation* in nature, not a statement of "natural theology" as such. On general revelation, see Demarest, B.A., *General Revelation: Historical Views and Contemporary Issues,* Grand Rapids: Zondervan (1982).

11 The doctrine of God's general revelation in nature is not limited to these specific texts. More broadly, the nature of God is revealed in scripture through many images and metaphors. God is described in terms of light, water, wind, fire, bread, shepherd, father, and so on. These images from the created order provide further foundation for the knowledge of God by *analogy* – the insight that things of the created order communicate (partial) truths of God with both elements of similarity and difference.

tial yet true knowledge of the true God can be discerned. In the later history of redemption – after Christ and the Spirit have been more fully revealed, it was to be expected that New Covenant believers would look for such hints of the Trinity.

A further caveat is in order before discussing the main topic of this paper, a comparison between the composition of the proton and the structural relation between the trinitarian persons and the one God and divine essence. The church fathers and subsequent commentators have recognized that no analogy from the created order can be fully adequate for understanding the nature of the Triune God; the infinite can not be contained or circumscribed by any finite entity or concept. Furthermore, Christian theologians have long recognized that such illustrations of the Trinity from the natural order can, taken in isolation and apart from the canonical teachings of scripture, seem to better illustrate the heresies of tritheism, modalism, or subordinationism than the church doctrine of the Trinity.

In his discussion of the persons of the Trinity, Augustine famously said that he made his proposals "… not in order to give a complete explanation of it, but that we might not be obliged to remain silent."[12] The current proposal is being made in the same spirit. The inadequacies of the proton/quarks comparison are freely recognized – not the least of which being that impersonal and material hypostatic entities such as subatomic particles are not in those respects like the personal and spiritual hypostases of the Trinity. Nevertheless, it is here presupposed that such comparisons have some value, in particular with respect to a *structural* comparison of compositions: the one God constituted by three united yet distinct persons; the one proton constituted by three united yet distinct quarks.

A prior assumption in this paper is that the metaphysics of any era – whether that of Aristotle, Aquinas, or our own – will reflect the physics and natural knowledge of the time. For example, the metaphysics of Aristotle that has been so influential in Western theological reflection on the doctrine of God and the Trinity, privileged solid, material objects visible to the senses as paradigm instances of the "real" and of hypostatic entities. As Paul Studtmann has observed, Aristotle, with his premodern science and empirical orientation, "… takes material particulars as ontological bedrock … entities such as Socrates and a horse are the most real entities in Aristotle's worldview."[13] Such a metaphysics may not be adequate for conceptualizing the whole-part relations of non-material and mental substances such as the Persons of the Trinity, that, unlike Socrates and horses, are characterized by *perichoresis* and the interpenetration of their

12 Augustine, *De Trin.* 5.9.

13 Studtmann, P., "Aristotle's Categories," 2.1, *Stanford Encyclopedia of Philosophy,* accessed at https://plato.stanford.edu/entries/aristotle-categories/, October 14, 2021.

personal hypostases.

On the other hand, another illustration from the common-sense physics of the day that was popular among the church fathers – the image of an iron poker made red-hot by the fire in the fireplace – is more amenable as an analogy for the *perichoresis* concept in Christology and trinitarian theology.[14] The iron is in the fire, and the fire is in the iron. The fire and the iron permeate one another, while each maintains its distinctive identity and properties – as is the case with the two natures of Christ and the three persons of the Trinity.[15]

Aristotle's type instances of hypostatic individuals – Socrates and a horse – are both solid material objects, and not amenable to illustrate the perichoretic inter-containment of the Father in the Son and the Son in the Father (Jn 14:10). The image of the iron in the fire and the fire in the iron, on the other hand, has happily selected two substances that can interpenetrate – an iron poker (a solid material object) and fire (energy: heat; photons of light). John of Damascus and other church fathers had no knowledge of the Pauli Exclusion Principle[16] of modern physics, which explains the fact that solid material objects, composed of nuclei surrounded by shells of electrons, can not occupy the same space. On the other hand, any number of carriers of energy such as photons can occupy the same space, and can be present within a material object. The patristic illustration of the iron and the fire was happily consistent with this scientific truth.

While we are not bound by the specific scientific beliefs that may have been held by the church fathers, we can follow their theological method by attempting to use the best science of our own day in the service of Christian truth – in the present case, new knowledge concerning the structure of the proton. The intention in this paper is to employ concepts from modern physics in a manner that is consistent with and supportive of historic Trinitarian orthodoxy. Key tenets of this historic orthodox belief have been helpfully summarized by Thomas McCall and William Hasker as follows: consistency with the mono-

14 John of Damascus uses this illustration in *De fide orthodoxa* 61.1; cited by Stamatovic, S., "The Meaning of *Perichoresis*," *Open Theology* 2 (2016): 303-323 at 315.

15 Stamatovic provides this helpful definition of perichoresis: "*perichoresis* or permeation is unity of the different, where the difference remains completely preserved despite the communication of one to the other," p. 321.

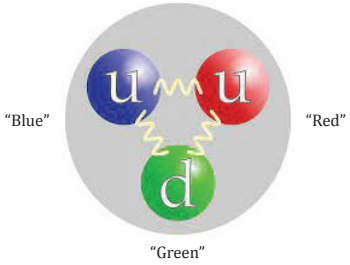
16 Two or more solid material object – three billiard balls; Socrates and a horse – can not be literally in one another, since solid objects exclude one another. However, non-material entities such as electromagnetic waves and human states of consciousness do not exclude one another, and can occupy the same physical or mental space. Any number of electromagnetic wavelengths (e.g. radio signals of different frequencies or light beams of different wavelengths and colors such as red, green and blue) can be "stacked" and superimposed upon one another in the same space, while still retaining their respective distinctive identities. The impenetrability of solid material objects is a consequence of the *Pauli Exclusion Principle* in quantum physics (on this see, "Pauli Exclusion Principle," http://hyperphysics.phy-astr.gsu.edu/hbase/pauli.html, accessed October 11, 2021). This principle does not apply to the photons that are packets of electromagnetic radiation.

theism of Jewish Second Temple monotheism and of Jesus, Paul, and the New Testament authors; affirmation of the real, eternal distinction of the divine Persons; affirmation of Father, Son, and Holy Spirit as *homoousios*; and affirmation that Father, Son, and Holy Spirit express a not merely functional unity, but a unity ontologically grounded in the unity of the numerically one, unique, and undivided divine essence.[17]

2. Non-Attribution of Distinctive Properties: One Proton, Three Quarks

The existence of quarks was hypothesized by the physicists Murray Gell-Mann and George Zweig in 1964, and confirmed in 1968 by experiments at the Stanford Linear Accelerator in California.[18] The whimsical name "quark" was chosen by Gell-Mann after a perusal of James Joyce's *Finnegan's Wake*, with its phrase "Three quarks for Muster Mark."[19] According to Gell-Mann, the number three fitted perfectly with the way quarks occur in nature.

Heretofore, the proton had been considered (along with the neutron) the fundamental particle of the atomic nucleus. The name "proton," meaning "first" in Greek had been given to it by the English physicist Ernest Rutherford in 1920 after his experiments on the hydrogen nucleus.[20] In the current Standard Model of particle physics, the proton is now understood to be composed of three quarks tightly bound together by the strong nuclear force – two up quarks (u), and one down quark (d), as in the diagram below:



17 McCall, T., *Which Trinity? Whose Monotheism?* Grand Rapids, MI: Eerdmans (2010), p. 86; Hasker, W., *Metaphysics & the Tri-Personal God*, p. 176.

18 For history of the discovery of quarks and their physical properties, see Smith, T.P., *Hidden Worlds:Hunting for Quarks in Ordinary Matter*, Princeton: Princeton University Press (2003), pp. 90-108, 'Particle Taxonomy', and pp. 131-147, 'Three Quarks Plus'; and Close, F., *The New Cosmic Onion: Quarks and the Nature of the Universe*, New York: Taylor and Francis (2007), pp. 75-106. See also Dodd, J. and Gripaios, B. *The Ideas of Particle Physics,* 4th ed. (Cambridge: Cambridge University Press, 2020), pp. 143-164, "Quantum Chromodynamics – the Theory of Quarks."

19 Gell-Mann gives his account of his naming of the quark in Gell-Mann, M., *The Quark and the Jaguar: Adventures in the Simple and the Complex*, (New York: W.H. Freeman and Co., (1994), pp. 180-181.

20 Romer, A., "Proton or prouton? Rutherford and the depths of the atom," *American Journal of Physics* (1997) 65, 707-716.

The quarks are so tightly bound together that they never appear in isolation in nature. The three quarks have the properties of mass, energy, electrical charge, and spin, properties shared by the proton which they constitute. In addition, they have a distinctive quantum mechanical property known as " colour charge," a property which does not characterize the proton. The " colours" (red, green, blue) of the quarks are arbitrary and have no connection to the colours of light as we experience them. The colours of the quark, however, are intrinsic properties that serve to distinguish one quark from the others.

When interacting to form the one proton, the colour charges of the three quarks are not conserved, such that the proton has no colour. The distinctive colour charges of the three quarks are ontologically present in the one proton, but phenomenologically absent, so to speak. Colour is not attributed to the proton, even though it is a distinguishing property of the constituent quarks.

Consequently, this feature of the quark-proton relationship can be seen to illustrate the Non-Attribution of Distinctive Properties hypothesis (NADP): *Distinctive properties of the parts of a whole, that are essential to the identities of those parts, are not properties that are essential to the identity of the larger, inclusive whole.* In the present case, colour is a distinctive property of the three quarks, but not of the one proton so constituted. Colour is not an essential property of the identity of the proton, though it is essential to the distinctive identity of the quarks. Colour is not an emergent property of the proton, but one that could be said to be "submerged."

Given the limitations inherent in any proposed analogy for the Trinity, one aspect of *disanalogy* should be acknowledged. The tightly bound quarks in the proton, as they exchange the gluons that mediate the strong nuclear force, are constantly changing colours that distinguish them. The down quark changes from blue to green, and the green up quark changes to blue.[21] This is unlike the distinctive personal properties of Father, Son, and Holy Spirit, that are constant and invariable. However, even though the colour property of the quarks is constantly changing, other properties such as spin, electrical charge, and mass are constant. And despite the continuous changes of colour among red, green and blue quarks, the *additive* result of these colour changes is always unchanged—a colour of white, or no colour, for the proton as whole.

This combination of changing and unchanging aspects of the quarks suggests yet another intimation of the dynamic relationships among the Trinity. The Trinity is the *living* God, and inherent in all life is process, change, and interaction. Each of the Triune persons embodies and preserves without change the *homoousios,* the eternally constant divine essence.[22] Just as the constant

21 Deschenes, P.J. and Burke, J., "Color and the Strong Force," Duke Department of Physics webpage, accessed at https://webhome.phy.duke.edu/~kolena/modern/color.html, 22 December 2021.

22 The patristic tradition speaks of the *inseparable operations* of the Trinity: Father, Son, and Holy

systolic/diastolic actions of a human heart mark the presence of life, so in the Trinity, the unceasing, reciprocal giving and receiving of love and glory by Father, Son, and Spirit mark the joyous reality of the divine life. In the proton, the gluons mediate the dynamic changes of colour. In the Trinity, the Spirit has been conceived as the divine "force carrier of love" from Father to Son and Son to Father.

Before considering possible parallels between the one proton/3 quarks and one God/3 persons relations, two other (non-theological) illustrations of the NADP principle will be offered. First, consider three people in a doctor's waiting room. The first is Annie, a five-year old girl; the second is her grandmother, Barbara, who has taken her for this doctor's visit; and the third is Carol, who is eight months pregnant with her first child. The receptionist is directed to call in the "pregnant mother" for her appointment. Without further specification, the receptionist can recognize Carol as the pregnant mother rather than Annie or Barbara. Carol's eight month old baby in her womb is essential to her identity as a pregnant mother. But the particular distinctive properties of her baby (e.g., male or female; current weight, etc.) are not essential for identifying Carol as the pregnant mother. Those distinctive properties of the baby (a part) in the uterus are ontologically present but not phenomenologically apparent in the pregnant mother (the whole).

Second, imagine three pies placed on the dining room table: one custard; one cherry; and one chocolate. The custard pie has been cut into three equal slices, with a red birthday candle placed on one slice, a green birthday candle placed on a second slice, and a blue birthday candle placed on the third slice. The three slices of the custard pie are identical as to substance, appearance, and taste, and only distinguished by the colour of the candles. If the mother says to her daughter, "Please bring me the slice of the custard pie with the red candle," the colour red is essential to the identity of that individual slice. If, on the other hand, the mother says to her daughter, "Please bring me the whole custard pie," then the colour of the candles are not essential to pick out the custard pie from the cherry and chocolate pies. This is consistent with the NADP principle that the distinctive properties of the parts of a whole (candle colours) are not essential to the identity of the larger inclusive whole (the custard pie).

Spirit are distinct, but never separated, in their actions in neither time nor eternity. The phenomenon of *quark confinement* suggests a point of similarity here, in that quarks are never found in isolation, but always tightly bound together by the strong force. On the concept of inseparable operations, see the comprehensive study of Vidu, A., *The Same God Who Works All Things: Inseparable Operations in Trinitarian Theology,* Grand Rapids, Mich.: Eerdmans (2021). On quark confinement, see Hansen, L., "Confinement of Quarks," in *The Color Force*, Duke Department of Physics webpage, accessed at http://webhome.phy.duke.edu/~kolena/modern/modern.html, 22 December 2021.

3. Non-Attribution of Distinctive Properties: One God, Three Persons

We now test the applicability of the NADP hypothesis and the proton/quarks analogy to Trinitarian theology. Two questions are of interest: Can the hypothesis be helpful with respect to the identity of God as variously revealed in scripture and redemptive history – first as the one God of Israel, and then as the Triune God of the church? And can the hypothesis help in addressing the "one and threeness" problem – how Father, Son, and Spirit can each be God, and yet there not be three gods? Positive answers are offered for both questions.

As to the first question, the issue is complicated by the variety of names and terms used of God in Scripture: the God of Abraham, Isaac, and Jacob; Elohim; Yahweh; Father; Son; Logos; Spirit, and so on. Are all these the same God? Is the God who spoke to Moses at the burning bush, or the God who spoke to Isaiah in his temple vision, the Triune God revealed in the New Testament? The NADP hypothesis enables us to give the answer "Yes!" to these questions. Recall the NADP: *Distinctive properties of the parts of a whole, that are essential to the identities of those parts, are not properties that are essential to the identity of the larger, inclusive whole.* With respect to the Trinity, this means that the distinctive personal properties of Father, Son, and Holy Spirit (the parts) which are essential for identifying their unique personal identities, are not essential for the identity of the one God (the whole) and divine essence which they conjointly instantiate. These distinguishing personal properties, revealed in Scripture and the history of redemption, have been traditionally stated in terms of relations of origin, i.e., generation; filiation; procession. Distinctive personal properties revealed in the actions of God revealed in the New Testament could include, for the Father, audibly speaking the words, "This is my beloved Son"; for the Son, becoming incarnate from the Virgin Mary; for the Spirit, appearing visibly in the form of a dove. Father, Son, and Holy Spirit understood as proper names or titles also serve to mark the personal distinctions.

In the Old Covenant, it was neither necessary nor helpful for God's revealed identity to include his triune nature. At this stage of redemptive history, it was crucial for Israel, freshly liberated from the polytheism of Egyptian and ancient Near Eastern culture, to understand that there was one and only one true God – the God of Abraham, who was the same God who redeemed them in the Exodus and called them into covenant at Sinai. Only when the "time had fully come" (Gal 4:4-6), when God sent forth his Son to be born of a woman, under the law, in order to adopt the redeemed as sons and to give them the Spirit, was the time ripe for the full revelation of the one God's triune nature. Earlier revelation might have triggered a relapse into polytheism.

Just as in the one proton the distinctive colours of the three quarks are not manifested in the identity of the proton, so the distinctive personal properties of Father, Son, and Spirit were not necessary to establish the identity of the one

God of Israel – who was identified as the creator of the world, the God of the fathers, and the redeemer of Israel at the Exodus and Sinai. Like the colours of the quarks, the distinctive personal properties of the persons of the Trinity were ontologically present, but not phenomenologically apparent – submerged, or quiescent, to be subsequently revealed at the proper time. Just as the words "evening star" and "morning star" have different senses and connotations, but the same ontological reference – the planet Venus – so the "God of Abraham" and "the Trinity" have different semantic senses but the same ontological reference.

Both in the case of the proton and the Trinity a principle of *complementarity*[23] suggests itself. From one point of view – that of ordinary chemistry and the periodic chart of the elements, the proton is one stable and indivisible particle. From the point of view of the Standard Model of particle physics, the proton is three quarks tightly bound by the strong nuclear force. Both descriptions are true and complementary, being relative to the context and purpose of the speakers. Similarly, both oneness and threeness are truly predicated of God, in the respective contexts and purposes. They are complementary descriptions of the same God.

Is there further light that can be shed on this one and threeness problem by the proton/quark comparison and the NADP hypothesis? With respect to the threeness, the proton is constituted by three quarks, each with distinct properties. The quarks share properties of mass, energy, electric charge, and spin with the proton, and these properties are essential to the existence of both quarks and protons. The three distinct quarks are tightly bound together by the strong nuclear force, and are never observed in isolation from one another. Similarly, the one God is constituted of three persons, Father, Son, and Holy Spirit, each possessing distinctive personal properties. The three persons share the divine properties such as omnipotence, omniscience, self-existence, self-awareness, love, holiness, and so forth that are necessary for the existence of the three persons and the one God. The three persons are tightly and inseparably bound together perichoretically shared common essence, and by the "strong force" of reciprocal love. Like the three quarks of the proton, the three persons of the

23 The principle of complementarity is associated with the Danish physicist Niels Bohr, one of the fathers of modern quantum mechanics. See Bohr, N. *The Philosophical Writings of Niels Bohr*, Woodbridge, Conn.: Ox Bow Press (1987-1998), and Faye, J, "Copenhagen Interpretation of Quantum Mechanics", *The Stanford Encyclopedia of Philosophy*, https://plato.stanford.edu/archives/win2019/entries/qm-copenhagen/, accessed 11 November 2021. A commonly invoked illustration of the complementarity principle is *wave-particle duality*: the electron can be conceptualized both as a particle and as a wave, depending on the experimental context. Both concepts are needed to relate to the data, and both can be considered equally true.

Trinity never exist or act in separation from one another.

As to the oneness of the proton and of God, the proton, though constituted by distinct quarks, can truly be considered one distinct particle, a unified whole never observed to be split among its three constituent parts. Its properly specified properties of mass, energy, electric charge and spin are the necessary and sufficient properties for specifying its identity. As to the oneness of God, the one true God, though constituted by three persons, is one unified being, fully instantiating the one divine essence equally shared by the persons. As stated above, God's three persons never exist in isolation or act independently from one another.

The Non-Attribution of Distinctive Properties hypothesis applies both to the one God and to the single proton. The colours of the quarks, though necessary to the quarks as parts of a larger whole, do not appear as necessary properties of the whole proton. They are submerged, being ontologically present but phenomenologically absent. The distinctive personal properties of Father, Son, and Holy Spirit that are essential to their identities are not properties that are essential (like the metaphysical and moral attributes) to the identity of the one God. The distinctive properties of the persons were submerged, so to speak, in the earlier history of redemption, being ontologically present in the Burning Bush but not phenomenologically manifest.[24] Thus the oneness and threeness of the proton and of the Triune God are recognizable as complementary descriptions of the same unified yet internally complex realities, viewed and experienced from different perspectives, contexts, and times.

4. Conclusions

This article proposed a new analogy for the Trinity from modern physics – one proton composed of three quarks - with a view to shedding additional light on the one and threeness problem and the identity of God across redemptive history. The hypothesis of the Non-Attribution of Distinctive Properties (NADP) was illustrated from the proton-quark and other examples, and applied to the Trinity: the distinctive personal properties of Father, Son, and Holy Spirit that are essential to their identities are not essential for recognizing the identity of the one true God, the God of Abraham and of Jewish monotheism. These distinctive personal properties were ontologically present throughout biblical revelation, but not fully manifested before Christ and the Spirit were revealed in the incarnation, cross, resurrection, and Pentecost. The oneness and threeness of God are complementary, not contradictory descriptions of the

24 To say that the distinct persons were not manifest *phenomenologically* in the burning bush—though *ontologically* present—could be stated alternatively by saying that these distinctive persons were not, at that stage of redemptive history, epistemically available.

same God.

Finally, this article has also attempted to take to heart the observation of Barry Smith[25] that modern analytic philosophy since the earlier days of Russell and Wittgenstein has at times overly focused on formal logic and set theory, and given less attention to the possible value of new discoveries in the sciences for metaphysical analysis. This article hopes to be modest contribution and nudge in that direction.

John Jefferson Davis is Senior Professor of Systematic Theology and Christian Ethics, Gordon-Conwell Theological Seminary, Hamilton, Massachusetts.

25 Smith, B., 'Ontology', in Kin, J. and Sosa, E. (eds) *A Companion to Metaphysics* (Cambridge, Mass.: Blackwell, 1995), pp. 373-374. He welcomes a newer trend in which "… philosophers are once more addressing the problems of ontology and metaphysics in direct and rigorous fashion … dealing with the messy and subtle forms of things rather than with the logically neat and tidy forms of deliberately constructed surrogates," p. 374.