THE INSPIRATION OF GOD AND WOLFHART PANNENBERG'S "FIELD THEORY OF INFORMATION"

by George Medley, III

Abstract. This paper will examine the implications of an extended "field theory of information," suggested by Wolfhart Pannenberg, specifically in the Christian understanding of creation. The paper argues that the Holy Spirit created the world as field, a concept from physics, and the creation is directed by the logos utilizing information. Taking into account more recent developments of information theory, the essay further suggests that present creation has a causal impact upon the information utilized in creation. In order to adequately address Pannenberg's hypothesis that the logos utilizes information at creation the essay will also include an introductory examination of Pannenberg's Christology which shifts from a strict "from below" Christology, to a more open "third way" of doing Christology beyond "above" and "below." The essay concludes with a brief section relating the implications of an extended "field theory of information" to creative inspiration, as well as parallels with human inspiration.

Keywords: creation; divine action; field theory; Holy Spirit; information; Wolfhart Pannenberg; Arthur Peacocke; philosophy of science; John Polkinghorne; Pierre Teilhard de Chardin

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While inspiration, theologically speaking, usually focuses on the inspiration given from God to humans, little is spoken of the inspiration that God may have had to perform certain actions. It is important to note that inspiration, aside from its linguistic roots, seems to connote a creative spark upon which to draw and need not, for the purposes of this study, be a reference to something having its source in God. Of particular interest is the inspiration that led God to create, and to subsequently sustain that creation. In order to approach these topics, this paper will move toward developing a "field theory of information" as suggested by Wolfhart Pannenberg. To do so, it will engage Pannenberg's shifting Christologies, his scientific pneumatology, and their interaction within Pannenberg's theology, as well as exploring why other theological engagements with information theory are inadequate. After a preliminary discussion of Pannenberg's early Christology, this paper will provide a brief background of the theological

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use of information theory, field theory as it is utilized in Pannenberg's theology, and Pannenberg's mature Christology in order to introduce the potential theological and philosophical benefit of elaborating upon Pannenberg's "field theory of information" particularly as it concerns a theology of creation.

Pannenberg's Shifting Christology

It seems peculiar to associate the creative work of the divine logos with the theology of Wolfhart Pannenberg, particularly given that his Christology is often characterized as strictly "from below" and that, at least in his earlier works, he does little to address the preincarnate logos. However, in later works by Pannenberg, there is a shift in emphasis away from a strict "from below" Christology to a focus on humanity's relation with God, which leads to a shift in Pannenberg's Christology. As Elizabeth Johnson notes, in the afterword of the fifth German edition of *Jesus, God and Man* (Pannenberg 1968b), Pannenberg had begun to express some doubts about the usefulness of a strict adherence to a "from below" methodology. To be sure, the grounding for his theology and Christology in observable history, as initially stated in *Revelation as History,* had not dissipated by the time of the fifth German edition of *Jesus, God and Man*, as evidenced in part by the three volumes of *Basic Questions in Theology*. Rather than a complete abandonment of Christology "from below," Pannenberg's later work should be understood as his attempt to refine it, to discover a "third way" beyond "above" and "below" (Johnson 1982, 246).

Johnson suggests a possible direction related to two concerns brought out by Pannenberg. The first is anthropological, as seen in *Anthropology in Theological Perspective*, and the second is Trinitarian. Johnson further suggests that the two may be related as Pannenberg links them and the historical person of Jesus to a Christology built upon God's relation to humanity (1982, 247–49). It is in this way that Pannenberg, therefore, might be understood to have moved beyond both "above" and "below" Christology.

Pannenberg shifts his focus away from a strict "from below" theology to the all-encompassing nature of God's relation to creation generally, and especially God's relation with humanity. The evidence of this anthropological turn can be seen in the monographs of Pannenberg translated into English as *Ethics*: *On the Church*; *Spirit, Faith and Church,* and *The Apostles Creed in Light of Today's Questions*. Ultimately, as Stanley Grenz points out, this causes Pannenberg to take a renewed interest in the Spirit and in scientific dialogue with theology (Grenz 1988a, 797–98; Grenz 1988b, 37–39, 47–48). This leads Pannenberg, in turn, to refocus the rest of his theology in light of anthropology and therefore, according to Grenz, move toward a systematic theology that attempts to reconcile the

Trinitarian *logos* with the historical person of Jesus (1988a, 797). The result is, among other things, his development of a "field theory of information" reconciling his pneumatological and developed Christological emphases.

Information Theory and Theology

Pannenberg first suggests a theological interaction with information theory in his early (1970) essay "Kontingenz und Naturgesetz," or "Contingency and Natural Law" appearing in *Erwägungen zu einer Theologie der Natur* (translated and reprinted in Pannenberg 1993, 65–66). Here, it seems that Pannenberg may have first encountered information theory in an extended treatment while reading the writing of Carl Friedrich von Weizsäcker. The primary reasons Pannenberg might have had for reading Weizsäcker stem from Weizsäcker's development of a scientific "history of nature." Since Pannenberg had developed a strong concern for God's interaction with humanity, and believed that such interaction occurred primarily through history, he began to emphasize God's historical relation with all of creation (1968a, 123–58). Although Pannenberg thought of the end of history as fixed, he nevertheless sought to describe the universe as entirely contingent. The concept of contingency is, arguably, another reason Pannenberg may have read Weizsäcker.

However, the reference to information theory in the 1970 essay is merely a passing one, and it is not addressed again by Pannenberg until the 1981 article "Theological Questions to Scientists" where, in a brief paragraph, Pannenberg urges scientists to bring together information theory with field theory and develop a "field theory of information." This could then be applied theologically along the lines of Pannenberg's previous and extensive work relating field theory to the Holy Spirit's activity in the world (Pannenberg 1981, 75). The exact manner in which Pannenberg thought this application should occur will be addressed toward the end this paper. In addition to Pannenberg, two other prominent theologians, John Polkinghorne and Arthur Peacocke, have written extensively on the relation of information theory to theology. Before exploring these applications too much further, however, it would be best at this point to briefly introduce information theory.

Overview of Information Theory. Historically, information theory came out of the need to develop stable communication methods during and directly after World War One. It led to a mathematical model, which could reduce the informatic entropy of a message. High informatic entropy, not to be confused with thermodynamic entropy, is best understood as a highly disorganized and/or low content system. Low informatic entropy refers to a system that is high in content, yet whose informational content is easily transferable. Information theory has subsequently found applications in

computer science, physics, and biology. For biological systems, the primary area of information is DNA, which contains high information content, yet conforms to certain rules and repetitions that allow for it to have and subsequently maintain a low informatic entropy (Barbour 1997, 180–95, 227–30).

Although distinct from thermodynamic entropy the terms are related, as the early pioneers in information theory may have meant to emphasize in their choice of terms. In thermodynamics, entropy refers to the disorder and loss of potential energy in a given system. A high entropy system is one that is generally highly disordered and with low energy. According to the second law of thermodynamics, actions are irreversible, and a closed system steadily moves from low entropy to high entropy. It is from this principle that some physicists describe the universe as progressing from the Big Bang toward a cold and dark void as expansion continues. This concept offers a unique problem for biology.

Biological evolution is necessarily a move from high informatic entropy (disorder) to low informatic entropy. Hence life becomes more complex as time moves on, and life generally requires the more complex method of maintaining information, DNA, to begin at all. In order to move to low informatic entropy, thermodynamic entropy must also be reduced. However, the second law of thermodynamics would seem to prevent this. A possible solution is seen in the environmental science work of Ilya Prigogine who observed that sometimes systems with high informatic entropy would suddenly, and often times seemingly randomly, move to highly complex systems. An example offered is when a stream or river suddenly develops a vortex. She discovered that such a change was possible when a significant outside force acted upon the system. Thus a transition from high entropy to low entropy is possible in open systems, which would not violate the second law of thermodynamics (Barbour 1997, 182). Jeffrey Wicken applied these findings to biology to explain the manner in which life could have evolved from nonlife. Wicken's model was particularly useful in that it avoided too close of an identification of informatic entropy with thermodynamic entropy, which, while related, should be nevertheless be treated independently (1987, 26–90).

Other Theological Engagements with Information Theory. Both John Polkinghorne and Arthur Peacocke link information with the divine *logos*, which, as John Puddefoot notes, is appropriate to both the first century understanding of *logos* and the modern understanding of information. Further, speaking of information specifically in biological terms as the logos, or related to the logos, has become the standard way of relating information theory to Christian theology (Puddefoot 1996, 301–20). In Polkinghorne's use of information theory, he argues that God's omnipresence means, by definition, that there is precisely no distance between God and all

of creation. Drawing on chaos theory, Polkinghorne notes that within a system, a small change in entropy over a small distance can lead to massive changes throughout the system, the so-called "butterfly effect." Although quantum mechanics accounts for changes across a distance of zero, chaos theory does not. Polkinghorne theorizes that changes caused by God across a distance of zero could have immense, potentially infinite, effects, characterizing the action of God as a single "input of pure information" or an input of information with absolutely no entropy, informatic or thermodynamic (1991, 40–45). Such an input, argues Polkinghorne, allows for an indirect top-down causation that still leaves room for undefined change, though within certain limits defined by the input of information, thus resulting in a form of compatabilism with respect to the freedom of the human will.

Peacocke offers a more direct top-down causation where God acts a divine "communicator of information" not at one temporal point only, but continuously in relation to Creation. Rather than a deterministic model, however, Peacocke argues that his model still allows for individual human freedom (1979, 103–05). The metaphor Peacocke uses is of a composer and individual musicians. Although the composer writes the notes, there is still room for artistic expression, embellishments, tonal differences, and other such freedoms (107).

Unfortunately, neither Polkinghorne's nor Peacocke's use of information theory avoids the pitfalls each seeks to avoid. Polkinghorne explicitly states that his use of information theory does not lapse into deism. He argues that a God who is too close, or who operates via a "bottom-up" causation, would amount to panentheism. In contrast, Polkinghorne argues that theologians in general are too quick to call certain theories deistic when they are no such thing (1991, 46). However, merely pointing out that theologians are cautious with regard to deism does not change the fact that Polkinghorne's use of information theory amounts to deism. It is puzzling how one could call it anything else when God is seen as the one who inserts pure information into the system and, with the exception of the later incarnation of the *logos*, performs no subsequent interaction with it, leaving the universe operate according to the causally directed path. It may not be pure deism, but it is deistic in its direction nonetheless.

Peacocke, on the other hand, lapses into the determinism he attempts to avoid. If, rather than leaving the processes alone, as in Polkinghorne's model, God is continually injecting information, it is difficult to see how any real sense of freedom can be had. Rather than the freedom of a musician performing as part of an orchestra, this is a computer that spits out a predefined melody, or, at best, a prisoner who is told she or he is free to look at whichever wall she or he wishes. The reason for this seems to be that Peacocke had yet realized that even the chance changes that are allowable with information theory united to quantum or chaos theory

are not entirely aleatoric. Further research has shown information infused reactions in chaos theory to be highly deterministic (Wildman and Russell 1996, 49–92). Thus a "top-down" model of causation using information theory together with either quantum theory or chaos theory collapses into determinism. In contrast, Pannenberg, who wishes to wed information theory to field theory, seems tied to a causal model that is not "top-down" as Polkinghorne's and Peacocke's models are, but one that is necessarily "bottom-up." A brief overview of field theory will demonstrate why this may be the case.

Field Theory

At its most fundamental level, field theory describes a way of action occurring over a distance of space, without an intervening material substance. Newtonian physics would not be considered field theory because Newton utilizes the medium of the *aether*, which has since been dismissed (Newton 1999, 405–07, 809). The first definitive modern field theory was posited by Michael Faraday, who suggested its existence through his observation of what he postulated were nonmaterial magnetic and electric fields. The unique feature of field theory, in distinction from earlier Newtonian physics, is its suggestion that the dynamic field, the field of force that has causal efficacy between one material object and another across a distance, can change from one type of field to another; for example, Faraday postulated that magnetic and electric fields could easily switch from one to the other. Faraday posited that there really is just one dynamic field that manifests itself as a variety of particular fields, going so far as to suggest that even matter was a manifestation of this field (Berkson 1974, 2–3, 81; cf. Faraday 1961).

Later, Albert Einstein's theory of relativity also described the field via the direct proportion of energy to matter. Thus the law of conservation of energy and law of conservation of mass becomes the law of conservation of mass and energy because mass and energy are interchangeable via the field. Contemporary physics is in surprising agreement with these suggestions of not only Einstein, but Faraday before him and no longer defines its most basic parts in terms of mass. Instead, energy has been found to be more fundamental than mass, which fits well with field theory as initially proposed by Faraday (Jammer 1961, 215–21).

Pannenberg claims that the Spirit functions in a manner similar the dynamic field. In creation, this means that the Spirit creates as field (Pannenberg 1993, 37–40; Pannenberg 1989, 163–64). Field theory adapts the mathematical concept of singularities. While Einstein's physics equations theorized that these actually only occur at event horizons in black holes, field theory does not necessitate that they only, or at least that they always only, occur in black holes (Oppenheimer and Snyder,

1939, 455–59). It is interesting to note that Einstein himself rejected the idea that singularities existed in black holes, or even the slightly older theory that they functioned as a beginning point of the universe at the Big Bang (Einstein 1939, 936). Despite Einstein's personal rejection, both his equations and other physicists continued to predict the existence of these singularities.

A singularity is an object of immense density, having a high mass and concentrated in relative little space, which is undefined to a certain extent. It is hypothesized that at the beginning of the universe, singularities or a single singularity functioned as a sort of pure potentiality that, in relation to other particles, can potentially yield an infinite, or near infinite, number of variable values in relation to other particles. In this way, multiple singularities, or a single singularity, interacting with the dynamic field, which can manifest itself as objects of mass or energy including as these initial singularities, resulted in the present state of the physical universe (Bruce and Giblin 1992, 292–300). Pannenberg hypothesizes that God's initial act of creation was via the Spirit, who might be described metaphorically as manifesting in singularities and functioning as a dynamic field and by doing so create the world (1994, 80–85). Thus the Spirit of God is the creative force. While Pannenberg goes on to speak about the Spirit's continuous presence and dynamic activity after the initial creation, this says enough for our purposes here.

Pannenberg's utilization of field theory has been met with many criticisms. It is likely that the most well known of these has been levied by John Polkinghorne, who has repeatedly charged that Pannenberg has fundamentally misunderstood the makeup and mechanics of fields as they operate in contemporary physics (Polkinghorne 2001, 796–97). Polkinghorne's other assertion, regarding the fundamentally different manner in which, he alleges, theology and philosophy are done in Germany and Britain is both puzzling and inaccurate, as noted by Pannenberg in his response (Polkinghorne 2001, 795; Pannenberg 2001, 799). Rather, it is more likely that the "bottom up thinking" that Polkinghorne holds in high regard is more characteristic of scientific investigation, which is related to Polkinghorne's background, and that "top down thinking" is actually more characteristic of those who are philosophers and theologians first.

Although Polkinghorne's criticism would certainly be valid were Pannenberg attempting to direct the conversation in purely scientific terms, it is not valid on the terms that Pannenberg suggests the dialogue between science and religion must take place. Polkinghorne is correct in his assertion that contemporary physics has moved well beyond the field theories of Faraday and Einstein, both of which are employed by Pannenberg, and generally consider fields to have a material existence of a sort, comprised primarily of photons and other quantum particles

(Polkinghorne 2001, 796). However, as Pannenberg notes, Polkinghorne has pushed the comparison in the wrong direction.

Pannenberg, in his response, notes that he is seeking to give language to an otherwise ineffable process that coincides with the unity of the universe, something provided not only in the older field theories of the universe, but even in modern field theories (Pannenberg 2001, 800). It is not the case that God as *pneuma* is identical with field, which would need to be the case for Polkinghorne's criticism to be valid. Rather, it is the case that the field provides a holistic view of the universe while also helpfully describing a process of producing matter from nonmatter, in the older field theories, or atomic matter from material things of a completely different kind, many of which notably have no mass themselves, in the present field theories. While a lengthy discussion of what this means could be engaged at this point, it will be more profitable to return to Pannenberg's intent in this particular engagement with science.

Although Philip Hefner, who also responds to Pannenberg, is correct to note that the field operates as something of a metaphor in Pannenberg's theology, Hefner fails to grasp the more complete nuance offered by Pannenberg, as evidenced by his questions at the end of his article (Hefner 2001, 804–05; 807–08). In partial response to Hefner's question, I would note Pannenberg's earlier response where he declares that his use of field theory should not be understood as "just a metaphor," but he is nevertheless careful to state clearly that he does not mean to say that God is ontologically identical with the field. Rather, Pannenberg argues that the potential benefit of using field theory is as both a metaphor and as a "linguistic analogy" (Pannenberg 2000, 64–68). In this way it gives us a vocabulary that, while certainly still inexact, is a useful tool for beginning to describe the indescribable of God's actions both within the life of the Trinity and in interaction with created beings, including the initial creative act.

The problem, and the advantage, with describing creation as occurring via singularities and the field of the Spirit is that such singularities, by their definition, are undefined. This is complicated by Pannenberg's eschatology, which is tied, in many ways, to a modified version of Pierre Teilhard de Chardin's Omega Point theory (Pannenberg 1977, 29; Teilhard de Chardin 1959, 254–60). Simply put, Pannenberg argues that history is moving toward a defined climax that will encompass all of creation, but in a way that is simultaneously contingent, and thus undefined. Even though Pannenberg uses field as more of a linguistic analogy than an ontological description of God, Pannenberg must still account for the massive decrease in entropy that such an event would entail. Since the Omega Point involves the entire universe, there is no outside *physical* force that can be exerted on it because the universe, taken in its totality, is a closed system. Pannenberg's use of field theory solves this latter problem

of granting an outside force, and the use of information theory upon field theory may solve the former problem of limiting all possibilities toward a single one without compromising the contingent nature of the universe.

However, Pannenberg's theology cannot use information theory of the type needed without first reconciling his Christology "from below" with the preincarnate second person of the Trinity: the logos.

Embracing "From Below" Christology to Find a Third Way

By the time of his *Systematic Theology*, as Grenz notes elsewhere, Pannenberg is comfortable with the preexistent *logos*, while still grounding his Christology in the historical person of Jesus. However, as a result of Pannenberg's renewed interest in the relation of God to humanity, Grenz points out that the Jesus presented in Pannenberg's *Systematic Theology* is one who is more intentional and active than the one presented in *Jesus, God and Man*. This leads, among other things, to a rejection of the notion that the cross is a fate that "befell Jesus" and it is instead seen as an end that was actively sought by Jesus, who is revealed to be the Son of God at the resurrection (Grenz 1990, 140–48). This move might be traced, in part, to Pannenberg's attempt to bring information theory to bear on field theory, which he notes as the best way to understand a fully Trinitarian theology (Pannenberg 1993, 65–66).

In the second volume of his *Systematic Theology,* Pannenberg addresses the issue of Christology, and its link to soteriology, more directly. In contrast to *Jesus, God and Man*, Pannenberg opens chapter eleven with the statement "The Son's sending by the Father and his incarnation has as their goal the salvation of the world" (1994, 397). Thus, the soteriological function of Jesus' death is no longer secondary to his divinity, as in *Jesus, God and Man*, but divinity is assumed as a precondition for both the incarnation, and the mission of Jesus. The incarnation, rather than a distinguishing and distancing factor of ourselves from Jesus as Pannenberg may have assumed in the first edition of *Jesus, God and Man*, actually "becomes an act of representation" to humanity not only on the part of the person Jesus, but of God as well (1994, 421). Rather than removing Jesus from our existence and placing him with God, then, the prior divinity of Jesus brings God closer to our present lived experience precisely in Jesus' humanity.

Pannenberg reconciles his various Christological methods by arguing that there are three levels of history for understanding the death of Jesus. The first is that presented in *Jesus, God and Man* of the human person Jesus (Pannenberg 1986b). The second is "the same history as the medium of the eternal Son of God." The third level is that history "as the medium of the active presence of the exalted Lord" through the proclamation of the gospel (Pannenberg 1994, 441). Therefore, a Christology "from below" is

still *epistemically* prior to the person, death, and the deity of Christ, while the deity of the "eternal son" is *ontologically* prior.

In this understanding, it would be the case that the resurrection of Jesus reveals at that point in history that the person Jesus was the incarnate eternal Son all along, and he continues to be active in the proclamation of this news, thus allowing Pannenberg to explore Christology on these various historical levels. The unifying factor in all of these Christologies, however, is that the death of Jesus has a redemptive effect in light of his revealed divinity. Such a turn in Pannenberg's theology, rather than a move away from "from below" Christology is a development of a truer "from below" Christology that encompasses "from above" Christology. This "third way" finds expression in, among other places, his "field theory of information."

A Field Theory of Information

Pannenberg opens his slightly more elaborated discussion of a field theory of information[1] by recalling the analogy of Irenaeus that the Spirit and the *logos* are the "two hands of God by which he created all things" (Pannenberg 1994, 109). Thus a field theory of information is also Trinitarian in its description of creation. Keep in mind, that above I had mentioned that singularities of the field/Spirit, were they to be sources of creation, would be completely contingent. The probability of any particular set of events occurring as a result of the interaction between singularities and other manifestations of the field is astronomically high. The more complex or improbable an event in a closed system is, the higher the content of information must be in order to bring about a specific event; in a completely open system the values approach or reach infinity, particularly when the probability of each individual event is itself one of an infinite number of possibilities (von Weizsäcker 1980, 274–94). Thus the only entity capable of knowing the infinite set of information needed to attain a particular outcome or set of outcomes, without limiting the system, in such a situation would be an infinite being. In this case, it can be identified as God, specifically, the *logos*. It is important to note, at this point, that Pannenberg is unique in his use of information theory. While others equate the divine logos with information, Pannenberg argues that the *logos* is able to utilize information, all the while remaining distinct from it (1994, 111–12). It is in this way that Pannenberg hopes to avoid the panentheism that Polkinghorne cautioned would accompany a "bottom-up" use of information theory.

The creation, then, is an expression of the creativity of the *logos* utilizing information. Thus looking at the world around us, "Christians recognize the work of the divine logos" everywhere. Since the creation, despite not being directly observable, is historical in nature, in that it occurred over a period of time, and revelatory, in that the Christian can see it is as

the work of God, it conforms to the initial parameters Pannenberg set out for the relevatory acts of God in *Revelation as History*. Further, the incarnation, then, can be understood as "the perfect realization of the Logos in the singularity of an individual creaturely form that is not just factually different from all others but that gives validity to all others alongside itself" (Pannenberg 1994, 113–14).

To extend the work of Pannenberg, then, it will be advantageous to examine contemporary information theory. Pannenberg's model seems concerned with information only with regard to initial creation and its direction toward both incarnation and the eschaton. Luciano Floridi has become a pioneer in the newly developed "philosophy of information." Part of what Pannenberg does not account for is the two-way flow of information that seems to occur in all open systems, which creation of this sort must be. For instance, Ian Barbour points out the recent suggestion that DNA has a memory-like feature that allows for it to be semi-adaptive (1997, 228–29). Thus the open system that an organism encounters impacts the replication of other cells. Similarly, Floridi argues that the very act of information transfer results in a reciprocal gain of information (Floridi 2011, 233–35, 275–79). What exactly this knowledge is remains ill-defined, but often it results in the creation of new knowledge, or inspiration, particularly if an open and contingent universe is assumed.

The main aim of most information theory, and in particular the "philosophy of information" advocated by Floridi, is a practical and real world application. Instead of being tied up with merely far-removed abstracts, then, we might do well to ask what a field theory of information might mean for the individual believer. If, as Pannenberg argues, all of creation, and particularly people, exist as unique singularities of the Spirit and the system is open, as a field theory would necessitate, then there is the possibility of a two-way information exchange. In other words, our world and our actions have an impact upon God. Rather than being removed from the theology of Pannenberg, the precursor to this can be found in Pannenberg's assertion, elsewhere in the *Systematic Theology*, that through both the creation of the world and the incarnation of the logos "God has made himself dependent upon the course of history" (1988, 329). This may also serve to help Pannenberg explain the tension he describes between a dependent-independent creation. The information transfer allows for, even suggests, a dependent-independent interplay on both sides of the exchange.

Moving to the eschaton, Pannenberg argues that the message of Jesus reveals the eschatological Kingdom of God. For Pannenberg it seems that in some sense this end is not only assumed, but already defined in its peculiarity without, somehow, compromising the contingent nature of the universe. However, given the fact that God operates as the "power from the future" for Pannenberg, and that there is this two-way interaction of information, it seems that a field theory of information could imply

that while the end of history, in a sense, is set, our actions now have a determinative effect on how that future actually occurs. This interplay may avoid the determinism of which Pannenberg's eschatological model is often accused.

Further, this means that our present actions have a causal impact upon the past creative actions of God from God's position in the future. In other words, our activity now acts, in some sense, to be the creative inspiration upon the actions of God from eternity. If we follow Pannenberg's suggestion, that the irreversibility of the second law of thermodynamics be disregarded, which a truly contingent universe seems to require, then the two-way transfer of information that occurs does so not only between objects temporally, but across space-time, then a suitable nondeterministic model of retrograde causation might be obtainable which could have far-reaching implications for views of redemption and divine knowledge as well as understanding God's creative inspiration.

The Creative Inspiration of God

It seems, then, that the history of all humanity might be understood, at least in part, as an inspiration for God's initial creative act. This does not necessarily mean the universe functions deterministically because, in order for this model to be viable, creation must be contingent. It does, however, mean that our actions in the past, present, and in the future could serve to further give inspiration to God, both retrocausally back to the initial creative event and in the future establishment of the Kingdom of God. The existence of this present universe, then, colors both the creation of the world and the eschatological end toward which it is moving.

An interesting way to understand the impulse that led God to create might be to show its relevance, in some ways, to the "image of God" in humanity. Although people may wonder what inspired an artist or a composer or novelist to create his or her respective works, it is generally accepted that there is, within humanity, a creative impulse. In other words, it is in the nature of humanity to create *something*, and many take this creative impulse to be a reflection of the image of God. When asking why there is something, rather than nothing, in the universe, such an understanding is helpful. It is simply within the nature of the Spirit to create, much as it was in the nature of the initial singularities to collapse into particular states. However, in the same way that such an impulse in people requires direction to yield something beautiful, which we might call art, so with the Spirit is the creative impulse directed by the eternal *logos* utilizing information in the manner described above. Thus the creation of God, both at the beginning and end of history, is best understood as God's artwork, inspired by information, and, as a result, by that very creation.

Conclusion

Through further exploration of Pannenberg's suggested "field theory of information" and its link to the creative acts of God at the beginning and end of history, some interesting insights have come to light. In particular, if one allows for retrocausality, the use of information by the *logos* to affect the singularities of the Spirit at the initial creative event is directly impacted by the later existence of that creation. In other words, our present existence acts as an inspiration for God's creation. The manner in which God created drew inspiration from this two-way flow of information; as Pannenberg described it, God was made dependent upon the resultant creation. Looking to the future, also, the activity of creatures has a direct impact upon the information that inspires God's establishment of the future kingdom of heaven. This paper has, through an examination of the theological use of information theory, Pannenberg's employment of field theory, and Pannenberg's developed Christology, given a picture of an initial foray into extending Pannenberg's suggested "field theory of information," and what its potential impact could be, not only in broadly theological terms, but also directly in relation to a theology of creation. Granted, much more can be done within this area of "field theory of information," especially given the recent trend toward various unification theories, but this essay has shown some possible directions and possible theological results that such an investigation may have and offers an encouragement for the area to be further explored.

Note

An earlier form of this essay received the Arthur Peacocke Essay Prize from the Science and Religion Forum (United Kingdom) in 2011.

1. Although Pannenberg does not use the exact term "field theory of information" in his systematic, he does give his most extended discussion of information theory and does so entirely in the context of field theory. Additionally, Pannenberg's failure to use the term is attributable to his intent to focus the discussion in his systematic primarily upon his use of field theory, and not upon information theory. Considering that his only other mentions of information theory are as part of a "field theory of information," and that this paper has accurately presented his position, the term "field theory of information" will continue to be used throughout for the sake of continuity and simplicity.

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