

Holistic Rationality and a Complement Model for Natural Sciences and Christian Theology Interaction

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Abstract

A complement model is proposed to account for the interaction between the natural sciences and Christian theology that cultivates cooperation between the two disciplines. This model is based upon a conception of holistic rationality, in which the two main epistemological conceptions of rationality—instrumental and categorical—are enriched in terms of the axiological and metaphysical stances towards what is preferably and possibly knowable and of an epistemic subject's ethical stance. The axiological and the ethical stances consist of values and virtues, respectively, while the metaphysical stance involves absolute presuppositions. This conception of rationality, in which rules and principles or ends and means, are expanded with respect to values, virtues, and presuppositions, permits an analysis of the interplay between science and theology at a foundational level in terms of the formulation, appraisal, and acceptance of scientific and theological knowledge. Moreover, it provides practitioners in both disciplines an opportunity to combine rationally in a complementary fashion their epistemic claims to form a comprehensive world picture, which captures the world's complexity but still maintains the integrity of each discipline's epistemic claims.

Keywords: complement model, Christian theology, holistic rationality, metaphysical presuppositions, natural sciences, values, and virtues

1. Introduction

A variety of models have been championed over the last several decades to account for the interplay between the natural sciences and Christian theology. Ian Barbour (1997) provides the most recognized example. Barbour, in the 1989-1991 Gifford lectures, identifies four models to account for the interactions between science and religion. In the first model,

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conflict, both science and religion reject each other's epistemic claims. The reason for conflict, according to Barbour, is science's materialism and religion's biblical literalism. In the next model, independence, both science and religion are viewed as completely separate disciplines. Each discipline has its own methodology and linguistic means for expressing its epistemic claims. In the third model, dialogue, science and religion have significant overlap of common interests. Important to this model is the recognition that science and religion are not as separate in terms of methodology as asserted by logical empiricists. In the final model, integration, scientific and religious epistemic claims are combined into a single proposition or statement.

Following Barbour's lead, other scholars interested in the interplay between science and religion propose additional taxonomies (GREGERSON AND VAN HUYSSTEEN, 1998; HAUGHT, 1995; LIVINGSTONE, 1997; MCGRATH 1999; PETERS, 1996; POLKINGHORNE, 1998; STENMARK, 2004). For example, Alister McGrath (1999) divides science and religion interactions simply into confrontational and non-confrontational models. Examples of the former are the traditional conflict and warfare models, in which both disciplines are hostile to or suspicious of each other's epistemic claims about the world. Examples of the latter include models in which science and religion converge or remain distinct. Convergent models are based upon the notion that "all truth is God's truth." Models in which science and religion are distinct distinguish between two questions: "causal" or "how" questions, which only science is able to answer, and "ultimate" or "why" questions, which only religion is permitted to answer (GILKEY, 1959; POLKINGHORNE, 1987; TRIGG, 1998).

Besides these models, a complementarity model based on the complementarity theory of physics is proposed for science and religion interaction (BEDAU, 1974; BUBE, 1995; MACKAY, 1974; MARCUM, 2005A; REICH, 1990; WATTS, 1998). For example, Hugo Bedau (1974) champions a model for science and religion interactions—based on Bohr's notion of complementarity to resolve paradoxes of quantum physics—to resolve paradoxes between scientific and religious epistemic claims. He secures the model on a person's attitude to such claims. "*By 'attitude' here,*" Bedau asserts,

one would understand psychological states, capacities, or dispositions in terms of which persons perceive and conceptualize their environment, such that if and only if a person has at a particular time this attitude with respect to a given

context, event, object, or situation, then he interprets it scientifically (or, if in the other attitude, religiously);

and, he continues, “such that no one person can actualize at one and the same time both attitudes with respect to the same entity, even though he might at different times (and different persons might at the same time)” (BEDAU, 1974: 218).

In *Science and Religion*, John Hedley Brooke claims that the problem historically with the complementarity model of science and religion interaction is that transition from complementarity at the physical level “to complementarity between different levels (especially if one involved the transcendent) was not a straightforward move” (BROOKE, 1991: 331). Rather, the transition is fraught with difficulties. For example, a major problem with the complementarity model is that the two disciplines are held to be completely separate and to answer different questions. According to Roger Trigg, relegating science to “how” questions and theology to “why” questions is at best problematic. The problem, claims Trigg, is “whether the two can be kept entirely separate” (TRIGG, 1998: 71). Science, he claims, is interested also in “why” questions and theology in “how” questions. Moreover, Bedau (1974) acknowledges that adequate criteria are not available for “attitudinalizing” scientific and religious perspectives.

In this paper I propose a notion of holistic rationality to explicate and defend a complement model for the interaction between the natural sciences and Christian theology that avoids the problems of the complementarity model based on traditional conceptions of rationality, both the categorical or principle-based conception and the instrumental or means-end conception. To that end I develop the notion by enriching the traditional conceptions of rationality, in terms of the axiological values, ethical virtues, and metaphysical presuppositions an epistemic subject employs in investigating the world.¹ This conception of rationality, in terms of principles and rules or ends and means, as well as with respect especially to values, virtues, and presuppositions, permits an analysis of the interplay between science and theology at a foundational level in terms of the formulation, appraisal, and acceptance of scientific and theological knowledge.²

1 It must be noted that holistic refers not to a joining of different conceptions of rationality to produce a single, unified conception of rationality but to an enlarging or expanding of any conception of reality.

2 The present paper represents an extension of a previous effort to chart the rational boundaries of scientific and theological instrumental rationality (MARCUM 2003) and to explicate and defend a complementary model of science-theology interaction (MARCUM, 2005a).

According to the proposed complement model, examination of the values, virtues, and presuppositions involved in rationality provides practitioners in both disciplines an opportunity to compare and combine, if possible, their epistemic claims rationally to form a comprehensive world picture, which captures the world's complexity but still maintains the integrity of each discipline's epistemic claims. Moreover, scientists and theologians must respect each other's foundations and comport themselves in a charitable manner toward them, in order to fashion a comprehensive picture of the world. Although the world appears simple or uniform from an experiential or a single disciplinary perspective, it is however multilayered and requires multiple approaches to grasp it completely. The complement model developed herein on holistic rationality permits scientists and theologians to understand the world in its fullness rather than to construct a truncated or an impoverished world picture based solely on a single discipline and its rationality.

2. Traditional Rationality

What is rationality? Although the question is broadly answered in terms of the reasonableness in a belief or action, it is a contentious question in western philosophical thought (BROWN, 1988; MOSER *ET AL.*, 1999; RESCHER, 1988; STENMARK, 1995). Traditionally, the question is answered from two perspectives or approaches.³ The first is practical, while the second is theoretical (LEHRER, 1999; MELE AND RAWLING, 2004; STENMARK, 1995). Practical rationality is concerned with the reasonableness of one's actions or what one should do. It is instrumental in nature, in that an action's reasonableness depends upon one's goal and the means to achieve it. In other words, it is dependent on a context and is not universal for all persons, times, and places. Theoretical rationality, however, focuses on a belief's reasonableness or what one should believe. It is categorical in nature and is independent of any context and therefore universally applicable to all persons, times, and places. It is composed of rules and principles by which a belief's reasonableness is evaluated. In this section, the instrumental and categorical rationality of science and theology are examined.

3 There are a variety of theories for explicating rationality (BROWN, 1988; RESCHER, 1988; STENMARK, 1995). For example, Stenmark (1995) champions a conception of rationality that he calls "presumptionism", in which beliefs are provisionally accepted until proven otherwise.

2.1. Instrumental Rationality

Of all the different types of rationality, instrumental rationality is the most widely recognized today among philosophers (MOSER *et al.*, 1999). It is concerned with means-end reasoning. “If you intend that a situation, *X*, occur and,” claim Paul Moser and colleagues, “you believe, in agreement with your evidence, that another situation, *Y*, is the most effective means to *X*, then you rationally should aim to have *Y* occur” (MOSER *et al.*, 1999, 130). There are two components to instrumental rationality: (1) the ends or goals toward which rationality or an epistemic agent aspires, and (2) the rational means or methods that epistemic agents employ to achieve them. In this section, the ends or goals and means or methods of both the natural sciences and Christian theology are examined in terms of their similarities and differences.

2.1.1. Scientific and Theological Ends

Broadly speaking, the chief end or goal of the natural sciences is to explain natural phenomena, especially in terms of antecedent natural causes (HEMPEL, 1965). Although this goal seems rather simple and apparently unproblematic, it is far from simple and is indeed deeply problematic. For example, what does it mean to explain natural phenomena in terms of antecedent natural causes? What is the physical connection between cause and effect? Scientists and philosophers answer these questions in a variety of ways, although most answers utilize the notion of scientific theory and hypothesis or natural law.

For some, the goal of science is truth as stated in a scientific theory and hypothesis or a natural law, i.e. a scientific theory or hypothesis, or a natural law, accurately represents or corresponds to a material mechanism of a natural phenomenon (MACHAMER *et al.*, 2000). For others, the goal of science is the prediction of events, novel or otherwise, based on an accepted scientific theory and hypothesis or natural law (POPPER, 1979). And still for others, the goal of science is less theoretical. For example, Larry Laudan proposes that “*the aim of science is to secure theories with a high problem-solving effectiveness*” (LAUDAN, 1996: 78). Unfortunately, there is no consensus among philosophers of science concerning the goal of science.

The general goal of Christian theology is knowledge of the triune God, especially in terms of the incarnation and resurrection of Jesus Christ, and one’s relationship to that God, as experienced through religious conversion (LONERGAN, 1972). As for science so for

theology, this general goal is far too simplistic and much too problematic. Just as explanations of natural phenomena are stated in scientific theories and hypotheses or natural laws, so are theological claims of the triune God expressed in theological dogmas or doctrines. Addressing the nature of doctrine within a postliberal age the theologian George Lindbeck (1984) recognizes three types of doctrinal statements: cognitive, experiential-expressive, and cultural-linguistic—each with a particular goal.

The goal of cognitive doctrines is propositional statements, which are *“truth claims about objective realities”* (LINDBECK, 1984: 24). Knowledge of God then is articulated in propositional forms that are absolute in nature and are derived from revealed sources, such as Scripture. The goal of experiential-expressive doctrines is statements that are *“noninformative and nondiscursive symbols of inner feelings, attitudes, or existential orientations”* (Idem, 16). Knowledge of God then is expressed in terms relative to one’s psychosomatic state. The goal of cultural-linguistic doctrines, Lindbeck’s preferred means for addressing ecumenical issues, is statements sensitive to and embedded in cultural traditions. Rather than being composed of propositions or expressive symbols, these doctrinal statements are *“communally authoritative rules of discourse, attitude, and action”* (Ibid., 18). With respect to content these rules are invariant, as opposed to expressive symbols; but, unlike propositions, they are applied to meet the demands of a given cultural context. Knowledge of God then is derived from a variety of sources but regulated by a particular need of the Church.

The differences between the goals of scientific and theological investigations are considerable. The first difference concerns the objects of inquiry. For natural scientists, natural phenomena are the objects of investigations, and so the goal of science is to articulate in naturalistic terms an understanding of those phenomena. For Christian theologians, the object of investigation is the triune God, who must be understood in supernaturalistic terms. Moreover, the explanations of scientific and theological objects are also different. For science it is explanatory causal networks of natural phenomena, while for theology it is knowledge of the triune God as revealed through God’s word. Furthermore, while scientific claims are justified for the most part through empirical means, acceptance of God’s self-revelation comes through a personal experience of faith. Thus, the goal of science

is explanation of natural phenomena in naturalistic terms while for theology it is belief in God through a personal experience of conversion that reshapes a person.

2.1.2. *Scientific and Theological Means*

Part of the folklore of modern science is the notion that there is a unique scientific method by which its ends or goals are achieved (GOWER, 1997). In the early twentieth century that notion of scientific method was identified with logical rules to guarantee the truth of scientific claims. However, within the last half of the twentieth century the notion was fatally criticized on several fronts. Once the centerpiece of the philosophy of science it has been demoted to scientific practice and material culture, by social-minded philosophers and historians of science (BUCHWALD, 1995). Today scientific method refers, if it has any referential import, to the experimental protocols for generating data and not to the logical rules needed to justify scientific facts. Within this new conception of scientific method, if it may be called that, each of the natural sciences employs distinct methods from those of the other natural sciences. Thus, today there is no unique method of science applicable to all the natural sciences; rather, there are distinct methods or practices specific to each natural science.

Whether there is a unique theological method is also contested (MUELLER, 1984). For some Christian traditions there is a prevailing theological method, such as the scholastic method for Roman Catholics prior to Vatican II. Today there is a plurality of methods used by theologians, based on differences in historical and philosophical traditions, biblical hermeneutics, and loci of authority. For example the Jesuit theologian Bernard Lonergan, in his influential book *Method in Theology*, proposes a transcendental theological method in which he identifies “*the conditions of the possibility of knowing an object in so far as that knowledge is a priori*” (LONERGAN, 1972: 14). According to Lonergan method is “*not a set of rules to be followed meticulously by a dolt*” (Idem, xi); rather, it is “*a normative pattern of recurrent and related operations yielding cumulative and progressive results*” (Ibid., 4). Based on a cognitional structure of experiencing, understanding, judging, and deciding, he goes on to enumerate eight functional specialties required for understanding the nature of God. For Lonergan, this method vis-à-vis the goal of theology results in the knowledge of a loving God. As the goals of science and theology differ, so do the methods of the respective disciplines for achieving those goals. Scientists employ experimental protocols for investigating natural

phenomena. These protocols allow scientists to examine in a controlled manner the phenomenon of interest. These phenomena are directly accessible through the senses or the instrumentally aided senses and are investigated through the process of experimentation. Not so for theologians, who must rely on methods dependent on God's self-revelation. For theologians the object of investigation is the triune God, who is not directly evident through the senses, whether aided or not. They cannot directly test God but must be concerned with interpreting God's word appropriately.

2.2. Categorical Rationality

Categorical rationality is the classical form of rationality (BROWN, 1988; STENMARK, 1995). Although its roots go back to the Greeks, it was the product particularly of the Enlightenment's project to secure all human knowledge on reason alone. Categorical rationality, however, fell out of favor after the inauguration of postmodernism. It is concerned with logical rules and principles by which an argument or a fact may be evaluated or assessed. According to Mikael Stenmark (1995), categorical rationality is predicated upon what he calls the "rule" principle. This principle, claims Stenmark, asserts that a "*belief (action or evaluation) is rational only if it is obtained by following the appropriate rules*" (STENMARK, 1995: 56). In other words, a rational agent only accepts or believes those epistemic claims that are derived through the application of epistemic rules and principles.

Stenmark also identifies two other important principles that ground categorical rationality. The first is the "evidential" principle: "*It is rational to accept a proposition or belief only if there are good reasons to believe that it is true*" (STENMARK, 1995: 42). Epistemic beliefs are held to the extent that there is sufficient evidence to secure those beliefs. In the absence of such evidence, the belief is at best tentative and should be held as suspect. Related to the evidential principle is the "proportionality" principle. According to Stenmark, this principle claims that the "*firmness with which one accepts a proposition (belief, theory, or the like) ought always to be in proportion to the strength of the evidence for it*" (Idem). In other words, not all epistemic statements are equally supported or justified by the evidence. Some are more secure in terms of supporting evidence than others.

Harold Brown (1988) identifies three features of classical rationality. The first is the universal nature of rationality. Rationality is universal in the sense that all epistemic agents come to the

same conclusion, given the same conditions. To come to a different conclusion is to be irrational. For example, an argument is either valid or not and any rational agent assents to a valid argument. The second feature is necessity, in that a rational belief or action follows necessarily from pre-given conditions. The final feature is a set of rules or principles, which provides the means by which to arrive at a universal and necessary conclusion. For example, the inference rules of deductive logic provide a rational agent with the means to derive universal and necessary conclusions. According to Brown, *“rules are at the heart of our classical model of rationality: if we have universally applicable rules, then all who begin from the same information must indeed arrive at the same conclusion”* (BROWN, 1988: 19).

Traditionally for the natural sciences, rules governing scientific activity are postulated in terms of the scientific method. As Brown notes, *“one standard task of philosophy of science has long been the attempt to formulate the rules [of scientific method] in accordance with which scientific hypotheses are to be accepted or rejected”* (Idem, 79). The reliance upon rules is predicated upon the success of deductive logic, with its set of inference rules. The logical positivists attempted to capitalize upon the success of deductive logic by proposing the verification principle, which states that no scientific proposition is acceptable unless logically reducible to or supported by experience or observation (AYER, 1952). The problem with the positivists’ attempt to secure scientific knowledge logically is that deductive inference rules are not so much concerned with the soundness or truth of an argument as with its validity.

Rather than deductive inference rules, logical positivists and empiricists attempted to develop inductive inference rules for securing scientific knowledge (BROWN, 1988).⁴ These rules allow scientists to justify their generalizations, in terms of natural laws, from a limited number of observations. They are patterned after the deductive inference rule *modus ponens*, “if *A*, then *B*; given *A*, therefore *B*.” David Hume (2000) points out the problem with the positivists’ program of attempting to identify inductive rules. Hume argues that inductive procedures could not provide the type of soundness comparable to deductive validity, since a falsifying observation could potentially overturn an inductive conclusion. The classic example of induction is that “All swans are white,” based on the observation of only white swans. This proposition was used to illustrate induction in Europe until the discovery of black swans in

4 The types of rules that scientists are searching for, claims Brown (1988) and Stenmark (1995), are algorithms.

Australia (MAJOR, 1963). The attempt to discover inductive inference rules was less than successful and was eventually abandoned (BROWN, 1988).

In response to the failure of logical positivist induction, Karl Popper (1980) proposes a deductive scheme for securing scientific knowledge. Popper's intuition is that scientists do not try to prove hypotheses and theories evidentially but rather they try to disprove them. Scientists make a series of bold conjectures and then through ruthless testing accept only those corroborated by the experimental evidence and reject the others. He calls his scheme falsificationism. It too is based on a deductive rule, *modus tollens*: "if *A*, then *B*; given $\sim B$, therefore $\sim A$." The problem with Popper's falsificationism, as Willard Quine (1951) argues, is that scientific theories are not isolated entities but interconnected with one another and form a matrix or network of beliefs. Scientists cannot test a single theory at any one time but only a group of them. Thus, they can never be completely certain that they are refuting or corroborating the theory under consideration. It may turn out to be true or false after all.

For Christian theology, according to Torrance, categorical rationality or formal logic is also important but limited in its usefulness for theological knowledge.⁵ "*Formal logic*," claims Torrance, "*does not tell us how we actually learn the truth, although it does have its rightful place in clarifying the way in which we are to order our speech in correct non-contradictory statements*" (TORRANCE, 1996: 219). Torrance calls this formal logic the "logic of Man," which he divides into "logic of existence-statements" and "logic of coherence-statements." The former logic is concerned with the investigative activities involved in understanding the world, while the latter logic pertains to connection of existence-statements. "*There is*," concludes Torrance, "*a systematic connection on the nature of things, a regularity upon which we can rely that makes it possible to live a planned and rational life*" (Idem, p. 264).

The problem with the "logic of Man," according to Torrance, is that as an object God's nature outstrips our rational and logical capacities. "*How can we describe*," queries Torrance, "*in neat and tidy syllogisms or in clear-cut, prescinded concepts, the transcendent Majesty of the risen Christ?*" (Ibid., p. 220). What is required, he claims, is a "logic of God." This logic is "*the way His Truth has taken in His self-giving and self-objectification for us, and therefore the forms of reflexion that arise in our knowledge corresponding to the form of the Truth*"

⁵ Torrance defines rationality as "our ability to relate our thought and our action appropriately to objective intelligible realities" (TORRANCE, 1996: 11). Rationality, therefore, is centered in the object under consideration.

(TORRANCE, 1996: p. 205). Torrance divides the “logic of God” into “logic of Grace” and “logic of Christ.” The former logic involves an “epistemological inversion” in which God reaches out to us to reveal the divine nature, while the latter logic pertains to the revelation of God in human form. *“It is here then”*, concludes Torrance,

in the inner life and being of Jesus Christ, in the hypostatic union, that we discern the interior logic of theological thinking, the logic of Christ, the logic that is in Christ before it is in our knowledge of Him, the logic that inheres ontologically and personally in Him but which is reflected noetically and sacramentally in us in the conformity of our life and thought in Him and in the directing of them though Him to God the Father (Idem, p. 217).

Categorical reasoning, then, is important for both scientific and theological reasoning and knowing, scientists and theologians cannot commit logical fallacies or if such fallacies are committed they are not committed for long. Still attempts to secure such reasoning or knowing either deductively or inductively is problematic. Categorical rationality is unable to secure the content necessary and sufficient for either scientific or theological knowledge. Moreover, there is a major difference between scientific and theological categorical reasoning: the object of scientific thinking is natural phenomena, while the object of theological thinking is the creator of those phenomena including the creature engaged in the thinking.

3. Holistic Rationality

Although the traditional conceptions of categorical rationality and instrumental rationality capture much of the epistemic activity involved in the natural sciences and Christian theology, they fail to account for all of the activity that influences epistemic activity in these disciplines. Both science and theology are rational enterprises from traditional conceptions, but their rationality includes more than these conceptions can offer. What is needed is an enriched conception of traditional rationality—axiologically, ethically, and metaphysically.

Rationality is too large and multifaceted a phenomena to be captured completely by the traditional epistemological conceptions. *“Properly construed”*, claims Rescher, *“rationality is a wide-ranging and complex as the domain of intelligence at large”* (RESCHER, 1988: viii). To enrich the traditional conceptions, I propose a holistic rationality that includes the axiological

dimension of values, the ethical dimension of virtue, and the metaphysical dimension of presuppositions. To that end each of these dimensions is explored and discussed in this section, in terms of science and theology and their interaction vis-à-vis traditional rationality.

3.1. Values

The programmatic study of values is a field called axiology (RESCHER, 1969). Unfortunately, the notion of value is rather vaguely defined within the philosophical literature. For example, Rescher (1969) lists nine different definitions of value compiled by a colleague, Kurt Baier. Robert Halliday, however, provides a useful definition that denotes the salient features for a notion of value: *“Relative worth, goodness, significance, or utility, attribute, or event; or, an intangible quality or attribute that has intrinsic worth”* (HALLIDAY, 2004: 1535). For our present purposes, value is defined with respect to the relative or intrinsic worth of a thing that allows a person to distinguish between the epistemic and the non-epistemic.

The role of values in rationality, particularly scientific rationality, is an important, although a controversial, subject. Thomas Kuhn (1977) in a well-known essay on the role of values in scientific theory choice demonstrates the need for values to compensate for the inability of objective factors to account for why scientists choose between two competing theories. For Kuhn, the objective criteria of accuracy, consistency, fruitfulness, scope, and simplicity do not determine theory choice, as held by the logical positivists; rather, these criteria also function as subjective values in that they can influence it. Consequently, there is no algorithm or scientific method that justifies scientific knowledge. Kuhn's intent is not to discard rationality but to include the scientific community as an important factor in the practice of science.

Today, science is now viewed as a value-laden enterprise and its factual knowledge as value-dependent. For example, Robert Proctor (1991) argues that scientific knowledge is not neutral but rather driven by political and social values. In addition, Alfred Tauber (2007) claims that the fact/value dichotomy in science is specious and that science is imbued with values that serve an epistemological function. This revision of value in science calls forth an axiological analysis of the values that undergird rationality. From such an analysis, Ernan McMullin (1982) divides the role of values into epistemic and non-epistemic functions.

Epistemic values are those that are used to advance the veracity of scientific claims (MCMULLIN, 1982). They are important for assessing correspondence between scientific

theories and the natural world and include, e.g. external consistency, fertility, internal coherence, predictive accuracy, simplicity, and unifying power. Besides epistemic values, there are non-epistemic values that can be used, when epistemic values fail to distinguish between empirically equivalent theories. They do not enhance a theory's "epistemic status" but reflect specific cultural, social, political, and religious beliefs. Although these values are influential in the short run within a community of practitioners, in terms of evaluating competing theories, they are eventually replaced by epistemic considerations. In a study on the development of nineteenth and twentieth century evolutionary science, for example, Michael Ruse (1999) demonstrates a shift from non-epistemic to epistemic values in its practice.

Finally values also serve a cognitive or an epistemic function, in that they are used to determine or evaluate whether the ends or goals of an action or a belief are "appropriate" (STENMARK, 1995). According to Stenmark, not all ends or goals are necessarily appropriate and thereby rational. Some may not be in a person's best interest. He proposes a version of holistic rationality in which both appropriate ends and means are chosen. "*On this conception of rationality*", claims Stenmark, "*a rational person is someone who is able to choose ends that are in his or her best interest and find means that are, or appear to be, sufficient for satisfying those ends*" (Idem, p. 35). Stenmark's holistic rationality unites both the ends and means in terms of what is or should be of value to both an individual and a community.

Values also play an important role in theology, although the evaluation or expression of theological doctrines is not necessarily conducted in these terms. The epistemic values utilized by theologians to express or appraise doctrines are not necessarily the same ones used by scientists for articulating or assessing theories. For example, predictive accuracy is generally not a critical value for evaluating theological doctrines. Doctrines are not usually used to predict future events, although some doctrines are concerned with such events. However, there are some epistemic values that theologians share with scientists. For example, internal consistency is important for assessing logical inconsistencies in theological doctrines. Also, external coherence with other theological doctrines is an important factor for evaluating the robustness of a specific doctrine. For example, Bruce Marshall (2000) argues that the Trinity is a "primary" doctrine to which other doctrines must cohere.

Non-epistemic or cultural – including of course scientific - values are also important for evaluating theological doctrines; for they can influence doctrinal content. For example, western Christian theologians use several different metaphors to evaluate the meaning of the atonement doctrine (MCINTYRE, 1992). These metaphors are based upon a notion of justice, in which guilt is the predominant social value. However, this value is of little consequence for evaluating the doctrine in Japan, where shame is the predominant social value underlying the notion of justice (GREEN; BAKER, 2000). Scientific values can also influence the evaluation of doctrines. Arthur Peacocke, for example, utilizes current evidence from biology and psychology to evaluate the doctrine of human being. He explores, for instance, the issue that genetic imprinting raises for understanding original sin (PEACOCKE, 1993: 245-248).

3.2. Virtues

The role of virtues in the formulation, appraisal, and acceptance of knowledge is a sub-discipline of philosophy called “virtue epistemology.” *“The name ‘virtue epistemology’,”* observes Linda Zagzebski and Abrol Fairweather, *“has come to designate a class of recent theories that focus epistemic evaluation on properties of persons rather than properties of beliefs or propositions”* (ZAGZEBSKI; FAIRWEATHER, 2001: 3). Virtue epistemology is based on virtue theory, in which the action of a person is analyzed in terms of the person’s normative ethical characteristics rather than of the acts themselves. In like manner, virtue epistemologists are interested in a person’s normative epistemic characteristics rather than in the knowledge itself. Traditional epistemology focuses on knowledge production and justification in terms of the evidence or methods used to produce it, while virtue epistemology focuses on the intellectual virtues of the epistemic agent.

Intellectual virtues are divided into two types (GRECO, 2002). The first pertains to the reliable or sound cognitive faculties or capacities necessary for obtaining and insuring knowledge, including the senses, especially vision, memory, intuition, introspection, and inferential reasoning. This kind of virtue epistemology is called “reliable virtue epistemology,” since knowledge as “justified true belief” is based on the reliability of cognitive faculties and processes. The second type of intellectual virtues pertains to the virtuous features of the epistemic agent, such as honesty, open-mindedness, humility, fairness, curiosity, tenacity,

generosity, and integrity. This kind of virtue epistemology is called “responsible virtue epistemology,” since knowledge is based on the responsible and conscientious activities of the epistemic agent. These types of intellectual virtues are akin to moral virtues.

Robert Roberts and Jay Wood (2007) identify a number of intellectual virtues that are important in scientific practices that deliver the epistemic goods or knowledge. “*Science*,” claim Roberts and Wood, “*always involves difficult, potentially discouraging, time-consuming work where outcome is seldom if ever assured. These facts of life suggest*,” they conclude, “*that a good scientist is likely to exemplify patience, perseverance, industriousness, a capacity for self-denial, and even courage*” (ROBERTS; WOODS, 2007: 143). These ethical or moral characteristics of a scientist function in an epistemic capacity to ensure the production and assimilation of scientific knowledge not only within professional communities but also within lay communities.

Roberts and Wood provide an example of Jane Goodall’s work with chimpanzee behavior to illustrate the role of intellectual virtues in scientific practice. One of the chief virtues exhibited by Goodall is a love of knowledge. This virtue is not a mawkish sentimentality over what is true but a passionate desire to know it. Goodall’s desire to know is an intellectual appetite or virtue that drives her to study and know the truth about chimpanzee behavior. Moreover, this passion spills over into a desire to incorporate others into her research program, as exemplified by the intellectual virtues of purveyance and generosity. Goodall found it necessary early on in her program to establish a research center staffed by colleagues and students, who contributed to the success of the center. Finally she often displayed courage in the face of danger, especially from contact with wild chimpanzees.

Intellectual virtues are also important for the practice of Christian theology, especially from a pastoral perspective in which theological doctrine is meant to inspire the faithful with respect to religious virtues such as love, joy, and peace. Ellen Charry (1997) reconstructs the theological activity of several pre-seventeenth theologians as they attempt to formulate doctrinal theology to educate and equip Christians to love God with their whole heart, mind, and soul. For example, Charry recounts the role of humility in the theological practice of Bernard of Clairvaux. Bernard’s personal virtue of humility also served as an intellectual virtue that allowed him to understand and communicate and thereby to incite in others a self-love rooted in God’s love for us. “In *On Loving God*,” writes Charry, “*Bernard argues that*

eventually, in the light of self-knowledge that comes from deepening humility, one comes to love oneself only in God” (CHARRY, 1997: 178).

Certainly scientists and theologians share a genuine desire to know the facts and to employ intellectual virtues that ensure them. For example, honesty is the disposition to tell not only the truth but also to avoid telling a lie. Moreover, honesty involves both the uprightness and reliability of character—not only morally but also intellectually. Honesty and virtues like it are essential for the acquisition of knowledge in science and theology. Although scientists are often portrayed as being more virtuous than those in other disciplines, postmodern studies have deflated that caricature. Both scientists and theologians are virtuous (both epistemologically and ethically) seekers of the truth concerning the function and meaning of the world.

3.3. *Metaphysical Presuppositions*

Besides values and virtues, a conception of holistic rationality must also include a notion of metaphysical presuppositions. For such presuppositions are important in the formation, assessment, and assimilation of epistemic claims by a professional community. R.G. Collingwood (1998) in his *Essay on Metaphysics* provides such a notion. According to Collingwood, the metaphysician’s task is to untangle the knot of absolute presuppositions upon which a discipline is founded.⁶ That task is accomplished through metaphysical analysis, which involves the identification of the absolute presuppositions required for raising questions about the world. Importantly for Collingwood the logical efficacy of these presuppositions, i.e. their ability to generate questions, is independent of their truth value; rather, their efficacy depends upon their being supposed.

There are a number of important absolute presuppositions that form the foundations of the natural sciences. These include determinism, materialism, mechanism, and reductionism, to name but a few. Although these presuppositions are necessary for the generation and evaluation of scientific knowledge, they are not unproblematic or universally accepted by all scientists. For example, the reductionistic assumption for the prevalent theory of cancer, the oncogene theory, is recently challenged by more holistic approaches and modified

⁶ Torrance cautions that “as we seek to penetrate into the rationality of something, our inquiry must also cut back into ourselves and into our presuppositions, for they must be brought into question if we are really to understand the thing concerned out of itself and in accordance with its own nature” (TORRANCE, 1996: xi).

considerably in the past few years (MARCUM, 2005b). Consequently, scientists assent to no single set of absolute presuppositions; rather, they utilize wide range of presuppositions to generate and evaluate scientific knowledge.

However, most practitioners in the natural sciences would agree upon one absolute presupposition - naturalism. Although defining naturalism is an intimidating exercise, for present purposes the presupposition is taken to declare that natural phenomena are the results of natural events and forces and that human reason can observe and comprehend them. It is generally divided into at least two types: methodological and metaphysical (POST, 1999).

Methodological naturalism presupposes that scientists investigate only natural phenomena and formulate physical or mechanistic explanations for them. As such, this presupposition provides the basis for an experimental strategy or heuristic to guide research in the natural sciences. It is also important to note that this naturalistic posture or attitude of scientists is voluntary and confined only to investigation of the natural world. The presupposition is impotent for investigating or raising questions about phenomena that outstrip the physical world, such as religious experience. Whether God intervenes in natural processes is an issue that simply cannot be addressed by presupposing methodological naturalism.

Metaphysical naturalism, on the other hand, is the presupposition that physical or material phenomena are all there is. William Drees calls this "ontological" naturalism: "*science-inspired naturalism holds that all objects, including human beings, consist of the stuff described by chemists in the periodic table of elements*" (DREES, 2003: 594). Underlying this type of naturalism is the presupposition that an object's ontology is the result of physical and material factors alone. As such, metaphysical naturalism denies the existence of anything that is not physical or material. It goes well beyond the limit presupposed in terms of methodological naturalism and denies the possibility of the supernatural.

As absolute presuppositions are important for analyzing the framing of questions within scientific inquiries, they serve a similar function for analyzing theological investigations. For more orthodox and conservative Christian theologians the prevailing presupposition is supernaturalism (WARD, 2003). According to this presupposition there exists phenomena that transcend the natural world and that human reason cannot comprehend, or even apprehend, without divine aid. Thus, in God's created order there is not only the natural realm

but also the supernatural realm. For an orthodox Protestant Christian theologian, divine revelation, particularly as given in the Bible, serves as the main resource in formulating theological doctrines and dogmas. Appropriation of revelation to doctrinal formulation involves accurate and relevant interpretation of the Bible. Besides supernaturalism there are other absolute presuppositions used in theological investigations, such as intervention of the divine into the created order and intelligibility of and/or purpose within the created order. Finally, not all Christian theologians subscribe to supernaturalism; there are certainly a number of Christian theologians who subscribe to some form of natural theology (WARD, 2003).

The differences between science and theology with respect to their absolute presuppositions of naturalism and supernaturalism are significant. Unfortunately, some proponents for either discipline are often only too eager to discredit the other's presupposition about how to investigate and understand the world. Hence, there are those subscribing to supernaturalism who enumerate the inadequacies of the naturalistic presupposition for the natural sciences. For example, Alvin Plantinga asserts that methodological naturalism *"has little to be said for it; when examined coolly [sic] in the light of day"* (PLANTINGA, 1997: 153). Of course there are those subscribing to naturalism, who reject supernaturalism as inadmissible as a causal factor in natural events. For example, Niles Eldredge, who describes himself as a "lapsed Baptist" and now espouses agnosticism, writes: *"We humans can directly experience that material world only through our senses, and there is no way we can directly experience the supernatural"* (ELDREDGE, 2000: 13).

4. A Complement Model for Science and Theology Interaction

As evident from the above discussion, both the natural sciences and Christian theology are rational enterprises with respect to the conception of holistic rationality developed herein. Science and theology may say different things about the world of human experience, not because one is rational and the other is not but rather because both think in terms appropriate to a specific dimension of the world it investigates and tries to understand. Thus, theology is concerned with the world's supernatural dimension and its rationality is tailored to that dimension. It is concerned with the transcendent, but the transcendent that interacts or intersects with the physical. Science, on the other hand, examines the world's natural

dimension and its rationality is suited to it. It is concerned with the physical, although there is no reason why it should ultimately dismiss the transcendent out of hand.

The proposed complement model then takes advantage of a conception of holistic rationality, in terms of values, virtues, and presuppositions. This model maintains the integrity of both disciplines. However, it recognizes that there is significant overlap between the two disciplines, such that conflict between the two disciplines may be unavoidable at times. The complement model requires more than discourse to combine the epistemic claims of each discipline. Moreover, this combination is not an integration of the two disciplines into a single discipline in which the integrity of either one or both of the disciplines is compromised, but rather a complementing of the truths from both disciplines to form a comprehensive picture of the world. Again efforts to complement the epistemic claims from both disciplines may lead to conflict, until the error in either or both of the disciplines is corrected.

The proposed complement model is based on the principle of charity. Practitioners of both science and theology must exhibit charity towards each other's epistemic claims and rationality. The principle is methodological in nature and attempts to maximize agreement between two belief systems: *"We make maximum sense of the words and thoughts of others when we interpret in a way that optimizes agreement"* (DAVIDSON, 1984: 197). It is an attitude that allows practitioners of a discipline to be open-minded about and receptive towards another discipline, in order to learn and embrace what that discipline is saying about the world. The principle is also provisional in nature, however, in that scientists and theologians first attempt to seek mutual understanding before critiquing each other's knowledge of the world (HENDERSON, 1987). Thus, each discipline serves as a critical stance to keep the other from making claims about the world that are false or inadequate.

Finally, the fundamental basis of the complement model is that there are not several worlds that exist independently of one another, e.g. one religious and the other scientific. Rather, there is one world that both the natural sciences and Christian theology investigate:

"They are both concerned with exploring, and submitting to, the way things are. Because of this, they are capable of interacting with each other: theology explaining the source of the rational order and structure which science both assumes and confirms in its investigations of the world; science by its study of

creation setting conditions of consonance which must be satisfied by any account of the Creator and his activity” (POLKINGHORNE, 1987: 97).

What distinguishes science and theology from each other is not the structure of their rationality but the instantiation of that rationality.

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