

The Conflict Between Theological and Scientific Modes of Conceptualization

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I. Introduction

Christianity has always stood in conflict with those who believe they flourish in this world solely on the basis of their own intellectual and physical powers; worldly success achieved through the exercise of intelligence and strength does not silence the admonitions of Christianity to look to a deeper source for the ground of human existence. It is no coincidence that hardness of heart — unresponsiveness to the word of God — can be found in the Pharaoh, because those who feel encouraged by their successful accumulation of power to persist in the construction of a world whose value they measure solely by its fulfillment of their desires will experience the greatest atrophy of the capacity for spiritual responsiveness to a call that does not originate from themselves. Plato also knew this, as he demonstrated by offering as the highest model of an unhappy life the tyrant who best succeeds at overcoming all obstacles to the fulfillment of his appetites and ambitions, since such fulfillment carries him, unaware, toward the death of the soul. Within the Christian context, this observation culminates in Paul's notion of the wisdom and folly of the cross. The absurdity of the cross transmutes into folly the wisdom of those who look only to themselves for the source of value, while the apparent folly of the gospel in the eyes of the world when perceived through the insight of faith radiates as the ultimate source of truth and value (1 Cor. 1:18-25).

This reflection opens up a perspective within which to explore the tension between science and theology. To be sure, the Pauline distinction between the folly of worldly wisdom and the wisdom of God's folly does not correspond to a distinction between dangerous scientists and beleaguered theologians or believers. Human intelligence and power possess great dignity and it is only the mistake of regarding such intelligence and power as the sole source and sufficient measure of value that Paul means to contradict. Moreover, Christian believers struggle every day with the natural temptation to regard themselves as the center of things and do not need to look beyond themselves to find evidence of the folly of worldly wisdom. The tension between science and theology should not be understood simply as a tension between practitioners of science and practitioners of faith but rather as a tension between conceptual modes of understanding and explanation at work in every effort to understand ourselves and the world within which our lives unfold.

Science does play a special role, however, in any effort to understand in contemporary terms the problem to which Paul draws our attention in the first letter to the Corinthians, because the accomplishments of modern science and the modes of conceptualization fostered by modern scientific explanation serve every day as a forceful demonstration of the power of human enterprise. This point is not contradicted by the correct observation that the number of people with a genuinely accomplished understanding of modern science is relatively small. Science shapes our habitual modes of conceptualization even when it does not inform our theoretical grasp of the world in a sophisticated manner. It seems likely that many scientists who understand the nature of scientific understanding thereby know also the limits of scientific knowledge and are less prone to fall into a naive scientism than the person with only a casual understanding of scientific matters.

A good philosophical term to capture a mode of thinking that excludes from cognition whatever does not emerge in accordance with the principles of scientific reasoning is “naturalism.” Naturalism serves well as an example of a view of the world that stresses the sufficiency of human knowing and acting and excludes from consideration the relationship of the human person to an order that transcends the natural sphere. The naturalist viewpoint will admit into consideration objects and processes that emerge and function in accordance with scientific modes of explanation, and will exclude as cognitively inadmissible an experience or a claim that does not receive legitimation from a scientific perspective.

The problem posed by naturalism when considered from the perspective of Christian faith is not the adherence to scientific method itself but the premature closure of the horizon of knowing that truncates both the concept of the human person and of the world in which human persons unfold their lives. Such a problem can be described aptly as a conflict between modes of conceptualization. I hope to take a few steps toward increased interaction between scientific and theological ways of thinking and accounting for the world and human experience by exploring the tension between these conflicting modes of conceptualization.

I will first explore certain biblical concepts that challenge the human inclination to draw excessively narrow boundaries around ourselves, an inclination found in its contemporary form in naturalism. The second part of this paper will bring forward the argument that the mathematical language of contemporary scientific thinking has served as one key way in which modern science has given rise to contemporary naturalism, a view of the world that admits conceptually only that which fits the mode of thinking according to which the natural sciences provide their explanations of phenomena. The third part of the paper will review a modern scientific effort to seek the “complementarity” of different modes of understanding as a way of overcoming the limitations of a naturalistic worldview. The paper will conclude by offering a brief reading of a poem by Gerald Manley Hopkins in which the conflict between naturalism and faith in contemporary experience is projected and resolved by the poet. Such a resolution does not represent the banishment of

scientific thinking in favor of the language and experience of faith, but rather a retrieval of the perspective of faith from within the prevailing power of an outlook shaped by modern scientific thinking. Such a retrieval, representing the ability to reassert the call and knowledge of faith without repudiating the accomplishments of science, can be taken as a goal for interdisciplinary understanding that properly belongs at the heart especially of a Catholic university.

II. Biblical Concepts

The biblical description of the experience of faith shows that faith challenges us to open ourselves to a horizon of experience that supersedes our habitual expectations. We can see this by exploring three related biblical concepts. The first concept is the “fullness of life,” or simply “fulfillment,” describing a condition of life that comes to one through Christ, a condition made possible through the second concept, “the fullness of divinity” that dwells bodily in Christ (Col 2.9-10). The third concept is “the glory of the Lord,” describing the mode of appearance in which the divinity of Jesus Christ manifests itself to our contemplative vision, a mode of appearance that results from the fullness of divinity in the word made flesh (John 1.14-16). When we behold the glory of the Lord, we participate in the fullness that belongs to Christ as the only Son of the Father. The concepts “fullness of life,” “fullness of divinity” and “glory of the Lord” describe a way in which we know God the Father through the Son in contemplative vision, and describe also what it is that comes to appearance through such glory and what condition of life we reach in this experience of faith.

These concepts were surely difficult and momentous for the first few generations of hearers listening to Paul’s letter to the Colossians and to John’s gospel, and the philological work of biblical scholars has helped us to understand more clearly the existing beliefs and ways of thinking that Paul and John are probably trying to refute through the particular way they have shaped these concepts.

Contemporary listeners have an additional conceptual difficulty we must face as we try to understand these words. Our ways of thinking and our modes of conceptualization are shaped extensively by the accomplishments of modern science (even though we may be ignorant of the particular teachings of modern science) through the influence modern scientific thinking has exerted upon modern culture as a whole. The concepts of the “fullness of life” and the “glory of the Lord” do not function well within our habitual modern mode of conceptualization and so they strike our ears as vague though perhaps strangely enticing metaphorical concepts.

Hans Urs von Balthasar in the following passage from the first volume of *The Glory of the Lord* begins to bring out the conflict between modern scientific thinking and the manner in which Christian revelation offers itself:

For fundamental theology, the heart of the matter should be the question: "How does God's revelation confront man in history? How is it perceived?" But under the influence of a modern rationalistic concept of science, the question shifted ever more from its proper center to the margin, to be re-stated in this manner: "Here we encounter a man who claims to be God, and who, on the basis of this claim, demands that we should believe many truths he utters which cannot be verified by reason. What basis acceptable to reason can we give to his authoritative claims?" Anyone asking the question in this way has really already forfeited an answer, because he is at once enmeshed in an insoluble dilemma. On the one hand, he can believe on the basis of sufficient rational certainty; but then he is not believing on the basis of divine authority, and his faith is not Christian faith. Or, on the other hand, he can achieve faith by renouncing all rational certainty and believing on the basis of mere probability; but then his faith is not really rational. (173)

The dilemma pointed to by von Balthasar arises from the tension between the two modes of conceptualization at issue in the divine revelation of the divinity of Jesus Christ and in the ways of knowing through which modern science operates. The problem remains a dilemma and hence unsolvable unless we are prepared to understand the phenomena of faith in the terms in which they present themselves and not in the terms mandated by the enterprise of modern science, terms important and powerful in the domain to which they pertain but that do not pertain to all domains of human experience. In other words, the solution of the dilemma is to question the mode of conceptualization whose necessary inadequacy to represent the phenomena of faith produces the dilemma in the first place and through that questioning to retrieve that mode of conceptualization through which the meaning of faith can be disclosed.

It is important to note that von Balthasar is not rejecting reason as an essential component of theological thinking; the dilemma at issue stands as a dilemma only when one attempts to deduce the more fundamental knowledge of Christian faith from the narrower domain of that which is known by reason alone. He goes on to explain the rationality of what is known by faith:

Just as in the inductive process the universal law is suddenly seen in a particular case or in a group of cases, so too do the signs of revelation crystallize about a center which becomes visible in the light of faith. The act of faith is, thus, rational precisely at the moment that it is made truly as an act of faith. The extent to which an individual believer can justify his vision rationally and reflectively is secondary. The act of faith does not derive its central rationality from a previous experience of naked reason: this could not be the case, since its rationality really emerges only in the act of faith itself. This whole dynamism can occur only within man's total orientation toward God, that is to say, within an existential framework that engages reason no less than the will, freedom, or love. (176)

Von Balthasar's account of this dilemma is helpful also because it helps to clarify what might be meant by the expression "different modes of conceptualization." Although I will try to say more about what I mean by this phrase later in the paper, for now we can note that a mode of conceptualization can be identified by the manner in which it shapes the particular form in which a problem arises and thereby also anticipates a particular form of whatever will count as a possible (meaningful) solution. Problems are not themselves neutral but always take their terms and their form from the underlying mode of conceptualization within which they arise and they always anticipate a solution that will itself need to fit that underlying mode of conceptualization if it is to be recognized as a meaningful response.

It could be that questions can be distinguished from problems on the basis that a question implies greater flexibility and preparedness on the part of one who asks a question to reflect upon and possibly reform the conceptual basis from which the question arises if that task should suggest itself (either by wonder or aporia) as the best way of making progress in the pursuit of the truth. It could be that problems pertain above all to a modern scientific mode of conceptualization and that questions pertain above all to a theological mode of understanding that seeks a deeper understanding of revelation, or to a philosophical mode of understanding that stands outside of the modern scientific mode. This is not to say that scientists never transform a problem into a question by learning to re-conceptualize the theoretical basis for the problem at hand, or that theologians never work on the level of problem in which they proceed with assurance in some inquiries that their conceptual basis is sound as they seek to extend the reach of knowledge derived from that conceptual basis. Perhaps this is more than a convenient distinction of terminology; it could be that thinkers who pursue knowledge predominantly in the form of problems have as their goal the construction of a systematic knowledge (a model) that successfully (and perhaps also beautifully) accounts for all that can be known, while thinkers who pursue knowledge predominantly in the form of questions have as their goal the reformation and transformation of the seeker of wisdom toward a personal culmination or fulfillment that is in some sense congruent with and befitting the highest things to be known, a fulfillment that would also have important social and political implications for conducting human life in accordance with the good.

In line with this analysis, a modern scientist might say that the effort to eliminate the dilemma by re-conceptualizing the problem means to stop being a scientist at all and to become something else, and the question then would be whether one is ready to acknowledge "something else" — namely a mode of thinking in a different conceptual form — as containing the possible ground for knowledge. A theologian on the other hand might say that the rigorous standard of scientific knowledge upheld by the scientist is admirable and may even provide assistance in the effort to deepen the experience of faith. However, as von Balthasar argues, the experience of Christian faith is not itself grounded

in deductions drawn from scientific reasoning (although it may well be supported by such reasoning).

I will turn now to an examination of the concepts of the fullness of life and the glory of the Lord as they are presented through particular biblical texts and I will try to suggest that Paul and John are both aware that these concepts will conflict with the existing habitual view of the world held by the listeners. Later in the paper as we go on to clarify some of the features of the predominant modern modes of conceptualization shaped by modern science and the manner in which such modes conflict with theological understanding, we should bear in mind that this modern situation is only one form of the conflict between theological and “worldly” or naturalistic modes of conceptualization, although the modern conflict might be unusually severe and so a source of grave difficulty for modern Christian faith and theology.

The Letter of Paul to the Colossians has great relevance in this context, because Paul is engaged in the effort to establish Christian faith as the roots and foundation of life in opposition to other ways of knowing and experiencing the world that exert great power over the Colossians. Paul clearly believes that conflicting ways of knowing can obstruct receptivity to Christian revelation when those other ways of knowing enmesh the knower entirely within the natural world and so make one unresponsive to the word of God that breaks into the world. Here is a literal translation of Colossians 2.6-9 as it appears in The Anchor Bible:

6 As you have now received the Messiah Jesus, the Lord, so lead your lives in obedience to him: 7 it is suited to you to be firmly rooted and to be built up in him, namely to be made firm in faith, as you have been taught; but above all, overflow with thanksgiving! 8 Beware that no one may appear, who would carry you away as prey, by “philosophy,” and (namely) by empty deception accomplished by the betrayal of people according to the elements of the world and not according to the Messiah. 9 For in him resides all the fullness of the deity in corporal form. 10 And you have (also) been fulfilled in him who is the head of every rule and power.

(A less literal but clearer translation of verse 8 from the Revised Standard Version reads: 8 See to it that no one makes a prey of you by philosophy and empty deceit, according to human tradition, according to the elemental spirits of the universe, and not according to Christ.)

I will highlight certain aspects of this passage that present features of the mode of conceptualization Paul regards as requisite for understanding the revelation embodied in Jesus as Messiah and as the Son of God, and then sketch the contour of the mode of conceptualization that Paul thinks obstructs the receptivity of the listeners to the revealed word. For the sake of clarity, let me announce my argument boldly but in a manner that I will need in the next breath to retract and qualify: Paul’s words uncannily anticipate

naturalism grounded in modern science as one form of a philosophy that, if taken as the exclusive basis for one's life, would obstruct one's responsiveness to faith in Christ. Surely this is an indefensibly ahistorical argument, and perhaps a dangerous one if it misleads someone who is skeptical of theology to believe that theology routinely attributes foreknowledge of historical events to the apostles. The argument stated with its necessary qualifications is that there is a notable resemblance between the form of thought Paul opposes in this passage and the form taken by modern naturalism grounded in scientific thinking, a resemblance that would pertain not only to modern naturalism but to many other ways of thinking that view truth as purely human in its origin, are directed solely toward knowledge of an enclosed world, view that enclosed world as composed of some kind of irreducible elements or fundamentals, and are transmitted through tradition.

Paul views acceptance of Jesus as Messiah and Lord as fundamental for human life: "... so lead your lives in obedience to him" (2.6), or, literally and more simply in the Greek text, "walk in him" (*peripateite*), an expression also used informally in modern therapeutic circles to mean act in conformity with your beliefs (walk your talk). He then uses two similar metaphors to deepen this sense of fundamental importance, imploring the listeners to "root themselves" and "build up their lives" in Christ, each metaphor pointing to that which literally "grounds" something — a plant grounded through its roots and a building through its foundation. Is there a subtle hint here that the groundedness Paul advocates means something other than being grounded in the world, suggested by the expression "walk in him" (and thus not on the earthly ground), be rooted and built up in him (thus again not on earthly ground)? These expressions of groundedness in something other than earthly ground deliberately challenge any mode of conceptualization built up exclusively from the common experience of daily living in touch with the earth upon which we support ourselves. To bring out this contrast, Paul next urges his listeners to be on guard against any person who advocates a "philosophy" (and he uses the Greek word *philosophia*, which appears in the New Testament only in this passage) that has as its basis "the elements of the world" (*stoixeia tou kosmou*) rather than Christ.

The phrase "elements of the world" in this passage is striking. Biblical scholars have offered many possible interpretations of the phrase, and examples of it from other Biblical texts and from non-Biblical sources have been exhaustively collected. It is this term that gives this passage its uncanny (and ahistorical) semblance of reference to modern science. The word "stoixeia" stands in the title of Euclid's *Elements* (and as the title of other ancient studies of geometry), and it is through the modern transformation (a conceptual transformation) of ancient geometry into modern analytic geometry that the foundation of modern mathematical physics is prepared. The term *stoixeia* is also the term used in Ancient Greek thought when earth, air, fire, and water are understood as the "elements" out of which everything is composed. Two key principles of modern science (its mathematical foundation and atomic theory) thus depend on concepts that stand

linked to this term, although again the resemblance between what Paul is attacking in this passage and modern science is simply the more general resemblance that each “philosophy” builds its account of the world systematically on the basis of fundamental building blocks of that world, and understands itself as sufficient to provide an adequate account of that world.

The other feature of the philosophy opposed by St. Paul is that it is either constructed in accordance with human tradition (*paradosin*) as interpreted by most translations or aims at the “betrayal (*paradosin*) of people” as interpreted by the translators of The Anchor Bible. We should never forget the suppleness of this Greek concept of “giving over” or “handing over” describing the acts that constitute tradition, a giving over that is necessary for the perpetuation of our cultural institutions but that also always contains some act of betrayal of what is handed over since the act of transmission inevitably alters what is transmitted. In any case, Paul’s point here is that the authority of what is handed over is merely human, whereas what has been received in verse 6 (*parelabete*) is divine in origin, and Paul in verse 8 contrasts the source of the teaching he opposes with the teaching he delivers as based on Christ.

Verses 9 and 10 introduce the concept of “fullness” (*pleroma*) and here we find the heart of the contrast between two modes of conceptualization, only one of which is sufficient for understanding what is presented through faith. In what way does groundedness in Christ rise above groundedness in teachings that rely solely on worldly accounts and authority? Worldly teachings fall short of encompassing the full extent or true depth of the world created by God and filled by God; no matter how systematic, comprehensive, even powerful and persuasive a naturalistic philosophy may be, it falls short in some dimension hard to name but captured in the concept of “fullness.” Christ, Paul tells us in this passage, is a man who shares with us our human level of existence but he is also one with the Father and so the fullness of deity, a supreme mode of existence (if we can still use this term for God), simultaneously and bodily resides in him.

“Fullness,” as a concept, then, indicates a gradation in levels of existence and ranks all levels of existence in relation to the fullest mode realized only in God but in which Christ as the Son of God also fully participates. One could say of the mode of conceptualization at work in this term that it is implicitly “trinitarian,” meaning that it stands open to the mysterious concept of a God who is one while simultaneously is also Father, Son, and Holy Spirit, and it is open to ontological differentiation and gradation with the culmination of being in the indescribable “fullness” or completion of being in God.

The term *pleroma* (translated here as “fullness”) is linked etymologically to the English “fill,” and the Latin *plenus*, and through *plenus* to the English root “plete” as in “replete,” “deplete,” “complete,” and “complement.” The question that brings out the conflict of the two modes of conceptualization under discussion in this passage, then, is what constitutes completeness? “Completeness” may be that which describes the fundamental horizon

within which a mode of conceptualization operates. The contrast pointed to by Paul is between a mode of conceptualization in which God has revealed the highest sense of completeness through the incarnation of the fullness of deity in Christ and a mode of conceptualization in which the world as a natural system constitutes the concept of completeness.

The biblical concept of fullness has important implications for our effort to clarify what might be meant by the “complementarity” of science and Theology. One would say they do not operate on the same conceptual level if they operate on the basis of different concepts of completeness as the horizon for all concepts within each mode of knowledge. For this reason science, if indeed it draws closer year by year to a fuller account of the objects in its domain, nevertheless does not reduce the conceptual domain within which theology deepens our understanding of our relationship to a loving God who has revealed himself in his fullness through his Son.

We will turn now to one more biblical concept, the concept of the “glory of the Lord” as expressed in John’s Gospel: “And the word became flesh and dwelt among us, full of grace and truth; we have beheld his glory, glory as of the only Son from the Father” (Jn 1.14). The same concept is at work in Paul’s Second Letter to the Corinthians: “And we all, with unveiled face, beholding the glory of the Lord, are being changed into his likeness from one degree of glory to another; for this comes from the Lord who is the Spirit” (3.18). The “glory” or “splendor” (*doxa*) that we see in Christ is linked to the fullness of divinity in him, as expressed directly by John who when citing our contemplation of the glory of the Lord points to his being “full (*pleroma*) of grace and truth” and being one with the Father, and in Paul who sees the holy spirit at work in the splendor or glory of Christ that we see (or “reflect” in Paul’s term). Just as the fullness of divinity in Christ enables us to reach fulfillment or fullness of life through our faith in Christ, so also our perception of the glory of the Lord transforms us (*metamorphoumetha*) in Paul’s account progressively “from glory to glory” as we participate increasingly (more fully) in Christ through the development of faith.

The concept of glory entails the perceptible manifestation of the divinity of Christ to the eye of contemplation, and it is this perceptual knowledge that enables faith and understanding to remain interlinked with one another. Turning once again to von Balthasar, we find the suggestion that the manifestation of what is made known by faith through contemplative perception of the glory (splendor) of the Lord makes theology as the search for a deeper understanding of faith possible. Von Balthasar praises the “Christian who energetically strives to appropriate interiorly what he believes and, in so doing, sees the essential content of faith unfold before his vision (*theoria*)” (137). In this way the concept of glory and of the ability of the believer to see the content of faith through contemplative vision provide a conceptual basis for linking the highest mode of existence to the power of human perception understood in the sense that includes contemplative vision. Here again we find a direct conflict with contemporary scientific

modes of conceptualization according to which qualitative appearances are discounted in favor of measurable magnitudes and in which modes of appearance other than that which manifests itself to sensory perception are disregarded. Any attempt to understand the claims made in these texts on the basis of a purely scientific mode of conceptualization will end in futility, since scientific notions of perception and quality stand in the way of the concepts relied upon in these texts to express the possibility of a contemplative vision of the glory or splendor through which Christ comes to appearance as filled with divinity.

III. Science as the Basis of Modern Modes of Conceptualization

The conflict between theological and scientific modes of conceptualization follows directly from the conceptual transformation that occurred through the development of the modern mathematical language through which modern science operates, according to the powerful arguments put forward by Jacob Klein and Edmund Husserl, among others. The conceptual transformation that occurred with science through the development of its mathematical language then gave rise to broader conceptual transformations in modern culture as a whole, according to this argument. We must note right away that this argument does not suggest that modern science somehow took a wrong turn through the development of the mathematical language with which it operates; the argument instead brings out an unanticipated consequence of the strength and power of the new scientific language, a consequence that provides an essential insight into the problems of modern culture as a whole.

I can do little more in this context than refer to key points in this argument while suggesting that this difficult issue stands at the heart of the conceptual conflict we encounter at every turn when engaging in dialogue between science and theology.

Jacob Klein in *Greek Mathematical Thought and the Origins of Algebra* demonstrates the conceptual transformations of ancient mathematical concepts in the development of the early modern mathematical language of science, and then uses this account to describe key features of the more general modern mode of conceptualization that resulted from the success of modern science. He argues that the mathematical language of modern science is inseparable from the content of modern science:

After three centuries of intensive development, it has finally become impossible to separate the content of mathematical physics from its form. The fact that elementary presentations of physical science which are to a certain degree nonmathematical and appear quite free of presuppositions in their derivations of fundamental concepts (having recourse, throughout, to immediate “intuition”) are still in vogue should not deceive us about the fact that it is impossible, and has always been impossible, to grasp the meaning of what we nowadays call physics independently of its mathematical form. Thence arise the insurmountable difficulties in which discussions of modern physical theories become

entangled as soon as physicists or non-physicists attempt to disregard the mathematical apparatus and to present the results of scientific research in popular form. The intimate connection of the formal mathematical language with the content of mathematical physics stems from the special kind of conceptualization which is a concomitant of modern science and which was of fundamental importance in its formation. (3-4)

Klein goes on to argue that while ancient science and philosophy were established on the basis of abstractions drawn from pre-scientific experience and thus rooted in our daily and naive experience of the world, the new science in its polemic against ancient and medieval (scholastic or “school”) science develops its concepts only through a system of internal references to the system of science itself:

The “new” science, on the other hand, generally obtains its concepts through a polemic against the traditional concepts of school science. Such concepts no longer have the natural range of meaning available in ordinary discourse, by an appeal to which a truer sense can always be distinguished from a series of less precise meanings. No longer is the thing intended by the concept an object of immediate insight. Nothing but the internal connection of all the concepts, their mutual relatedness, their subordination to the total edifice of science, determines for each of them a univocal sense and makes accessible to the understanding their only relevant, specifically scientific, content. In evolving its own concepts in the course of combating school science, the new science ceases to interpret the concepts of Greek episteme preserved in the scholastic tradition from the point of view of their “natural” foundations; rather, it interprets them with reference to the function which each of these concepts has within the whole of science. Thus every one of the newly obtained concepts is determined by reflection on the total context of that concept. Every concept of the “new” science belongs to a new conceptual dimension. The special intentionality of each such concept is no longer a problem: it is indifferently the same for all concepts; it is a medium beyond reflection, in which the development of the scientific world takes place. The more recent endeavors to provide the edifice of science with a firm logical foundation do not alter this aspect of the situation. (120-121)

We can see that if Klein’s account of the conceptual transformation at the heart of the development of modern science holds up, it explains well the appeal and power of a modern naturalistic philosophy that accepts as cognitively legitimate only that which follows according to notions of scientific causality. This account also throws light on the problems encountered at every turn when engaging in interdisciplinary dialogue with scientific concepts. The difficulty is exacerbated if we add Klein’s further claim in an essay titled “The World of Physics and the ‘Natural’ World” that the mode of conceptualization developed by modern science is a fundamental feature of our modern mode of conceptualization more generally understood:

Even if philosophy concerns itself exclusively with things falling within that other hemisphere of science, the so-called “Geisteswissen--schaften,” it should never forget,

even for an instant, that mathematical physics is at the foundation of our mental world and spiritual life, that we see the world and ourselves in this world at first quite ingenuously as mathematical physics has taught us to see it, that the direction, the very manner of our questioning is fixed in advance by mathematical physics, and that even a critical attitude towards mathematical physics does not free us from its dominion. The idea of science intrinsic to mathematical physics determines the basic fact of our contemporary life, namely, our “scientific consciousness.” (2-3)

Once again, if Klein’s analysis is correct, the task of clarifying the implications of the conflict between the modes of conceptualization at the heart of science and theology becomes crucial to the task of expanding interdisciplinary dialogue and understanding. We should note one further implication of Klein’s analysis: rigorous education in mathematics and science holds an important place in modern liberal education, since only through such education can we hope to grasp the language through which modern science offers its particular construction of the world in which we live. If one goal of liberal education is to make us capable of reflecting upon the presuppositions inherent in our experience of the world, then such education would be incomplete if it did not offer reflections upon the language and concepts of science that condition modern modes of thought and experience.

IV. On a Modern Scientific Concept of Complementarity

The search for a path that leads beyond the tension between scientific and theological modes of conceptualization can be found in the work of some modern scientists themselves, as physicist Gerald Holton has shown in a brilliant essay titled “The Roots of Complementarity.” The essay examines the concept of complementarity first presented by Niels Bohr in 1927 and developed repeatedly by Bohr throughout his career. Bohr develops the concept first to work out the relationship between classical physics and the emerging modern physics during the first three decades of the twentieth century, and applies it specifically to the conceptual problem posed by the discovery that light can be shown under certain experimental conditions to function in a manner that accords precisely with a wave theory and under other experimental conditions in a manner that accords with a particle theory, while it is experimentally impossible to evoke both functions simultaneously. The concept of “complementarity” asserts the conceptual compatibility of apparently contradictory theories in describing the nature of light. Bohr then goes on to seek out the broadest possible scope for the concept of complementarity in the search for the unity of knowledge as a whole. Holton shows how Bohr’s concept is either strongly influenced by or displays a remarkable similarity to a similar concept of complementarity developed by William James in *Principles of Psychology*.

Holton quotes Bohr’s 1958 essay titled “Quantum Physics and Philosophy”:

It is significant that ... in other fields of knowledge, we are confronted with situations reminding us of the situation in quantum physics. Thus, the integrity of living organisms, and the characteristics of conscious individuals and human cultures present features of wholeness, the account of which implies a typical complementary mode of description We are not dealing with more or less vague analogies, but with clear examples of logical relations which, in different contexts, are met with in wider fields. (134 in Holton)

This search for conceptual complementarity could be understood as an effort by a scientist to break out of the self-enclosed conceptual referentiality of science as suggested through Klein's description of the scientific mode of conceptualization and to establish contact once again with pre-scientific modes of experience. Holton quotes from Bohr's collection of essays published under the title *The Unity of Knowledge*:

The aim of our argumentation [in defending the principle of complementarity] is to emphasize that all experience, whether in science, philosophy, or art, which may be helpful to mankind, must be capable of being communicated by human means of expression, and it is on this basis that we shall approach the question of the unity of knowledge. (Holton 136)

Holton goes on to develop in these terms the concept of "thema" that stands at the heart of his effort to understand the place of modern science in the life of the mind. A "thema" is a fundamental idea that receives varying conceptual form in different intellectual endeavors. Holton believes we can identify a set of particular basic ideas that appear in particular ways in different sciences and in different modes of human knowledge. He cites as possible examples of a thema the idea of "discontinuity," which in physics will appear as atomism, while in psychology it will appear as individualized identity, for example. Each exemplification of the thema complements the others, so that the entire set of complementary exhibitions of the thema forms the fullest account of that idea we can achieve. Holton concludes his account of this theory with this statement: "From this point of view we realize that Bohr's proposal of the complementarity principle was nothing less than an attempt to make it the cornerstone of a new epistemology" (150).

Whether we regard the account of complementarity offered by Bohr or the version offered by Holton as satisfactory, the scientific search for a concept of complementarity stands as an important witness to the desire for interdisciplinary understanding emerging from within scientific thinking itself.

V. A Poetic Account of the Tension

Between Naturalism and Faith

We can now expand this account of the conflict between theological and scientific modes of conceptualization by turning to a great poetic enactment of the resolution of this

conflict. Gerald Manley Hopkins in his poem “The Grandeur of God” reflects upon the difficulty of perceiving and responding to the presence of God in the modern world, but moves in the second stanza to a moment of contemplative joy as he reaffirms the possibility of perceiving God’s presence in the world.

The Grandeur of God

The world is charged with the grandeur of God.

It will flame out, like shining from shook foil;

It gathers to a greatness, like the ooze of oil Crushed. Why do men then now not reck his rod? Generations have trod, have trod, have trod;

And all is seared with trade; bleared, smeared with toil;

And wears man’s smudge and shares man’s smell;

the soil Is bare now, nor can foot feel, being shod.

And, for all this, nature is never spent;

There lives the dearest freshness deep down things; And though the last lights off the black West went

Oh, morning, at the brown brink eastwards, springs — Because the Holy Ghost over the bent

World broods with warm breast and with ah! bright wings.

(In line two, Hopkins refers to the way in which light reflects from metal foil such as goldfoil; the reference to “oil crushed” means oil produced by crushing the substance from which the oil is derived, such as olives. Such oil then in its potency exudes the “essence” of the substance from which it was derived.)

Hopkins combines scientific, commercial, and political images in this poem to portray the way in which the modern world has been transformed by contemporary practices informed by modern science such that we almost lose sight of God’s presence filling the world. The speaker in the poem somehow recovers his capacity for sensing divine presence between the first and second stanzas, and the second stanza, full of hope, reaffirms God’s presence and the speaker’s perception of God’s presence. This reaffirmation is accomplished by recovering those faculties of perception, and

concomitantly those modes of conceptualization, through which the experience of faith manifests the loving presence of God.

The first line through the verb “charged” combines scientific and political meanings that reflect the modern condition of the world on the one hand, with an allusion to the fullness of the world on the other hand that functions according to a pre-scientific mode of conceptualization. In physics one can speak of a substance that is charged with electricity so that while remaining unchanged to visual inspection it nevertheless behaves differently under certain conditions, such as through the power to discharge electricity if brought into contact with an appropriate object. On the political level, the notion of charging someone to fulfill an assignment or a duty, of charging someone with an assignment meaning to load them with a duty they must bear by assigning it to them comes into play; possibly the legal notion of being “charged with” something (a crime) might come into play in the background.

But the phrase “charged with the Grandeur of God” also functions in accordance with the Biblical concept of “fullness” examined earlier in this paper. “Charged” in this sense means “to fill to capacity,” and “grandeur” points to the highest level of being pertaining to God and coming to appearance through the way in which God fills the world. The poem from its first line activates two conflicting modes of conceptualization simultaneously.

In line four, the question “Why do men then now not reckon his rod?” again activates a scientific and a theological mode of conceptualization simultaneously. “Reck” includes in its meaning “acknowledge, recognize, regard,” and perhaps also through its link to “reckon,” a sense of counting or calculating. “Rod” can be construed politically as a sign or token of power, or in terms of measurement as a standard of measure. The question therefore asks why men who do now regularly reckon according to scientific, economic, and political measures no longer regard or show respect for the authority and the theological measure of God, and it asks this again by combining within a single phrase two conflicting modes of conceptualization.

The first stanza, then, keeps in mind a theological concept of a world filled with God’s presence but also depicts a world in which the awareness of God’s presence is severely attenuated. The speaker in the first stanza has preserved an awareness that behind the surface of a modern mode of conceptualizing the world dwells a hidden, ancient theological mode of conceptualization.

The speaker then enacts the recovery of the theological mode of conceptualization and in the second stanza affirms the primacy of that mode through the enactment of a direct perception of the glory of the Lord. The first line of the second stanza again incorporates two conflicting modes of conceptualization, an economic and scientific mode on the one hand and a theological mode on the other hand. The phrase “nature is never spent” in a

scientific mode means never exhausts its energy; in an economic sense it means never loses its purchasing power; and in a theological sense means never reaches a state of depletion, that is, a state in which its fullness (completeness) is lost. The stanza asserts the hidden quality of God's presence in the modern world, invoking what in the twentieth century would be called "the eclipse of God."

In the last line of the poem, Hopkins reasserts the primary nature of the contemplative perception of the glory of the Lord, through the expression "ah! bright wings." Both through the rhythm of the line and through the interjection of an exclamatory cry of wonder near the end of the line, Hopkins suggests an experience through which the speaker is lifted up by the act of vision and possessed by the splendor of "bright wings." The poem thus ends strongly with the experience of theological perception in which faith is directly enacted.

Hopkins shows that it is possible in a poem to put into play the tension and conflict between two conflicting modes of conceptualization in an encounter with the world, and by working through the continuing interplay between the two modes to demonstrate and enact the possibility of recovering the ancient theological mode of conceptualization within the modern world.

VI. Concluding Comment

This essay has offered a survey of various ways in which we can articulate the tension between scientific and theological modes of conceptualization and understanding and has attempted to outline some of the major issues that would need to be pursued in the effort to reach greater mutual understanding. The essay also suggests that the intellectual desire to achieve the kind of comprehensive understanding of human experience that would result from true complementarity in scientific and theological knowledge emerges from all sides. Intellectual tension can be fruitful, and since both scientific and theological understanding are at the heart of the intellectual life of a modern Catholic university, this territory reveals itself as a crucial zone in the search for the integration of knowledge.

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