

On the Dialogue between Christian Theology and Modern Science

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Interdisciplinary research is not at all uncommon in the world of contemporary academia. In actual fact, disciplinary matrices are not constricted to rigid cognitive boundaries. They significantly crisscross and intertwine each other at different levels, making meaningful dialogue possible. Insights and findings proffered by one research tradition can have relevance for those working in a different field of inquiry. If the relevance is thought genuine, the findings will be accepted, and will become a source for much constructive research. The importance neuroscience has for philosophers working in the philosophy of mind is a case in point. Many believe that neuroscience can clarify or even solve the perennial conundrum of how mental states relate to brain states. The use of mathematics by physicists is another important example. Though couched in abstract formalisms untainted by empirical content, mathematics is an indispensable tool for decoding physical laws that underpin natural phenomena. Historians, to resort to another example, embarking on an understanding of any given historical period often gain much illumination by studying the literary works representative of the particular zeitgeist in question. Interdisciplinary investigations, however, are not restricted to the fruitful use of insights and findings. They can take the significantly different form of embracing the method that is thought conducive for research. Behaviorism's replacement of

introspective analysis with the methodological principles that guide research in empirical science is a good example. Philosophy's use of formal logic as a way of presenting and clarifying philosophical arguments is another example of how methodological influence can transcend disciplinary boundaries. Cognitive rapport across different theoretical disciplines, therefore, seems to characterize one salient feature of much academic research.

Does contemporary Christian theology share this openness and willingness to learn from what other disciplines have to offer? Theology is commonly conceived to be a discipline characterized by dogmatism and insularity. For critics, theology's passive and unquestioning acceptance of orthodoxy bequeathed by the apostolic church, and its unwillingness to revise traditional doctrine in light of the changes in the intellectual landscape mark theology as paradigmatic of the spectre of blind faith. There is an element of truth to this accusation, though like any other sweeping generalization, it doesn't accurately represent the vast spectrum of theological traditions that marks the theological scene. It is true that theologies of the more conservative type are extremely suspicious of appropriating secular values that are not part of the biblical paradigm. They commonly eschew such appropriations as symptomatic of a lukewarm, humanistic trend in theology that should be avoided at all costs. For conservative theologies, scripture bears witness to the theological truth bestowed once and for all by God, and this truth transcends and questions the fads and fallacies that govern profane existence. Accommodating to secular thought, therefore, becomes unnecessary. Though this is typical of much conservative theology, theology of the more liberal type has no qualms about making theological use of secular thought. Liberal theology generally assumes that the "the content of belief is not static, once for all 'delivered to the Saints', but is a dynamic corpus of ideas, beliefs and symbols which has historical continuity with the past but can take quite new forms."¹ This being the axiomatic premise for liberal theology, it is more appreciative of new

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empirical discoveries and theoretical insights that are at the forefront of modern knowledge. If thought relevant, it will openly incorporate modern knowledge in order to deepen its understanding of the religious commitments it has, and will even make necessary theological revisions in light of what it learns. It will thereby “relinquish any unestablished confidence that the content of traditional theological affirmations is divinely warranted.”² Notwithstanding the endemic mischaracterization of theology as a closed discipline, and the unwillingness of much conservative theology to engage in dialogue with modern thought, theology of the more liberal type does approximate to the interdisciplinary nature of modern scholarship.

The interdisciplinary rapport modern liberal theology enjoys can be illustrated with examples. The feminist critique, for example, of the patriarchal model that undergirds theological thinking is taken seriously by liberal theology. Feminists argue that the transformative power of the saving truth of the gospel can not appeal to the sensibilities of women in general unless the biblical portrayal of women as being somehow subservient to men is jettisoned as unbiblical. Constructive theological work that pays heed to this important criticism has entered mainstream theology. Hermeneutics is another discipline theology makes great use of. The theological interest in valid hermeneutical principles for exegesis is understandable given the importance theology ascribes to scripture. By demarcating valid from invalid inferences that can be drawn from the written language, hermeneutics can place an important restriction on the personal biases and preferences that can easily affect theological exegesis. To take another example, liberal theology is also heavily indebted to historical research. Though the knowledge of any given historical time and place may be of great value for theological inquiry, importance is especially ascribed to any new, reliable historical discovery that is made of the Mediterranean coast when Christ was alive. This is because a deeper understanding of the historical Jesus is naturally attained

whenever history reveals the cultural, religious, and social values that defined this particular historical setting. Philosophy is another important source for theology. The philosophical analysis of the concepts and categories that appear in natural language helps clarify thought by unveiling their meaning that otherwise gets unnoticed. Clarity and precision in theological thought is gained whenever it makes recourse to such conceptual analysis.

However important contemporary theology's cognitive exchange with history or philosophy may be, it is its present dialogue with empirical science that is thought paramount even by the theological critics and foes of science. This very exchange seems to vitiate the prevailing assumption that the progress in scientific knowledge renders Christianity obsolete by questioning the supernatural and miraculous elements that seem inherent in any theistic account of the world. Notwithstanding the model that understands science and Christianity in terms of conflict, many believe that Christianity's cognitive rapport "with the modern scientific perception of the processes at work in the world is ...one of the most exciting and exacting tasks of contemporary theology."³

But why is this dialogue considered important? One reason has to do with the prestige science as a theoretical endeavor enjoys in modern scholarship. Unlike theology which is often "taken to be a paradigm example of irrationality, where claims are not criticized and where things are believed on authority, and where emotions run high and subjectivity prevails"⁴, science is quite rightly thought to be a paradigm example of rationality, where theories are met with stringent criticisms, and where personal whims and the role of tradition play a marginal role. Because of science's endorsement of rational criticism as a methodological precept, it is commonly thought to yield factual knowledge that is both objective and reliable. This being the case, the validity of any putative truth-claim that is not consonant with the corpus of scientific knowledge is commonly treated with circumspection. Theologies, therefore, that take scientific

knowledge seriously will want to see whether theological articulations are compatible with what science unveils. The viability of theological articulations is thereby measured in terms of what we currently know about the scientific workings of the world. Secondly, the removal of “stumbling blocks” that may impede anyone from fully embracing the Christian faith is an important rationale of much theological apologetics. Though personal faith is conceived as a gift brought and sustained by the gracious and unmerited love of God, the unfailing will and determination to commit oneself to God is also an important prerequisite without which genuine faith is impossible. Existential factors like self-centeredness and pride aside, one important impediment to faith is the biblical worldview Christianity presupposes which, in short, maintains “a short earth history, an earth-centered astronomy, and a three-decker universe.”⁵ For those who reap the benefits of modern science and technology, embracing a faith that assumes such an anachronistic worldview uninformed by science is simply incredible if not impossible. Making the biblical paradigm compatible with science by reinterpreting and revising pieces of the general picture without compromising on matters essential to apostolic teaching is an urgent task awaiting any theology that wants to make the Christian faith relevant and saving for those living in a scientific age. In other words, a theology informed by science becomes necessary unless the church wants to “degenerate in the new millennium into an esoteric society internally communing with itself and thereby failing to transmit its ‘good news’ (the evangel) to the universal (catholicos) world.”⁶

Empirical science, for reasons just examined, is at present an important resource from which liberal theology makes great use of for constructive inquiry. What theology learns from empirical science can generally be divided into three broad categories. First, theology can study and incorporate the discoveries uncovered by science. Discoveries not only entail scientific theories and laws of nature, but the factual discoveries that are often made in light of theories.

Quantum theory and evolutionary biology are two well established theories of nature theologies appreciative of science often refer to. The ubiquitous reference made to the second law of thermodynamics is a clear case of a scientific law influencing theological thinking. The scientific fact about the inevitable death of the sun as we know it, and the implication this has upon biological life on earth, is an issue with deep theological meaning not unnoticed by theology. Secondly, use is often made of the methodological precepts and norms that guide scientific research, precepts that are typically believed to be cognitively responsible for producing the wealth of scientific knowledge. For example, reaching a consensus about theoretical matters in science is, among other factors, prefigured by ideas and proposals being subject to intersubjective criticism in a public domain. The notion of mutual criticism, or in a theological context, the “continued dialogue with other religious and nonreligious positions...in conscious openness to criticisms of formulation and content”⁷, is a methodological precept many theologians informed by science endorse. The third concerns the theoretical presuppositions, often unnoticed by scientists themselves, which undergird scientific inquiry and make any scientific understanding of our complex world possible. The scientific endeavor, for example, presupposes a world constrained by laws that are thought rational. The mechanics of the cosmos constrain natural events from following haphazard trajectories. Such a presupposition based upon faith seems to parallel the ways in which faith guides understanding in theological inquiry, and finding analogies of this kind can help illuminate exactly how and to what extent theology resembles other fields of inquiry.

Of the three possible ways of learning from empirical science, it is theology’s engagement with the empirical discoveries made by science which is at present the center of much theological discussion. Though the theological critique of the content of science still persists in certain theological quarters - the rebuttal of evolution from a literal reading of Genesis is a glaring example - most theologies

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engaged in this dialogue unquestioningly accept and creatively appropriate the latest discoveries established by science. Though theologies of different persuasions and commitments do not differ markedly in what they accept as viable scientific knowledge, the constructive use they make of it is variegated. This is clearly evidenced by the panoply of uses they make of science in their joint pursuit of a rich and clear understanding of the Christian faith. The purpose of this paper is to offer a survey of how scientific knowledge is differently used in relation to their faith.

I

Common misconceptions aside, theology has always been open to criticisms from secular disciplines. When Aristotelian metaphysics, for example, questioned the finitude of the cosmos - thereby denying that it was created at a particular point in time — an appeal was often made to both the canons of syllogistic logic and empirical evidence to counter the claim. When Platonism questioned the very possibility of God creating the world out of nothing, the attempt was made to point out the implausibility of reconciling the sovereignty of God with any cosmological model that requires God's dependence on physical matter for creation. When modern historiography denied the historicity of the resurrection by arguing that analogous cases have never been confirmed by reliable eyewitnesses, the common response was to refute the possibility of parallel cases existing, given Christ's unrepeatable and unique status as the second Adam. What these cases show is, once again, theology's openness to criticism, and its willingness to counter such criticisms in terms it thinks will prove convincing to the critic. Though the force or the originality of the criticism may be appreciated, theological counterarguments are sought without making internal theological adjustments. And internal theological maneuvering is thought unnecessary

because the criticisms don't convincingly demonstrate the religious beliefs in question to be untenable. Such criticisms are often thought to result from a jaundiced, misinformed, or superficial understanding of the Christian faith.

A very different theological response to criticism takes place, however, when the validity of the criticism is accepted without responding with countervailing arguments. The criticism is appropriated, and the acceptance is often followed by doctrinal modifications in response to the challenges that present themselves. To state the matter differently, though the doctrine itself is retained, the prevalent understanding commonly associated with it or the meaning often ascribed to it is revised in light of criticism.

Revising theological articulations is not always welcomed by the theological community. For different theological reasons, many are disinclined to make any revisions at all. The faithful preservation of traditional teaching vouchsafed by God is often thought to be the main function of theology, regardless of whether it dovetails with the values and beliefs held dearly by secular disciplines. Succumbing to standards outside the Christian tradition, on the other hand, is thought to result in never-ending doctrinal changes, for "today's prevailing wisdom rapidly becomes tomorrow's discarded whim."⁸ Theology must rather be a steadfast doctrinal rock in the sea of change. More importantly, any revision made to Christian teaching is considered tantamount to heresy, for it implies deviations from the teachings of the apostolic church founded by Christ himself. Further, by adopting the language and assumptions of secular disciplines, theology may "no longer speak with a distinctively Christian voice."⁹ Instead of faithfully absorbing and reflecting the unredeemed state we are in, theology must question human sin and hubris by propounding the distinctively Christian message.

Though reservations about revisionist theology exist, it is not an uncommon form many theologies take in academia. Theologies engaged in an extended dialogue with empirical science are no exception. Making amendments to what

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they think are shown untenable in light of what science affirms as well founded knowledge is a common methodological premise they embrace. As one participant in this dialogue articulates, "There is no a priori way to tell...whether our faith is distorting or helpful to our understanding of the object of study. So, in the end, we subject our conclusions to public scrutiny and careful scientific examination, then revise them in the light of what we learn in that process."¹⁰ One important theological use of science is to revise what faith affirms in the light of scientific knowledge.

Eschatology subject to revision as a result of scientific knowledge is a case in point. The God of Abraham, Isaac, and Jacob, the God who became flesh in the form of Christ, is not a cosmic spectator indifferent and detached to the goings-on of this world. He is certainly not the kind of god that appears in the metaphysics of Aristotle, a god absorbed in self-reflective thought. Nor is it a philosophical construct, not unlike the God of Spinoza, that stands for everything that has ontological status. No, the God of the Christian faith is not only a personal agent who created and sustains the very existence of the world, but is a holy being that wills the mutual exchange of communal love among both men and women. The cross is also emblematic of how God, out of his overflowing love for his creation, condescended and became man to share the travails of life, and ultimately death itself. "The Christian God is truly the 'fellow sufferer who understands,' for in Christ God has known human suffering and death from the inside. The Christian God is the Crucified God."¹¹

Yet more importantly, the God who experienced death on the cross is the same God who will eventually fulfill his divine purpose, however many the impeding obstacles, through providential guidance. The eschaton is truly the final consummation of the will of the creator, and its inauguration will ultimately compensate for the ceaseless tragedies that characterize so much of what we know about life. The basis for the belief in the eventual coming of this eschatological

reality is the trust in the faithfulness of God who will not forsake his creatures prior to their fulfillment in the eschaton. The other ground for this belief being the bodily resurrection of Christ which is said to give us a foretaste of what we will eventually experience.

Scripture is undoubtedly replete with a plethora of figurative images that depicts the eschaton. One way of systematizing such images is by way of asking where they expect the final inauguration to take place. Some portray it in strictly otherworldly images while others depict this state as a possibility that will be realized here on earth. That is, while the former affirms the reality of the kingdom in a post-mortem existence that awaits God's creatures after bodily resurrection, the latter identifies the kingdom with a condition that will be inaugurated, however distant in the future, prior to post-mortem existence.

There are a number of problems with the eschatological scenario that expects an eschatological reality to be realizable here on earth. First, the scenario seems elitist by denying true fulfillment to those who died prior to its inauguration. Ultimate fulfillment will be conferred fortuitously to those who happen to be born when the eschaton is established. This seems to contradict the central Christian affirmation concerning universal salvation. Secondly, it seems that a kingdom on earth can never be the real kingdom, for as long as we exist as physically embodied beings, we must confront the inevitability of death. And it is the absence of death that truly marks the eschaton as the fulfillment of God's plan for his creation.

But the most serious objection stems from what modern science has to say about the world we live in. Carbon-based life on earth is sustained by the heat emitted by the sun. The amount of heat in turn is well balanced. A slight difference in its output will seriously disrupt the physical conditions necessary for life. The heat instrumental for life is maintained by burning off hydrogen that is found within the core of the sun. The hydrogen fuel will last another five billion

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years, after which the sun will use up the last remnants of hydrogen transforming itself into a red giant. Thus, "all forms of carbon-based life will prove to have been no more than a transient episode in the history of the universe."¹² The scientific prediction of the fate of the planet is not congruent with the eschatological hope of the Christian faith. It is the eternal reign of God that we will experience in the kingdom; the ultimate reign of God that will never be cast into oblivion. Yet if the physical conditions for life are transient, the eschaton can not possibly be a state that will be inaugurated on this planet. Humanity is not destined to be here forever. Modern science convincingly shows that "true hope cannot centre simply of the achievement of some this-worldly state of affairs, though that recognition should by no means discourage the continuing human struggle for peace and justice on Earth."¹³

To make matters worse, however, not only the earth but the entire cosmos itself can not, according to modern science, sustain the existence of humanity indefinitely. The expanding nature of the cosmos after the original big bang is a well attested fact that was initially verified by Hubble. What the expanding nature of the universe means is that eventually the expansion itself will either come to a halt by reversing its direction or it will maintain its expansion indefinitely. The former conjecture implies that the cosmos in its entirety will collapse to the point from which it began. That is, the cosmos will return to that initial state when it "was a mindless energetic quark soup."¹⁴ If the latter holds true, then the expansion of the cosmos will continue indefinitely alongside the indefinite decrease in the cosmic temperature. Either way, humanity will be a transient phase within the long cosmic trajectory, because the conditions supportive of life can not forever be sustained. The eternal reign of humanity that cannot exist forever is a blatant contradiction. "Ultimate fulfillment cannot come simply through the continuation of the history of the world. Evolutionary optimism of that kind is an illusion."¹⁵

What modern science affirms questions any eschatological doctrine that claims that the eschaton can be realized here on earth, or elsewhere in the vast cosmos. Works in eschatology that reflect a serious engagement with empirical science take this point seriously, attempting to revise a standard construal of the eventual reign of God. We have here a clear example of science being used to revise what faith affirms.

Another example of this methodological approach in theology is the revision brought to what the Christian faith has traditionally affirmed about paradise. If there is anything every faith tradition can uncompromisingly affirm, it surely would be the concrete reality of much pain and suffering that exists in the world. Though we may have the fleeting experience of bliss or contentment, much of life seems to be pervaded by meaningless suffering serving no overarching purpose. It may just very well be that “we...don’t count for much in the grand scheme of things.”¹⁶ Facing the vicissitudes in life, stoic defiance may actually be the most commendable philosophy in life. To a certain extent, sentient creatures share our predicament. Though not crushed psychologically by existential angst, they inevitably inflict physical injuries upon one another when competing for survival, making their habitat “red in tooth and claw.” But it is physical death, the ultimate conclusion awaiting every being with life, which doesn’t seem to square with a philosophy of optimism. It puts an end to everything — cherished personal relationships, fulfilling personal projects, appreciation of art and music, the joy of making social contributions, etc — that may temporarily heal the series of pangs that characterize life.

But why so much pain and suffering in a world created by God? This is the theological rub that seems contrary to the central Christian affirmation regarding both the unconditional love God is said to have for the entire creation and the invaluable goodness of creation because created by God. The orthodox biblical response to this quagmire is to deny God’s responsibility for the plight his creation

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is in by holding humanity's first ancestral pair (Adam and Eve) responsible. Prior to their deliberate decision to distance themselves from God by turning themselves into autonomous agents, the world was devoid of pain, suffering, and death. Creatures were enmeshed in a state of unimaginable bliss, living harmoniously under the graceful surveillance of God. It was a world in which travails of any imaginable kind were absent. With sinful disobedience, however, entered everything despicable, radically transforming paradise into a deplorable state of existence.

What we now know about the evolutionary growth of species seriously questions the historicity of paradise. Starting from the arrival of single-cell bacteria on this planet to the kaleidoscopic variety of species we witness today, there has always been a severe competition for survival within and across different species because of the shortage in food supply. Competition for scarce resources has often resulted in the extinction of species with less advantageous traits for survival. Death has been an intrinsic feature of the cosmic scene from the very beginning. Pain has also been a salient feature of the biological world alongside death. The infliction of physical pain when competing for scarce resources is an inevitable byproduct of a world where creatures compete for survival. Sensing pain is also an indispensable trait for survival, without which species will never sense what may very well jeopardize their well-being. Thus, "there could never have been any literal "fall" from a cosmic paradise into the state of imperfection. Imperfection would have been there from the start, as the shadow side of an unfinished universe."¹⁷ Because pain and death have always existed on this planet, "there was no golden age that we have lost."¹⁸

Though not denying the spiritual significance behind the very notion of paradise, much work that reflects a serious engagement with science attempts to revise the literal understanding that has often been ascribed to it with a more nuanced, metaphorical exegesis. We witness here another case of how science

affects how theological inquiry proceeds by way of intimating a revision in what faith embraces.

II

Clarity is a quality in research much sought after by theoretical disciplines. This norm, because valued by academia, implies that a lot of work, within each discipline, is devoted to the clarification of theoretical ambiguity. Clarity and precision can be introduced to any given research tradition in many different ways. Firstly, because progress in research is often attained by way of solving theoretical problems, gaining a clearer understanding of problems becomes important. This is because the clarity brought to problems is often times the crucial precondition for them being solved. In addition, arguments are often presented for or against a particular point of view. Arguments can be subject to clarification by laying out the premises presupposed and the kind of inference rules applied to them when deriving conclusions. By making the structure of theoretical arguments explicit, fallacious reasoning and questionable assumptions can be exposed, thereby contributing to the overall discussion. Thirdly, most discussions that take place within and across theoretical disciplines resort to natural language as the ultimate means of discourse. This can unfortunately result in ambiguity, for the meanings assigned to concepts we find in natural language are often equivocal. The clarification of the concepts we use, therefore, can help bring precision to theoretical discourse. Though these examples do not exhaust the ways in which clarity of thought can be established within any disciplinary matrix, they serve to illustrate the importance often assigned to it.

Theological inquiry shares this general quest for clarity and precision. Yet Christian theology encounters an obvious difficulty here, because the central concept it seeks to explicate - God - is a transcendent mystery that by definition

defies clear cut representations in terms of human concepts and categories. That is, God's ultimate nature, being ineffable, can not be fathomed unequivocally without seriously distorting his true reality. The God that can easily fit into our categorical schemes or our grand intellectual systems is not and can not possibly be the transcendent Lord and creator of all there is. This God will be a human construct, an idol reflecting all the partialities, biases, and myopias that typically define human thinking.

But having said that, not all theological assertions concerning God are on a par. God-talk is constrained ultimately by scripture, for it is the ultimate court of appeal for determining what can and can not be said about God. Thus, because God is portrayed as a personal being in scripture, personal language is preferable to language interpreting God in strictly non-personal terms. Further, because God is conceived as a loving and caring father, words like "hate" and "greed", though still personal, can not be applied to God without serious qualifications.

Yet theological language grounded in scripture still can not give us an unerringly apt description of divine reality. Even the most refined, sophisticated, and elaborate characterization of God is a pale and shallow reflection of the unfathomable richness of God's being. This is because Christian theology has always understood that the "Bible has not fallen from heaven but had been written by men, each of them using his own idiom, images, metaphors and beliefs, thus conveying eternal truth in earthen vessels."¹⁹ Though an indispensable resource for thinking and talking about God, it is a fallible record of things divine by fallible men. But more importantly, designed to make cognitive sense of what happens in the mundane world of everyday experience, language, however stretched beyond normal usage, can not precisely express that which transcends the empirical.

Thus, an extremely nuanced balance must be maintained between total agnosticism and biblical literalism. Because the spectrum of images and metaphors contained in scripture can help constrain the otherwise plethora of

attributes that may get ascribed to God, we need not accept the agnostic creed of sheer silence in response to the reality of God. Contrary to agnosticism, it is not the case that nothing insightful or valuable can be maintained about God, if scripture is a reliable resource for theological articulations. But this contention must immediately be counterbalanced by the biblical insight concerning God's veiled reality. Contrary to biblical literalism, which gives a literal reading of everything and anything contained in scripture, the images and metaphors we find there are useful yet inadequate ways of representing God. They are, therefore, "neither pictures of reality nor useful fictions; they are partial and inadequate ways of imagining what is not observable."²⁰ Though an element of isomorphism exists between the biblical imageries of God and the nature of God himself, they can not be applied literally to unveil the God who is always hidden.

Given, therefore, the ineffable quality of God's being, theology has always appealed to other theoretical disciplines to help illuminate the very existence and nature of God. Clarifying the problem of transubstantiation, where the physical body and blood of Christ (the second person of the Trinity) is said to be miraculously present in the Eucharist, by invoking the concepts of "property" and "substance" is an example of the theological use of classical logic. The recent attempt to clarify the problem concerning how a transcendent God can relate to his creation by construing creation as God's body is an example of how theology makes use of panentheistic metaphysics to clarify a theological anomaly. Again, applying the principle of verification to God-talk to help determine whether the concept "God" has empirical content is a clear example of theology seeking clarity by borrowing and making extensive use of a principle that appears in analytic philosophy.

The use of scientific knowledge to clarify a problem in what the Christian faith affirms is another common cognitive strategy employed in theological inquiry. One such problem concerns how a transcendent God can act in a world governed

by scientific laws. The God of the Christian faith is a personal agent who acts in and through both history and nature to fulfill the purpose he has for creation. God is not a distant bystander passively observing the events that fill the cosmic scene. True, divine action, unlike the comings and goings of finite personal agents, can not be discerned empirically. Contrary to the seeming absence of God, however, faith affirms that God is directly involved in his creation, molding the course of nature and history, leading it to a divinely decreed end. Science, on the other hand, has for the most part conceived the world to consist of physical events interlocked in an ironclad causal network. In a world governed deterministically by the colliding of atomic corpuscles in space, science does not seem to leave much room or space for a causally active God. How could God act in a world where everything from atoms to galaxies follows a physically predetermined path?

The standard response has been to argue that God manifests his will by breeching the laws of nature which would otherwise follow a mechanical path against the intention he has in store for creation. Scripture is replete with such cases of divine intervention: God splitting the sea in half to allow room for the Jews to elope from Egyptian captivity; God temporarily ending what was then thought to have been the regular orbits of the sun; God raising Christ from death and the biblical testimony of the countless miracles performed by Christ. Identifying the loci of divine action with such acts of intervention is, however, problematic, for an account "of occasional intervention implies as its correlative a theory of ordinary absence."²¹ If God is said to be acting when suspending the laws of nature, then God can not be involved with the workings of the world when such interventions are absent. Yet this is contrary to the biblical understanding of God who sustains and grounds the very existence of the world at every point in time. Moreover, many have regarded this attempt of conceiving divine action problematic because it seriously undermines the goodness of God.

If God can overturn the course of nature to realize his will, why can not he do the same to prevent natural catastrophes, which often result in the loss of many innocent lives, from happening? One may in response argue that the world as we know it, the world governed by rational and regular natural laws, would turn into a scene of unpredictable chaos, if God was to intercede every time he thought a catastrophe was imminent. The kind of world envisaged here would not only make our personal lives impossible by depriving the important element of predictability, but would undermine the scientific enterprise itself which seeks to unravel the empirical laws that bestow predictability and rationality upon the world. Yet those who adopt this rejoinder seem to want to uphold both the interventionist model of divine action and the integrity of personal life and science. The question is whether they can have it both ways. In addition, the interventionist model runs against a fundamental methodological principle in science, which asserts that the world, being "a causal web, with its general causal principles, cannot be interrupted from time to time."²² For many Christian theologians engaged in an extended dialogue with science, any model of divine action that seriously undercuts the very foundational principle of science is untenable. In so far as the world is construed mechanistically, a viable way of conceiving divine action seems difficult, if not impossible.

Yet the recent advances in modern physics present a very different picture of how the underlying mechanism of the world works, and therefore seriously questions the viability of a mechanistic philosophy that has until present been thought to underlie the physics of the past. Quantum theory especially demonstrates both at the theoretical and empirical level that subatomic particles, contrary to classical physics, do not obey rigid deterministic laws. The behavior they manifest under constrained experimental conditions shows that there is an element of unpredictability in the way they behave. For example, the nuclei of radioactive substances disintegrate, releasing subatomic entities during this process

of radioactive decay. Yet “no theory of nuclear stability exists that will always predict all the details of radioactive decay.”²³ Though the half-life of a large sample of any given radioactive substance is susceptible to precise prediction, the time each and every individual nucleus will take before disintegrating can not be predicted. In addition, Heisenberg’s Uncertainty Principle demonstrates our inability to simultaneously measure with precision both the position and velocity of any given atomic particle. Knowing the precise position of an atomic particle will result in the imprecision of its velocity, and by establishing its precise velocity, we have to face the imprecision concerning its position. Not knowing both the position and velocity of any given atomic particle means that “we cannot plot the trajectory of an atomic particle because we cannot know the initial conditions.”²⁴ This fact about what we can not know about atomic particles is not a reflection of our epistemic ignorance. It is not a gap in our understanding of the world which can be corrected by further experimentation or by the growth of scientific knowledge. “It is not just a limitation on human knowledge. It is a feature of the objective world.”²⁵ The atomic world, contrary to classical physics, is intrinsically unpredictable ; it is a world that is genuinely random and fuzzy.

Works that attempt to shed some meaningful light on how God can act in the world make extensive use of quantum theory. They jointly assume that modern physics, unlike the classical picture of corpuscles obeying deterministic laws, is more conducive for constructing a model for divine action. It is often maintained that the loci for divine action can be the “many instances in which the underlying laws of nature do not absolutely determine what happens, where they allow an element of chance, randomness, or choice.”²⁶ God can, that is, manifest his will by stepping in and determining the outcome of the probabilistic propensities that exist in the world without breaching the laws of nature. As one proponent of this model argues, “Wherever and whenever things look random, God might step in and determine then and there how those particular dice landed.”²⁷ Unbeknown to

us, God may very well mold the course of the world by decreeing the path of atoms that will bring out the result he has in mind at the macroscopic level. Whether or not God acts in relation to the world is not the issue at stake. That God, being a personal agent, acts is the fundamental tenet of the Christian faith. God being God, how he acts out his will in the world will always remain a mystery. Yet some are convinced that science of the quantum world may play the modest role of shedding some light upon the inscrutable ways in which God is said to act. We have here an example of how science is used to illuminate what faith maintains.

III

The content of Christian faith may very well be invariable. What the apostolic church confessed as binding articles of faith more than two thousand years ago is still the cornerstone of faith, embraced and respected by many practicing Christians. This is also true to a large extent of the theological community. Theological thought, though open to new ideas, is firmly founded upon what it sees as apostolic teaching, and seeks to rationally articulate the content of faith. Yet there has been and there still is disagreement among theologians about what should be at the forefront of theological discussion. Though the Trinitarian form of God is a much respected theological concern in contemporary theology, it is questionable whether this article of faith was thought crucial for theology in the patristic age. Conversely, though the early church had high hopes for the imminent coming of Christ, thus naturally leading to speculations regarding when his expected reign would be inaugurated, contemporary theology assigns marginal significance to such eschatological speculations. Often times, this very variation in what theology thinks should and shouldn't be addressed does result in the suppression of core Christian beliefs

from the theological scene.

One interesting pattern that seems to reappear in the history of Christian thought is how factors outside theology can help retrieve the value and importance of an article of faith which for some reason has been ignored. At the turn of this century, for example, notwithstanding liberal theology's optimistic estimate of humanity's creative power to solve the ills of this world, the First World War for neo-orthodox theology clearly refuted this contention by revealing the utter depravity and sinfulness of our being. The War in a way helped theology retrieve the significance of "original sin" which was set aside by liberal theology as a gratuitous underestimation of our potential to do good. Another recent example is the impact which poverty of the so-called developing countries has had on theological thinking. Convinced that theology in academia was not raising the urgent issue of how the church could pragmatically combat the spread of poverty, liberation theology has sought a complete reorientation of the theological agenda by insisting how the church must come to terms with the practical, everyday needs of the downtrodden before embarking on abstruse theological abstractions. This call for change, though initially met with scathing criticism, forced theology to reaffirm the significance of Christ's categorical injunction to forever serve with humility those who are in need.

The findings of modern science have also led to the theological retrieval of core Christian beliefs temporally marginalized. Two examples will be examined below.

The scientific worldview that underlies scripture presents a very static account of the entire cosmos. The notion of the world transforming itself into a different state of existence ; a world giving birth to genuine novelty and variety ; a world consisting of different hierarchical levels of being radically different from the primordial past is absent. The biblical account of the fixity of species is a reflection of this very worldview. The existence and nature of species, once

decreed by God, remain intact, immune from physical changes. Because animals are ideally suited to their environment, their immutability precludes biological change.

This cosmological picture of the world partly accounts for the theological appropriation in the past of deism as the most appropriate way of construing the being of God, and the relation he has with the cosmos. For deism, God is the transcendent creator of the world who, after creation, distances himself from it. God's involvement with the world is mostly restricted to the primordial act of creating the world out of nothing. Once created, the world follows its predetermined course that is shaped and constrained by the laws of nature. There is no need for God to enter the created domain from outside, for the static world, once created, was thought good by the creator. If the world that was created was thought good by the very being who brought it into existence, and if the created world is not susceptible to radical change that may taint God's creation, then there is no need for the creator to intervene and change something that is already intrinsically good. The God of deism is thus a self-contained God who from afar observes the self-sufficient world that traces the course outlined by mechanistic laws.

Modern science, however, depicts a world that is significantly different from that which underlies scripture. The world is not a static, monolithic block impervious to change. On the contrary, it is a world in a constant state of flux, a world where transformations of every imaginable kind are occurring at every hierarchical level. The biological world is a scene where variations in genetic mutation result in subtle differences in acquired traits, leading to the selection of organisms with more adaptable traits. Ill-adapted organisms are consequently exterminated by the process of evolution. Biological evolution, therefore, accounts for the variety and novelty that are brought into fruition. Further, seemingly static cosmic entities like stars and galaxies too are enmeshed in the

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process of structural change. Stars, for example, though seemingly stable, expand and contract in size depending on the amount of hydrogen they have for consumption. The universe itself, to mention another example, is extending its horizon, forever expanding in space and time. Even space itself, long thought to have been an invariable feature of the world, bends when approached by a massive object. Time is also another cosmic constant that is subject to change, for time slows down as things approach the speed of light.

This overarching scientific account of a world enmeshed in ceaseless flux has led in certain theological circles to the retrieval of a long-forgotten biblical insight regarding God's active and continuous involvement with the inner workings of the world. A world construed in such terms is thought to make more sense of the biblical notion of "creatio continua", which signifies God's ceaseless creation of the world at every point in time. It represents God creating "in a manner that operates non-interventionally within the grain of nature, rather than interventionally against it."²⁸ Unlike the deistic picture of God which merely highlights God's transcendence, God here is pictured as an active participant in the evolutionary process of creation, causally affecting it from within. The rich and complex world science unveils is still at a transitional phase which, with the help of God's creative power, will be transformed into a different state of being. The present state, contrary to deism, is therefore not a finished product of God's decree that awaits no further development. Though the extent of God's causal involvement with creation is hotly disputed, thus producing options ranging from God simply luring creation to a more desirable state to a model implying a more causally active God, contemporary theologies jointly assert the need to counterbalance deism's one-sided stress on transcendence with a model more appreciative of God being immanent in the world. But it is thanks to the modern scientific picture of change, particularly the change brought by biological evolution, which has been used to retrieve and reemphasize the importance behind

the biblical notion of “creatio continua”. God, that is, is “the immanent creator creating in and through the processes of the natural world.”²⁹

The second example has to do with what modern science has in recent years revealed about the horrendous state our environment is said to be in. The crippled state of our planet need not be fully retold here. It is a story that has already been forcefully stated by many. The planet, due to problems such as the depletion of the ozone layer, the greenhouse effect, acid rain, the fragmentation of the ecological food chain, not to mention nuclear waste and other unforeseeable environmental problems that genetic engineering may bring about, can not forever sustain biological life as we know it unless immediate and drastic measures are made on a global scale.

Given the complexity of the issue at hand, identifying the root cause or causes behind the environmental tragedy we face may seem premature. But if we seriously intend to rectify this problem, or to state in more moderate terms, if we wish to prevent the problem from exacerbating, the cause(s) responsible for our environmental plight must be identified. Here different research traditions may be able to offer complementary insights. Modern science can and does at present identify the physical factors responsible for the degradation of our planet, and also proposes concrete measures which are thought to effectively combat the problems in question. From the point of view of Christian faith, however, the identification of physical causes, though an indispensable and respectful step towards the desired solution, can not by itself eradicate the problem in toto. What is required is nothing other than a fundamental reorientation in the way we conceive nature and our relationship to it. What, then, is our standard way of understanding nature which needs to be amended?

Probably the most prevalent model of nature we have inherited construes the entire domain of nature as an area for unbridled human exploitation and subjugation. According to this model, nature, being rich and plentiful in useful

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resource for human life, can be utilized at any time to satisfy the needs we may have without bearing the consequences our choices may have upon nature. This model therefore encourages viewing the whole of nature as having value in so far as it serves the ends and needs we have. We can not be held morally accountable for what we do to nature. Moreover, because nature may at any time jeopardize the stability and well-being of human life, nature is often times seen as an encroaching threat that can only do us harm. We have no choice but to unveil its laws so as to make our natural environment a more habitable place for human life.

The Christian faith, paradoxically, has, to a certain extent, been supportive of this way of viewing nature. By radically bifurcating God and creation, anything not God is rendered profane, unworthy of veneration. Nature, not being God, can not be the object of our ultimate concern. Further, by assigning humanity a special place in God's creation, thus bifurcating its status from the rest of nature, it created a schism between nature and humanity, making it at times difficult for us to fully realize how much we are dependent upon nature. And by conferring humanity the right to dominate and control nature, it arguably created a seriously distorting illusion that we can use nature as means to human ends.

There is, however, a very different, long-forgotten biblical insight within the Christian faith that many believe can help reorient our fundamental preconception regarding nature and are place in it. The reorientation centers on the biblical notion of stewardship. Nature is God's creation. It is his property, not ours. Being the crown of creation, we have been entrusted by God to take great care of what ultimately is his. We have, therefore, the moral responsibility as stewards to respect and love nature, and heal the wounds it suffers from. Those who champion this insight argue that this overall vision is exactly the long forgotten vision that we need when nature is seriously in peril. Thus, we see how the environmental findings of modern science can help retrieve a biblical wisdom long forgotten.

IV

There is nothing unprecedented in the very attempt of confirming what faith maintains by way of appealing to the world of experience. Natural theology, which has a long and well-respected history in Christian thought, is predicated upon the belief that there exist core Christian beliefs the truth of which can be established by referring to the empirical world alone, without making recourse to divine revelation. It hypothetically suspends judgment concerning the truth which it sets out to demonstrate. The standard empirical arguments for the existence of God are a case in point. One version of the cosmological argument, for example, claims that we can empirically infer the existence of God by analyzing the contingent nature of the world. The world is not self-sufficient in the sense that it couldn't have brought itself into existence. It owes its very existence to a reality that transcends the world. This transcendent reality is construed as God. The teleological argument, to refer to another example, claims that the intricate, complex, and elaborate structure behind much of what can be observed in the natural world can be best explained by positing a cosmic intelligence responsible for crafting such a world. As these examples show, natural theology purports to rationally defend what faith affirms by resorting to what falls within the ambit of the empirical world without presupposing the truth which it seeks to justify.

We witness today a renewed interest in natural theology in mainstream Christian theology. In a world where pluralism is rampant, the resurgence of natural theology is quite understandable, for the empirical world can be commonly understood despite ideological and religious differences. Pluralism aside, there is more confidence in what the standard empirical arguments for Christian faith can achieve. Many recent works in natural theology are reexamining the arguments with renewed interest, attempting to strengthen their viability and cogency by removing possible logical loopholes or by restating them with more conceptual

precision. Other works however are presenting new arguments that, interestingly enough, make reference to what modern science is teaching us about the empirical world. One such argument will be examined.

As modern science makes it abundantly clear, the fact that we exist as conscious agents here on this planet is the result of a vast series of highly improbable factors. Everything that exists in the universe was contained in a point of infinite density prior to the big bang. If the rate of expansion a second after the big bang “had been smaller by even one part in a hundred thousand million million, the universe would have recollapsed before life could have formed.”³⁰ After the cosmic explosion, another series of highly fortuitous events made life on this planet possible. The formation of elementary particles from quarks required the complex chain of independent physical events. If the strong nuclear force had been weaker, there would only be hydrogen in the universe, and if the same force had been slightly stronger, there would only be helium. The formation of stars and the formation of galaxies from stars required the extremely complex and delicate interplay between elementary particles and gravitational constants. Further, the emergence of unicellular life from brute matter on this planet, a problem that still awaits scientific explication, involved, amongst a myriad of other physical factors, the finely tuned output of energy and light from the sun. The evolutionary emergence of human life from unicellular life seems highly improbable considering the vast number of species made extinct by natural selection. Thus, our existence as conscious agents seems to be the result of a chain of serendipitous events that started five billion years ago. It may very well be that our very existence is a lucky accident, a coincidence that doesn't invite a theological response.

Yet for those interested in constructing a viable natural theology consonant with the findings of modern science, the fine-tuning of physical constants for human life seems to lend support to what their faith affirms. The Christian faith

does not regard our existence to be “a pointless blip in the story of a pointless universe.”³¹ Rather, from the very moment of creation, God had endowed this world with the necessary physical conditions to make human life possible. Our arrival on the cosmic scene was intentionally planned out by God. We are, that is, meant to be here. Now, modern science delineates a chain of improbable events which led to our existence. As indicated above, the presence of life, especially human life, may be the result of blind mechanical laws that had no overarching purpose of producing life. Yet given our actual existence, and the sheer number of fortuitous chains of events leading up to our presence, it seems more intellectually satisfying to assume that our existence was somehow predetermined by a cosmic intelligence that wanted us to be here. “Life depends upon a combination of so many improbable factors that the whole cosmic process must have been set up by some vast cosmic intelligence.”³² Thus, the fine-tuned nature of the universe, a general yet important feature about the physical world established by science, is used to construct a minimal case supporting the existence of a cosmic being that wills our existence.

V

Interdisciplinary research is undoubtedly a salient feature of modern academia. Christian theology is no exception. Contemporary Christian theology of the more liberal type enjoys a cognitive rapport with neighboring theoretical disciplines, making extensive use of what they have to offer. But it is its engagement with the findings of modern science that typifies the overall interdisciplinary quality of much constructive work in theological inquiry. This paper outlined the different ways the findings of modern science are used in theology in relation to what faith affirms. To recapitulate, science is employed to revise, clarify, retrieve, or confirm what the Christian faith affirms.

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Though theology must “learn how to make use of science without letting science dictate the entire agenda of theology”³³, it must, unless wanting to ensconce itself in an intellectual ghetto, be willing to learn from what science teaches us about the world we live in. After all, “without the readiness to learn, and if need be to change, there is no way of establishing credibility outside the closed circle of one’s own faith.”³⁴

Notes

- 1 Arthur Peacocke, *Paths from Science towards God* (Oxford : Oneworld, 2002), p. xvi.
- 2 Arthur Peacocke, *Paths from Science towards God* (Oxford : Oneworld, 2002), p.30.
- 3 Christopher Knight, *Wrestling with the Divine* (Minneapolis : Fortress Press, 2001), p.84.
- 4 Mikael Stenmark, *How to Relate Science and Religion* (Cambridge : William B. Eerdmans, 2004), p.17.
- 5 Ian Barbour, *When Science meets Religion* (New York : Harper Collins Publishers, 2000), p.48.
- 6 Arthur Peacocke, *Paths from Science towards God* (Oxford : Oneworld, 2002), p.133.
- 7 Philip Clayton, *Explanation from Physics to Theology* (New Haven : Yale University Press, 1989), p.144.
- 8 Alister McGrath, *Passion for Truth* (Illinois : Intervarsity Press, 1996), p.70.
- 9 William Placher, *Unapologetic Theology* (Kentucky : Westminster John Knox Press, 1989), p.11.
- 10 Alan Padgett, *Science and the Study of God* (Cambridge : William B. Eerdmans, 2003), p.61.
- 11 John Polkinghorne, *Belief in God in an Age of Science* (New Haven : Yale University Press, 2003), p.43.
- 12 John Polkinghorne, *Science and the Trinity* (New Haven : Yale University Press, 2004), p.144.
- 13 John Polkinghorne, *Science and the Trinity* (New Haven : Yale University Press, 2004), p.149.
- 14 John Polkinghorne, *Science and Theology* (Minnesota : Fortress Press, 1998), p.54.

- 15 John Polkinghorne, *Exploring Reality* (New Haven : Yale University Press, 2005), pp.123-124.
- 16 Steven Weinberg, *Facing Up* (Cambridge : Harvard University Press, 2003), p.5.
- 17 John Haught, *Is Nature Enough?* (Cambridge : Cambridge University Press, 2006), p.187.
- 18 Keith Ward, *Pascal's Fire* (Oxford : Oneworld, 2006), p.53.
- 19 R. Hooykaas, *Religion and the Rise of Modern Science* (Vancouver : Regent College Publishing, 2000), p.144.
- 20 Ian Barbour, *Myths, Models, and Paradigms* (New York : Harper & Row, 1974), p.48.
- 21 Peter Barrett, *Science and Theology since Copernicus* (New York : T&T Clark International, 2004), p.104.
- 22 Donald Ray Griffin, *Two Great Truths* (Louisville : Westminster John Knox Press, 2004), p.2.
- 23 Robert Hazen and James Trefil, *Science Matters* (New York : Anchor Books, 1991), p.116.
- 24 Nancy Pearcey and Charles Thaxton, *The Soul of Science* (Illinois : Crossway Books, 1994), p.196.
- 25 Keith Ward, *Pascal's Fire* (Oxford : Oneworld, 2006), p.91.
- 26 Kitty Ferguson, *The Fire in the Equations* (Pennsylvania : Templeton Foundation Press, 2004), p.196.
- 27 Kitty Ferguson, *The Fire in the Equations* (Pennsylvania : Templeton Foundation Press, 2004), p.220.
- 28 John Polkinghorne, *Exploring Reality* (New Haven : Yale University Press, 2005), p.36.
- 29 Arthur Peacocke, *Paths from Science towards God* (Oxford : Oneworld, 2002), p.58.
- 30 Ian Barbour, *When Science meets Religion* (New York : Harper Collins Publishers, 2000), p.29.
- 31 Keith Ward, *Pascal's Fire* (Oxford : Oneworld, 2006), p.15.
- 32 Keith Ward, *Pascal's Fire* (Oxford : Oneworld, 2006), p.37.
- 33 Philip Luscombe, *Groundwork of Science and Religion* (Peterborough : Epworth Press, 2000), p.225.
- 34 John Habgood, *Varieties of Unbelief* (London : Darton, Longman and Todd, 2000), p.76.