Theological Perspectives

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MARTIN LUTHER'S EXPERIENTIAL THEOLOGY AS A MODEL FOR FAITH-SCIENCE RELATIONSHIPS

by Klaus Nürnberger

Abstract. The approach of experiential realism could indicate where science and faith deal with the same reality, where science questions faith assumptions, and where faith goes beyond the mandate and method of science. Although prescientific, Martin Luther's theology is the classical prototype of an experiential theology. We experience God's creative power in all of reality. We discern its regularities through observation and reason. So faith opens up all the space needed by science. However, experienced reality is highly ambiguous. It obscures God's intentions. God's intentions are revealed in the proclamation of the gospel: God is unconditionally for us and with us and not against us. This proclamation is a promise, appropriated in faith, and geared to a vision of what ought to become. It is based on the interpretation of a catastrophe—the cross of Christ—as God's pivotal redemptive act in human history. It goes beyond the mandate and method of science, yet it is capable of giving the latter a sense of purpose, criteria of acceptability, and authority to act in the interests of humanity and the earth. Theology challenges science to acknowledge the necessity of a transcendent frame of reference and moral accountability. Scientific insight challenges theology to reconceptualize its assumptions on God, creation, and eschatology to integrate best science.

Keywords: experiential realism; experiential theology; faith as protest; natural law and intentionality; science and Luther's theology; scientific exploration and transcendent vision

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Klaus Nürnberger (*www.klaus-nurnberger.com*) is Professor emeritus, Fellow and Senior Research Associate at the University of KwaZulu-Natal, Pietermaritzburg, South Africa. His address is 21 Farmers Folly, Lynnwood/Pretoria, 0084, South Africa; e-mail nurnberger@telkomsa.net.

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Experiential Realism

In Christ God became a Jew to the Jews. So Paul believed that to be a participant in the gospel he had to become "all things to all people" (1 Corinthians 9:19–23). Can theologians become scientists to scientists? Dialogue between science and theology depends on a common approach that makes it possible to indicate (a) how far science and faith deal with the same reality, (b) where current insights of science question traditional theological assumptions, and (c) where theological assumptions go beyond the mandate and method of science.[1]

Often *critical realism* is taken to be such a common approach (Polkinghorne 1996, 11ff.; Drees 1990, 157ff.). I prefer to call it experiential realism. First, experiential realism is not deterred by epistemological skepticism. Epistemology focuses on the observing subject and gets entangled in relativity and uncertainty. The practical pursuit of science focuses on the observed object and gets on with the job (von Weizsäcker 1990, 416). It is immensely successful in doing so.

Second, experiential realism is not deterred by the fact that all thought is based on assumptions, all language is metaphorical, scientific theories are constructs, and assumptions and metaphors have an impact on observation, comprehension, and the organization of experiments (Happel [1993] 1996, 105ff.). Although all of this is true, scientists do believe that there is a difference between scientifically established fact and superstition or pure fantasy.[2]

Third, experiential realism prioritizes the inductive rather than the deductive method. It avoids inferences drawn from reified biblical metaphors, Platonic abstractions, and unsubstantiated propositions.[3] It focuses on what humans actually experience, what can be intersubjectively accounted for, and what has consequences in the real world. Science demands not only coherence but also evidence and plausibility.

Fourth, "experience" cannot be restricted to the area of the natural sciences. It includes instincts, mental states, intuitions, symbolic representations, linguistic communication, information systems, patterns of interpretation, historical reconstruction, worldview assumptions, and religious convictions as far as they can be described, analyzed, critiqued, transformed, or abandoned. These structured phenomena belong to various levels of emergence and have consequences in the real world, so they must be taken seriously as aspects of immanent reality. Human, social, historical, and hermeneutical sciences have legitimate functions at universities. As I argue here, the need for a transcendent frame of reference is part of experienced reality, although the transcendent as such is not. Theology deals with *notions* of the transcendent, and these notions are part of immanent reality. In experiential realism, therefore, there is no "separation between the sources of religious knowledge and those of scientific knowledge" (Drees 1990, 160).

Can theology accept the premise that scientific insight reflects reality as it is, even if it contradicts biblical texts or theological propositions? Can it accept the truth of experienced reality and still face the painful dissonance between what has become and what ought to become?[4]

Among classical theologians, Martin Luther followed the most consistently experiential approach. It is amazing that this potential has not been recognized to any appreciable extent in the science-religion interface, even among theologians who hail from the Lutheran tradition such as Karl Heim, Paul Tillich, Wolfhart Pannenberg, Ted Peters, Antje Jackelén, and Philip Hefner. Of course, the assumptions of Luther's theology are premodern and extrascientific, but this is true of all classical theologies. What is remarkable in Luther's case is that the basic tenets of his theology are vastly more amenable to a dialogue with science than others of its kind.

If we tease out these basic tenets, we get a rather "modern" Luther, a streamlined Luther, as it were. Because the aim is not to engage in historical studies but to find a plausible contemporary approach, we should not hesitate to do exactly that. I begin with the briefest of summaries of contemporary scientific insight and proceed with an exploration of Luther's potential accommodation and complementation of the scientific enterprise. The outcome is that science and faith do not exclude but rather need each other. Conversely, current scientific insight challenges theology to reconceptualize classical theological doctrines such as the concept of God, creation, miracles, predestination, theodicy, eschatology, resurrection, and the relation of the Christian faith to other convictions. In this essay, however, I limit myself to the direct relevance of Luther's experiential theology for the topic at hand.

Science as an Aspect of Modernity

Science is based on empirical facts and provisional theories concerning entities and processes of reality that are accessible to human observation, comprehension, and manipulation.[5] Four times five will always be twenty, and the normal water molecule will always have two hydrogen atoms and one oxygen atom, irrespective of one's faith commitments or value judgments. Science as such therefore is a conviction-neutral and value-free enterprise. Or is it?

The scientific enterprise is embedded in a cultural context from which it cannot disentangle itself. It presupposes a frame of reference that should not be taken for granted. The primordial motive of science is not just curiosity but mastery. The legitimacy of mastery is built on certain assumptions. Modern science is part of modern culture. Modern culture goes back to the so-called Enlightenment, which has a clear emancipatory agenda. The Enlightenment triggered a staged rebellion against authority of all kinds: the institutional church, biblical scriptures, dogmatic traditions, a

privileged religion, Platonic and Aristotelian philosophy, the feudal system, the authoritarian state, the patriarchal society, slavery, the authoritarian approach to education, even the God concept as such. Think for yourself (rationalism), look for yourself (empiricism), pursue your own interests (economic liberalism), insist on your dignity (human rights), have a say in your government (democracy), find your personal Savior (pietism), allow the next generation to develop its own potential (anti-authoritarian education), conduct your life without a transcendent reference point.

Today modernity is characterized by four fundamental aspects: science, whose criterion is evidence; technology, whose criterion is efficiency; commerce, whose criterion is profitability; and the consumer culture, whose criterion is utility and pleasure. Whatever does not meet these criteria is being marginalized in all spheres of life that really matter. Religion is tolerated as a private pastime as long as it does not interfere in the mechanisms of modern society. At best it is embraced where it offers emotional security, spiritual highs, or a lucrative source of income.

The achievements of modernity have been immense: deconstruction of unwarranted assumptions and gross superstitions, superior knowledge, increased productivity, enhanced wealth creation, material need satisfaction, political power, military might. At the same time, they have proved to be incredibly dangerous, leading to unprecedented and growing discrepancies in life chances, marginalization of masses of people, imbalances between material, social, and spiritual need fulfillment, and ecological destruction. "What makes science ambiguous is the lack of love"—not as a personal motive but as a directive inherent in its operations (von Weizsäcker 1990, 430–33).

Because modernity is not rooted in a transcendent frame of reference it has become a loose cannon. It provides vast powers without concomitant visions and intrinsic accountability. It undermines its Western foundations.[6] Scientists, technicians, merchants, and consumers *can* be responsible, but they do not have to be, at least not on account of their basic assumptions. This emancipatory agenda and its possible repercussions have to be seen as the backdrop of the science-faith interface.

The Scientific Worldview in a Nutshell[7]

Now we come to the scientific worldview. Cosmology suggests that reality as we know it began with the Big Bang, usually described as the explosion of an initial singularity consisting of an infinite concentration of all energy found in the universe.[8] The Bang happened roughly 14 billion years ago. It sent energy flying in all directions. Tiny irregularities led to the compaction of energy in matter as a result of the force of gravity. Matter evolved to form all material objects found in the universe today.

However, the centrifugal dynamic continues. The entropic process tends to dismantle energy concentrations until equilibrium is reached.[9] Material

objects of all kinds are eroded. There is nothing in the universe that does not emerge, evolve, deteriorate, and disintegrate. Death and deconstruction are built into the system. In fact, the evolutionary process has been described as the "shortest available route" to total disintegration (Sachsse 1984, 6ff.).

The evolutionary process is characterized by levels of emergence. Emergence means that more simple components of reality are integrated into more complex levels of reality with their own characteristics (Clayton 2004, 38ff.; Kauffman 2008, 10ff.).[10] The human body is composed of elements such as carbon, calcium, oxygen, and hydrogen, but the sum total of these elements does not constitute a human body. Information and organization enter into the equation. The higher the level of emergence, the higher the level of complexity, flexibility, volatility, and transience. (Just compare a stone with an earthworm.)

A crude summary of the hierarchy of emergences would include: waves, subatomic particles, atoms, molecules, amino acids, proteins, cells, organs, and organisms. (For a more inclusive "ladder" see Clayton 2004, 27f.) One has to distinguish cosmological evolution through various levels of emergence from the evolution of different species at the same level of emergence.[11] At the level of organisms, for instance, one stream runs from algae to plants and another through amoebas to fungi and animals (McCarthy and Rubidge 2005, 174). These streams have differentiated into immense numbers of species but not necessarily into higher levels of emergence. Biological evolution essentially means that mutations lead to characteristics that are more adapted to particular environments than others and that give their bearers a competitive edge. However, the process of emergence overshoots the biological level. Neurological developments provide the preconditions for instincts, environmental conditioning, consciousness, self-consciousness, and reflective self-awareness (Clayton 2004, 110).

The personal level of emergence defines human nature. It is characterized by awareness of contexts larger than one's immediate environment, a sense of past and future, discernment of options with potentially beneficial and detrimental consequences, the formulation of goals, values, norms, and visions, and—of critical importance—communication through a highly differentiated and abstract system of symbols. The personal level presupposes all the infrapersonal levels of emergence. It is again embedded in suprapersonal levels of emergence: social, economic, and political structures and processes. There is a complex system of feedback loops between bottom-up causation and top-down causation throughout the hierarchy. Social processes can affect personal decisions that can affect biological functions, chemical reactions, physical and even subatomic processes—and vice versa.

Levels of emergence follow their own regularities. At the subatomic level it is probability, at the physical level causality, at the chemical level propensity, at the biological level teleology (in the sense that living creatures are

conditioned to seek survival, healing, avoidance of pain, and fulfillment of potential),[12] at the psychological level instinct and environmental conditioning. Intentionality is found only at the personal level. Intentionality operates within the constraints imposed by the hierarchy of infrapersonal and suprapersonal levels of emergence. However, within these parameters the human being is confronted with a range of options and thus with the gift of (constrained) freedom and the demand of (limited) accountability. The greater the realm of options, the greater the realm of freedom and accountability. Intentionality can extend the range of options by enlisting supportive powers against obstructive powers. In the end, the attainment of freedom and mastery is a power game between human intentionality and the impersonal forces of reality.

Spiritual Reality in Experiential Terms

To repeat, living beings are conditioned to strive for survival, healing, avoidance of pain, and fulfillment of potential. At the personal level, experiences of what ought not to be lead to projections of what ought to be and thus to visions of what ought to become. That one is derived from an uncharted sequence of events leads to a sense of gratitude. Dependence on a vast constellation of forces beyond one's control leads to humility.[13] The immensity of reality leads to awe. Past failures in relation to some kind of normativity lead to a sense of guilt. The unpredictability of the future leads to anxiety. These notions are matched with an intuitive sense of the powers that govern the universe and the desire to enter into communicative relationships with them.[14] It is at this point that religious and philosophical systems of meaning emerge.[15] They have an agenda that differs from that of scientific investigation. The existential discourse of orientation and self-entrustment differs from the scientific discourse of exploration and explanation.

To be plausible and relevant, spirituality must be able to integrate best science in its package of assumptions. However, the findings of science can neither obviate nor nullify the concerns of spirituality. To dismiss religious systems of meaning as subjective, and thus irrelevant, is one of the great, albeit unintended, deceptions of science because it renders humans rootless and rudderless creatures.[16]

The fact is that evolution has led to a being that is not determined solely by causality or solely by instincts. It is confronted with options from which it has to choose, which can have vastly beneficial or detrimental consequences for itself and its environment and which, therefore, demand accountability.[17] Plants and animals do not have this kind of problem.

Accountability to what, or to whom? Humans always operate within a frame of reference, however rudimentary. It consists of meaning and validity, criteria of acceptability, and authority to act within certain mandates and contexts.[18] Challenged by ever new situations and alternative interpre-

tations of reality, systems of meaning undergo an evolutionary process that is not dissimilar to evolutionary processes at other levels of emergence.[19]

Just as biological evolution has led to a vast differentiation of species in nature, systems of meaning vary greatly. They are historically, situationally, and culturally responsive. They are more complex, more diverse, more volatile, and more transient than their counterparts at lower levels of emergence. They also are more difficult to deal with than the objects of physics or biology. However, that does not make them spurious or dispensable. Without a basic frame of reference human beings would lack orientation. They could not objectify their existence and see it within a greater whole. There would be no spiritual freedom from the forces of their immediate environments. They would not be able to develop responsibility for the greater whole. To use a picture: Earth may be a speck of dust within the cosmos, but without its gravitational field we would be like astronauts separated from their spaceship, floating helplessly and aimlessly into outer space.

What science can expect of philosophy and theology is that systems of meaning integrate best science. However, the experienced need for meaning, criteria of acceptability, and authority necessarily explodes the limitations of empirical observation, rational comprehension, and deliberate manipulation. It leads to intuitions, visions, traditions, and rational constructs of a greater, but transcendent, reality in which immanent reality is embedded and that permeates this reality in all its manifestations.

Transcendent reality as such is by definition outside the sphere of human observation, comprehension, and control, but notions of the transcendent are part of immanent reality. They are located in our collective mindsets. They have consequences in the real world. They follow their peculiar logic. They can be described, analyzed, critiqued, upgraded, transformed, replaced, or abandoned. To a limited extent this also is true of scientific theories.[20]

The hierarchy of emergences and the diverse regularities operative at different levels of emergence lead to the differentiation of sciences found in academia today. They range from subatomic physics, Newtonian physics, biology, psychology, linguistics, history, sociology, economics, and political science to philosophy, religious studies, and theology.

Luther's Concept of God

I now proceed to explore possible links between modern science and the Christian faith as Luther understood it.[21] Let me begin with the concept of God. Luther was a late medieval theologian for whom the existence of God was self-evident. Today this question reappears in another form: Is the universe closed, or is it open to a transcendent Source and Destiny, however defined? Is the human being autonomous, or is it derived, dependent, and accountable?

These are perhaps the most fundamental questions raised by the interface between faith and science today.[22] But for Luther they would have been silly questions to ask. Reality cannot possibly be self-contained, and humans cannot possibly be autonomous. Modern science is not compelled to assume a closed universe and an autonomous human being. On the contrary, such a view is counterintuitive and, to my mind, arbitrary.[23] Assuming an open universe, Luther had a concept of God that was not very common in the sixteenth century. His worldview has been called dynamic universalism,[24] which assumes that God is the Source of experienced reality in its constant flux, its variability and complexity. Whatever exists and happens within us and around us is the result of God's ongoing creative activity (*creatio continua*). God's power does not just keep reality going; it constitutes reality.[25] Therefore God's presence is experienced in the very fabric of life. It is inescapable and undeniable (*Deus in vita*).

One has only to read Psalm 104 or Job 38–41 to discern the biblical source of this assumption. The Bible uses a plethora of metaphors to witness to God's creative activity. God creates with God's hands (Genesis 2), by means of an imperial decree (Genesis 1), a conflict with primeval monsters (Psalm 74:12ff.; Psalm 89:9f.; Isaiah 51:9), God's wisdom (Job 38–42; Proverbs 8–9; Wisdom of Solomon 7; Sirach 1), the divine logos (John 1), God's Son or God's Image (Colossians 1:13ff.),[26] God's Spirit—you name it! Stripped of its anthropomorphic connotations, the modern equivalent to pervasive creative power is the scientific concept of energy that follows certain regularities.

Science and faith deal with the same reality, albeit in different ways and following different agendas—description, analysis, and explanation on the side of science; reassurance, trust, and responsibility on the side of faith.[27] Science explores the behavior of energy in time and space and tries to discern the underlying regularities. For Luther there was no doubt that God's creative power follows certain discernible patterns. Following these leads, we are able to attain secular wisdom, entrench it in legal frameworks, and gain public acceptability. But that was ancient knowledge. In line with Ancient Near Eastern assumptions, most Old Testament traditions assume a cosmic order instituted by God (for detail see Nürnberger 2002, 204 and the index). It includes all kinds of regularity: natural law (the starry skies), social structure, and morality. The scientific equivalent is the operation of different regularities found at various levels of emergence: probability, causality, propensity, teleology, intentionality.[28]

Science insists on intersubjective scrutiny. For Luther, experienced reality belongs to the public domain, not to the arcane knowledge of faith. It is accessible to human observation and reason. To understand reality, you do not use the Bible as a textbook. Luther's approach gives science all the space it needs to pursue its agenda. Granted, Luther was as critical of Copernicus as almost everybody else was during his time (Pannenberg 1989,

153). But aversion to shockingly novel ways of looking at reality can also be observed in the history of science (classically depicted in Kuhn 1970). Luther was also not free from biblicist assumptions, but his theological approach points in a different direction, explored below.

Luther's theology has an apparent equivalent to scientific determinism. Obviously he could not have known the modern concept of causality and its reductionist derivations. The discussion of his time was about original sin and predestination. Luther keenly saw that humans are not free to think or do as they please. They are ridden like donkeys by forces greater than their own.[29] And yet they are responsible. Responsibility presupposes freedom. Luther never doubted that we are responsible.

Reductionists and determinists have to admit that it is they who take decisions concerning the initiation, the field, and the procedure of their scientific pursuits. That the future presents us with options and that we are constantly engaged in decision making are simple facts of life. So this contradiction needs a resolution both in science and in theology. The difference between factuality, potentiality, and actuality in historical processes provides a possible solution to the problem, which I spell out below.

It would seem, therefore, that a wide area of potential consonance exists between Luther's concept of the hidden God and the scientific explanation of reality. There are no serious clashes between the two. However, Luther has no interest in scientific analyses and explanations. He simply attributes experienced reality—the reality explored by science—to God, its ultimate Source and Destiny. This is a theological necessity because without it faith loses its existential rationale and ethical function.

Experienced Reality Hides God's Intentions

Luther was deeply aware of the ambiguity of experienced reality. We experience the flourishing of life and the agony of suffering and death. We experience providential protection and meaningless fate, unbelievable beauty and revolting ugliness, self-sacrificing love and ghastly atrocity. This ambiguity throws faith into constant affliction.

Perceptive scientists are aware of the profound ambiguity of reality, including the scientific pursuit as such.[30] Luther gathered from this ambiguity that it is impossible to discern God's intentions in the realities of life. Although God's power is manifest for all to see, God's intentions are not. Making use of an Old Testament metaphor, Luther called this experience the hidden God (*Deus absconditus*). God is hidden not because God is not present but because we cannot discern what God is up to.[31]

We should never try to detect God's purposes in the experiences of life, Luther warned. We should leave alone what we cannot know because speculation can only lead us astray. This includes pangs of fate, oppression, injustice, frustration, suffering, and death—the tricky question of providence.

It includes the gift of faith and the inability to believe—the tricky questions of predestination. It includes the question of how a powerful and loving God can allow earthquakes, wars, and atrocities to happen—the tricky problem of theodicy.

Modern science has demythologized and radicalized Luther's observation. It argues that the emergence, evolution, and operation of reality are not powered by intentionality, purpose, or (Aristotelian) teleology. Tsunamis, car crashes, and cancerous growths have causes but no purpose. It is also not too difficult to account for the purposelessness of reality in scientific terms. Intentionality occurs at the personal level of emergence and only there. This insight both confirms and illuminates Luther's observation. But it has deep-going theological repercussions. It requires theologians to abandon a Platonic-Gnostic concept of God. God must not be deemed pure Spirit and thus pure intentionality, endowed with unlimited power and elevated above the impersonal structures and processes of reality.[32] This concept of God corresponds with a concept of the ideal human being as a bodiless soul in charge of or imprisoned in but not constituted by a mortal body. The notion that the human soul can subsist and ought to subsist as an entity independent of its material infrastructure has Platonic, not biblical, origins.

God's Intentions Are Proclaimed in the Gospel

While in daily life we experience God's power but not God's intentions, the gospel reveals God's intentions but not God's power (*Deus revelatus*). This is the heart of Luther's theology. The classical Protestant formulation of the gospel is *justification by grace accepted in faith, rather than by human achievement or excellence*. It can be translated from judicial into communal terms as *God's suffering, transforming acceptance of the unacceptable into God's fellowship*. God, the ultimate Source and Master of reality, is unconditionally for us and with us and not against us. That is the gist of a Christian theology.

Here, it would seem, faith contradicts science fundamentally. There is not the slightest evidence of divine benevolence anywhere in the reality that science has so far investigated—a point hammered by Richard Dawkins (2006) in his attack on theism. However, Luther agrees that there is no such evidence. The gospel is a promise, not a statement of fact. Its agenda is reassurance, not explanation. It refers to the future, not to the present. It is not an axiomatic and not a descriptive but rather a performative statement. It articulates what ought to be, not what happens to be.

Nevertheless the gospel message is not sucked out of the thumb of the preacher. It is gleaned from the biblical witness to the Christ-event, which is deemed the culmination of the historical relationship between Yahweh

and Israel. It can easily be shown (as I have done in Nürnberger 2002) that this tradition was subject to an evolutionary process in its own right.

God's benevolence is proclaimed not on the basis of experienced reality but *in the face of* experienced reality. It is not a description or a legitimation of existing structures and processes. It is a call to become involved in God's creative and redemptive project. The observations of science stand, in their naked brutality, but existing reality is not accepted as ultimate or legitimate. Reality is confronted with a vision of what ought to be and drawn into a process of transformation.[33]

Moreover, the proclamation of God's unconditional benevolence is accepted (or not accepted) *in faith*, not on the basis of empirical evidence or logical inference. Only as far as we let ourselves in for it can we participate in its dynamic. Faith is not certainty or belief or assent to propositions deemed axiomatic. Faith is trust.[34] More precisely, faith entrusts itself to a movement that goes in a particular direction. Only through participation does the promise of redemption gain plausibility and affect reality.

The Cross of Christ as a Paradigmatic Event

According to Luther, God's intentions manifest themselves in humble earthly "masks" such as the temple, the man Jesus of Nazareth, the church's proclamation, and the sacraments. The gospel is geared to the cross of Christ and not to worldly greatness and glory. That God is for us and with us and not against us has manifested itself precisely in God's identification with that baby in the manger and with that man on the cross. God's love manifests itself in what seems to be the exact opposite of salvation.[35]

By implication, the subject matter of theology is based not on insight (science) or effectiveness (technology) but on "things that are not, to reduce to nothing things that are" (1 Corinthians 1:18–28 NRSV). This statement is not meant to deprecate the pursuits and achievements of science and technology as such. A redemptive project would be blind without science and powerless without technology. Rather, it is a critique of assumed human autonomy and self-accomplishment.

The consequences are far-reaching. God is present precisely among the illiterate, the failures in business, the rejects of society, the politically powerless, the guilty, the homeless, the jobless, the hopeless, the sick, the oppressed, the exploited, the suffering, the dying. God's presence does not legitimate misery and hopelessness but overcomes it. Here liberation theology meshes with Luther's theology, although this is not generally recognized (Nürnberger 2005, ch. 12). The gospel is the most radical protest against what is but ought not to be that one can think of. It is not a descriptive statement but a protest statement made in the face of the ambiguities of reality, meaninglessness, injustice, suffering, and death. It challenges science and technology to come aboard a universal creative and redemptive project.[36]

The Mediation of Power and Benevolence

There is only one God who is both powerful and benevolent. In a hidden way, therefore, God's redemptive love as manifest in Christ must be as present as God's creative power. Luther based this view not on metaphysical speculation but on a metaphor found in the New Testament. Christ went to sit "at the right hand of God" (Mark 16:19). For Luther this can only mean that the creative and redemptive love of God as manifest in Christ is valid and present at all times, in all places, under all circumstances—thus precisely in the context of the operation of God's power in experienced reality.

Luther's dynamic universalism comes into play here. In contrast with John Calvin, a nominalist, Luther believes not that God is in heaven but that heaven is where God is. God's power is everywhere. So God's benevolence must be everywhere. So Christ, in whom God's benevolence became manifest, must be everywhere.[37] In terms of Luther's theology, the Trinity can be expressed in a simple, nonspeculative way: God, experienced in God's *creative power* within the whole of reality, and believed in God's *redeeming love* as manifest in Christ, is *present in God's Spirit* within the community of believers. The Trinity does not express the eternal harmony of a God somewhere in heaven or the presence of the divine whole in its earthly parts.[38] Most conventional theologians seem to know more about God's inner nature than can be known. The Trinity expresses the existential struggle of a faith that maintains God's benevolent intentionality in the face of God's ambivalent power in experienced reality. According to Luther, faith appeals to God against God, struggles with God, and does not let God go until it is blessed.[39]

This struggle does not contradict scientific findings. On the contrary, it is occasioned by the very reality that science explores. This reality is deeply ambiguous—both supportive of life and hostile to life. "Science subjects itself to the facts, faith rebels against them" (Gerhard Theissen, quoted by Drees 1990, 180). The promise of the gospel lures the human being to imagine, think, and strive beyond the apparent limitations and necessities of reality. It undermines cynicism, fatalism, and despondency. In doing so it gives the scientific enterprise a rationale, a motivation, a direction toward a dynamic vision of comprehensive well-being.[40]

Moreover, for Luther the proclamation of the gospel—the message that God, the ultimate Source and Criterion of reality, is for us and with us and not against us—changes the way we see reality.[41] Meaninglessness turns into purpose. Depression turns into joy, gloom into hope, frustration into redeeming love. One begins to see the loving hand of God in all of reality. Faith, and only faith, gives purpose to a meaningless reality.

Extrapolated into the terms of our topic, a believer begins to see that natural law is part of the creative and redemptive intention of God, that

without natural law intentionality would remain without effect, that material reality has a price, that life presupposes death, and that authenticity depends not on perfection but on participation in the creative, redemptive, and transformative project of God.

Suffering Acceptance and Transformation

Reference to the divine vision brings us back to the core of Luther's theology. God's suffering and transforming acceptance of the unacceptable reverses the order between authenticity (righteousness) and acceptance. The urge for transformation is maintained, but authenticity changes from a *condition* of acceptance to a *consequence* of acceptance. God's unconditional acceptance stands in contradistinction to a demanding, inciting, judging, and condemning law that makes acceptance conditional on moral achievement or excellence.

The reversal of the order between authenticity and acceptance has immense repercussions in all spheres of life, including the scientific-technological enterprise. Spouses accept each other in spite of disappointed expectations. Parents accept their children in spite of their immaturity and waywardness. Citizens accept their governments and administrations in spite of inefficiency and corruption. Scientists accept the boundaries of current insights. Technicians accept inefficient gadgets. The aged accept their ailing bodies and their imminent demise. Employers accept the fallibility of their employees. National economies accept the scarcity of their resources. Producers accept the inadequacies of their factors of production. Consumers accept their limited incomes. Believers accept the fact that the reality of which they form a part is not perfect.[42]

But in all these cases acceptance happens in view of transformation. It has an inner rationale. There is a vision—the vision of comprehensive optimal well-being. Hefner speaks of a "concept of wholesomeness" (1993, 265). Acceptance is an invitation to participate in God's creative and redemptive project. It is an expectation that motivates and energizes; it does not oppress and humiliate. In contrast to Philipp Melanchthon and Calvin, Luther does not propagate a "third use of the law" that prescribes human behavior after they have been forgiven their sins. Involved in the new life of Christ and guided by the Spirit, believers know God's mind and act accordingly. They need no law.[43] But they also know that apart from participation in God's creative and redemptive love humankind needs provisional formulations of what should be deemed acceptable. This includes morality as well as statutory laws.[44] Because participation in the new life of Christ is a constant struggle against their old sinful nature, even believers need such guidelines. They can be gleaned from or informed by the combined wisdom of humankind, including both the Bible and classical antiquity.

The Criterion—God's Vision of Comprehensive Well-being

Ethical guidelines are motivated by God's creative and redemptive love but given concrete shape through our God-given observation and reason. As we have seen, the fact that humans are condemned to be free, to take decisions, to account for their motives and live with their consequences, necessitates the development of criteria. Moral codes and legal systems are meant to set up basic parameters for acceptable behavior.

There are two pitfalls here that Luther's approach addresses. First, such codes can become absolute, inflexible, and counterproductive if their basic rationale is not recognized. This has happened often enough in the history of Judaism, Christianity, and Islam. The subjugation of women in a patriarchal society is a good example. As Thomas Kuhn has shown, science also tends to absolutize certain apparent nonnegotiables.

Second, apart from their specific contents, all conditions of acceptance tend to enslave. This phenomenon operates in all cultures and in all dimensions of life. If one does not toe the line of Marxist-Leninist or fascist ideology, one ends up in social rejection, gulags, and concentration camps. Unless one is driven by the liberal-capitalist achievement norm, one drops out of the formal economy. One is terrorized by peer pressure, bound to the example of significant others and reference groups such as film stars and sports heroes. One is not open to the possibility that the assumptions of one's academic discipline may be flawed.

For Luther, as for the New Testament, there is a singular flexible and dynamic metanorm, namely, participation in the creative and redemptive love of God as manifest in Christ. This is not a set of rules that is defined once and for all. It is nothing we have to achieve. We are involved in and empowered by the new life of Christ rather than drawing on our own resources. According to the New Testament, God has a vision—the vision of comprehensive well-being. Any deficiency in well-being in any dimension of reality is the target of God's concern and thus the target of our concern. This has had far-reaching consequences for the way humans perceive reality.[45]

Suffering Acceptance and Sacrifice

Unconditional acceptance of the unacceptable implies suffering. This is true for both the accepting and the accepted party. God exposes Godself to the human, social, and earthly lack of authenticity and suffers the consequences. It is not humans who give sacrifices to God but God who gives sacrifices to humans.[46] That is the meaning of the incarnation and the cross of Christ. When called into God's fellowship, however, believers expose themselves with Christ to the imperfections of reality. They take the cross

upon themselves. Their motive is not perfection but transformation. They will become part of God's suffering.

Once we translate the gospel of suffering, transforming acceptance from its narrow moral connotations into the wide spheres of physical, social, earthly, and cosmic reality, it leads us to surprising insights. The law of entropy is the price God pays for having an evolutionary process in the first place.[47] The occurrence of tsunamis is the price God pays (and we have to pay) for an earth that allows the development of life. Death is the price God pays (and we have to pay) for having life.

It is God who sacrifices so that we can live. But God also expects us to be involved in God's sacrifice so that others can live. Unnecessary suffering, imposed deficiencies, and premature deaths are void of meaning and must be overcome. Life should flourish. But judicious frugality, suffering for others, and a mature death are part of God's sacrifice for the sake of the flourishing of life. As such they are immensely meaningful. This is true not only for family, community, and society but also for humanity as a whole and the rest of the natural world.

Once we enter these larger realms, faith links up with science. Mass famine and ecological disaster can be averted only if a critical mass of humankind accepts that sacrifice is indispensable and becomes willing to act accordingly. This planet will be saved not by the message that legitimates the profit- and pleasure seeking of "economic man" but by the message of the cross. (For more detail see Nürnberger 2002, 280–89.) There is a future to be won, and, following a monistic worldview, it is to be won right here in this world.

Suffering Acceptance and the Inerrancy of the Scriptures

"Only the Scriptures" (*sola Scriptura*) is one of the pillars of Protestantism. "Back to the sources" (*ad fontes*) was the humanist battle cry against an ecclesial tradition gone astray. For Luther it had an important, but limited, significance. The Scriptures are valid and binding only because and only as far as they witness to God's creative and redemptive love in Christ. What matters is the gospel of God's suffering, transforming acceptance of the unacceptable in contradistinction to a demanding, inciting, judging, condemning law. Whatever does not reflect this dialectic is not binding for us. In contrast to Calvin, therefore, Luther applied the gospel as a metacriterion to the Bible itself. He did not do so consistently, and there are lots of biblicist arguments in Luther's works. However, the thrust of Luther's approach is not biblicist, let alone fundamentalist.

The doctrine of the inerrancy of Scripture is a product of the "Protestant Orthodoxy" of the seventeenth century.[48] It tried to match the massive

doctrinal system of the Catholic Reformation and needed an axiomatic foundation for doing so. It is based on the metaphysical assumption of the perfection of God and the flawless inspiration of Scriptures as the Word of God. It is a deductive, not an exegetical, statement.

The Bible itself has a completely different message. It witnesses not to perfection but to transformation. God picks up compromised characters and transforms them into instruments of God's redemptive project (see Nürnberger 2002). This is a process in time. Applying the gospel of suffering, transforming acceptance to the Scriptures, we have to forgive them their provisional, historical-cultural, situational, highly problematic character and see whether we can formulate the message in more appropriate and more contemporary terms.

This is of decisive importance for the fruitless conflict between the pseudoscience of creationism and normal science.[49] Lutheran theology has no problem with recognizing the metaphorical or mythological character of biblical statements. We should concede that Ancient Near Eastern worldviews are prescientific and now obsolete. We should try to unearth the theological intentions behind biblical statements on creation and subject them to theological scrutiny. But we should not assume that biblical revelation is a substitute for scientific research.

How Does the Gospel Concern the Scientist?

As a pure method science is impervious to faith. Two plus two is four, irrespective of one's convictions. But science is not pure method. It operates within a frame of reference. It is a motivated human pursuit. It is built on definite assumptions. It follows predefined procedures. It has clear-cut goals. It is a massive multinational institution. It devours vast quantities of public resources. It interacts with technology. It serves commerce. It feeds powerfully into the modern consumer culture.

As a social force of the first order, science has helped to create weapons of mass destruction. It has lowered the death rate of the population without lowering its birth rate, thus creating an unprecedented population explosion. It has dislodged the ancient cultural, social, and moral foundations of vast sections of the world population, creating anomy and disorientation. It often serves particular interests in society at the expense of the interests of other sections of the society or nature. It has siphoned off financial means that might have taken masses of people out of misery.[50]

There is no value-free science. Scientists need meaning, acceptability, and authority as much as anybody else, the more so because science is being trusted by the population: "Faith in science has become the dominant religion of our times" (von Weizsäcker 1990, 405). As Luther keenly observed, the question is not whether God exists but to which God we entrust ourselves, from which God we expect our "salvation," to which

God we are willing to surrender our lives. Faith makes both God and idols, he said.

Science can serve the human claim to absolute autonomy. This may be the most proximate temptation of the scientist as seen from the perspective of the Christian faith. The metaphysical assumption that experienced reality is all there is serves a particular kind of agenda. It suggests that the awareness of the embeddedness of humankind in transcendent contexts, value judgments, and accountability are irrelevant. There is no meaning. All cosmic processes are pointless. Humans are beefed-up baboons without further significance, as a biologist recently told me.

This sounds like a call to humility. However, scrap transcendence, and humans become their own highest authorities. They can act either responsibly or irresponsibly. In modernity the latter has become the norm on a vast and dominating scale: "human decision has conditioned virtually all of the planetary physico-biokinetic systems, so that human decision is the critical factor in the continuing functioning of the planet's systems" (Hefner 1993, 265). Modern humans, endowed by science and technology with unprecedented power but without concomitant accountability, have become dangerous to their own survival and that of the earth.

The will to power of individuals such as Adolf Hitler, Joseph Stalin, Idi Amin, Pol Pot, and Robert Mugabe has shown that humans are not designed to be absolute. The intolerable and growing discrepancies in income, wealth and life chances, as well as the impact of human rapaciousness on the natural environment, show that a liberal worldview without transcendent accountability does not serve humankind and the earth very well.

Alternatively, science can become a tool of human participation in God's creative and redemptive project. It does not have to adopt the theological language of a bygone age to do that. It can help theology to reconceptualize its message in line with modern insight. It can enhance human awareness of derivation, dependence, ambiguity, guilt, responsibility, vulnerability, and mortality. It can lead to awe and humility. It can lure humanity into closer approximation to God's vision of comprehensive optimal well-being. True science does not contradict true faith. It can serve true faith and do so with integrity and conviction.

The quest for meaning, acceptability, and fulfillment through scientific discovery alone, through technological mastery alone, through profitability alone, through material enjoyment alone, is a wild goose chase. But science, technology, commerce, and consumption can become profoundly meaningful if they are embedded in the greater contexts of divine creativity, benevolence, and vision. Science needs faith to be responsible. Faith needs science to be plausible. Luther's experiential theology shows us how the two are linked together.

NOTES

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1. This is a more precise rendering of Ted Peters's concept of "hypothetical consonance" (1989, 13ff.). My approach is not a simple "two-language theory" (p. 16), where the two languages have nothing to say to each other.
2. "There are objective and final criteria assuring the correctness of a scientific statement" (Heisenberg [1958] 1999, 194).
3. There is a curious acceptance of the dogma of *creatio ex nihilo* (creation out of nothing) in the science-religion debate about creation (for example, Russell, Murphy, and Isham [1993] 1996) and the dogma of an eschatology informed by apocalyptic (for example in Peters, Russell, and Welker 2002). Considering the diversity and fragility of the scriptural sources, the existential meaning of these statements, and the status of current hermeneutics, one cannot suppress the feeling that a dogmatic fundamentalism has crept in through the back door. Moreover, many systematic theologians do not seem to take into account that the classical doctrine of the Trinity is a combination of reified biblical metaphors (father, son, spirit), Platonic abstraction (from historical experience to timeless "eternity"), and logical deductions made from such reifications (for example, Peters [1993] 1996, 263ff.). Confronted with the criteria of science and technology, a faith based on such constructs inevitably runs into cognitive dissonance. In view of a modern hermeneutics that unearthed the metaphorical character, historical-cultural origins, immense variability, and existential rationale of such statements, the intense and intricate debates about these issues seem to have hovered off into the stratosphere of the unreal. To make sense of such statements in terms of contemporary science we must retrace the path that has led from historical faith experience couched in metaphor to doctrinal proposition informed by Platonic metaphysics.
4. Willem B. Drees contrasts assumptions of consonance between theology and science with assumptions of the painful "absence of God" in the world and locates the function of theology in the realm of the latter (1990, 5f.).
5. Moti Ben-Ari (2005) gives an accessible characterization of the scientific enterprise in contrast to pseudoscience.
6. This has been persuasively argued by Lawrence E. Cahoone (1988).
7. A comprehensive and accessible overview is offered by Bill Bryson (2003).
8. For a deconstruction of this view see Greene 2005, 272ff.
9. I use the concept of entropic process as a metascientific category. The second thermodynamic law is only one of a number of expressions of the underlying mechanism. For an overview see the Wikipedia article on "entropy" on the Internet.
10. Both Philip Clayton and Stuart Kauffman believe that reductionism (physicalism) is as untenable as dualism. For unfazed reductionism see Ben-Ari 2005, 141ff. Regularities at lower levels certainly feed through to higher levels, while higher levels nevertheless constitute genuine novelty as well as downward causation. Chaos theory suggests that power balances within initial conditions at any given point in time and space and the resultant switches in direction may explain seemingly contradictory causal relationships—which means that historicity is part of the equation.
11. A lucid and illustrated depiction of the relation between cosmic, solar, terrestrial, and organic evolution is offered by T. McCarthy and B. Rubidge (2005).
12. According to Carl von Weizsäcker orthodox Darwinism implies teleology because evolution produces converging patterns of optimal (most effective) solutions such as eyes or wings (1990, 422).
13. Experiential awareness of dependence must be distinguished from the metaphysical postulate of ontological dependence proposed, for instance, by Langdon Gilkey (as quoted by Russell [1993] 1996, 295ff.).
14. Immense work has been done in the fields of anthropology (by Emile Durkheim, for example), sociology (Peter Berger and others), and the phenomenology of religion (Rudolf Otto and Gerhard van der Leeuw).
15. The motive behind creation narratives is not the same as the motive behind theories of origination, even though their mythological character seems to suggest that (Heller [1993] 1996, 98f., 101).

16. "Vast numbers of people in that secularised world . . . are rudderless and, basically, hopeless" (Arthur Peacocke, in Hefner 1993, ix). See also von Weizsäcker 1990, 424f.

17. "A cosmic trajectory, which had its origins in what seems to have been mere physical movement or vibration, has . . . gradually developed increasing directionality, ultimately creating a context within which deliberate purposive action could emerge and flourish" (Kaufman 2004, 46). "The unavoidability of freedom rests in the fact that freedom itself has emerged from a causal process that was impersonal, highly determined as it unfolded, and . . . much less complex and sophisticated than that which emerged from it" (Hefner 1993, 97).

18. "Physics constrains metaphysics but does not determine it, rather as the foundations of a house constrain the edifice that can be erected upon them but do not fix its detailed form" (Polkinghorne 2006, 975).

19. For the evolution of the biblical tradition see Nürnberger 2002.

20. "We shall take the simpleminded view that a theory is just a model of the universe, or a restricted part of it, and a set of rules that relate quantities in the model to observations that we make" (Hawking 2005, 13).

21. I do not provide detailed references on Luther in this essay. Extended references can be found in Nürnberger 2005. Other well-known depictions of Luther's theology include those of Paul Althaus, Roland Bainton, Gerhard Ebeling, Lennart Pinomaa, Heiko Oberman, and Oswald Bayer.

22. Richard Dawkins's *The God Delusion* (2006) presupposes that immanent reality is all there is. Any God who existed would have to operate within immanent reality as part of immanent reality, and obviously such a God does not exist.

23. One has to distinguish between gaps in scientific insight that can in principle be closed, for instance the emergence of life or the emergence of mind, and areas that are inaccessible to scientific exploration in principle such as what was "before" the Big Bang or "outside" the cosmos, where energy comes from, why mathematically traceable regularities exist, why there is something rather than nothing, or what might be valid criteria of what ought to be.

24. As a biblical scholar Luther was strongly affected by assumptions found in the Old Testament. Augustine influenced him in particular ways, but he was critical of classical metaphysics, especially Aristotle. Toying with nominalism for some time, he developed his own stance, namely dynamic universalism (Buddeberg 1962).

25. Gilkey comes close to Luther when he declares that creation and preservation are "different aspects of the simultaneous activity of God, who continually gives to all that arises existence and form, molding the new as well as preserving the old" (quoted in Russell [1993] 1996, 295). Peacocke's and Ian Barbour's stances are similar (Russell [1993] 1996, 296ff.). However, the concepts of ontological origination or pure relationship for the dependence of reality on God are metaphysical postulates, while Luther's concept is geared to actual daily experience. In the explanation to the first article of the Creed in the Small Catechism, Luther writes: "I believe that God has created me and all that exists, that he has given me and sustains my body and soul, all my limbs and senses . . . together with food and clothing . . . he provides me daily with all the necessities of life" (Tappert 1959, 345). The concept of *creatio ex nihilo* that plays such a dominant role in the argument is a metaphysical construct not found in the biblical creation stories or in the existential experience of faith. Paul's use of the motif in 1 Corinthians 1:28ff. and 2 Corinthians 4:6ff. refers not to *ex nihilo* creation but to transformation.

26. Son of God and Image of God are Ancient Near Eastern titles for the king as representative and plenipotentiary of God on earth (see Psalm 2).

27. The assumptions that God has created the world *ex nihilo* and will reconstitute the existing world in an eschatological future are taken, in much of the science-religion debate, as unproblematized axioms without considering their cultural-historical origins and their existential-experiential basis. In view of current hermeneutics these debates have become quite unreal and in a way similar to fundamentalist arguments. An example is the intricate discussion about the Big Bang depicted by Robert J. Russell ([1993] 1996).

28. "The rationality of the Creator is reflected in the created world" (Heller [1993] 1996, 103).

29. The most radical and most controversial development of this thought is found in his treatise against Erasmus called *De Servo Arbitrio* (The Bondage of the Will) (Luther [1525] 1972, 3).

30. This is powerfully depicted by von Weizsäcker (1990, 405ff.). However, many scientists accept the ambiguity of reality as inevitable. "In a universe of blind physical forces and genetic replication, some people are going to get hurt, other people are going to get lucky, and you won't find any rhyme or reason in it, nor any justice" (Dawkins 1995, 132f.).

31. Luther's observations mesh neatly with those of many if not most primal religions. Here the Supreme Being is omnipresent as the Source of the forces that constitute reality, yet "he" is inaccessible, unknowable, does not speak, does not hear. But there is also no rebellion against the inevitable. The result is a fatalistic attitude to life (Nürnberger 2007, 29ff.).

32. Pannenberg proposes the scientific concept of *field* as analogous to God's Spirit that is permeating the whole of reality (1989, 165). However, the Western theological concept of Spirit is linked to the Christ event. Moreover, one has to avoid a theological version of reductionism. God is the Source of experienced reality as a whole.

33. I agree with Drees (1990, 6) that theology is geared to the conflictual rather than the consonance model. However, conflict can occur only where experienced reality is taken seriously as it is.

34. Alister McGrath (2005, 84ff.) goes way too far in his denial that faith is trust. Although not blind trust, it is indeed self-entrustment.

35. This has been recognized by Jürgen Moltmann, especially in his *The Crucified God* (1974), but overlooked or neglected by many other theologians in the science-religion debate.

36. It is fascinating to juxtapose Luther's position with that of Dawkins: "We have the power to defy the selfish genes of our birth and, if necessary, the selfish memes of our indoctrination. We can even discuss ways of deliberately cultivating and nurturing pure, disinterested altruism—something that has no place in nature, something that has never existed before in the whole history of the world. We . . . have the power to turn against our creators. We, alone on earth, can rebel against the tyranny of the selfish replicators" (Dawkins [1976] 1989, 200f.). The question is on what assumptions this rebellion is based and whether it has any inkling of the sacrifices involved (the cross).

37. The contrast was articulated in Luther's stance on the presence of Christ in the Eucharist. "[God's right hand] is not a definite location . . . but the mighty power of God that . . . must be present and active everywhere—even in the tiniest leaf of a tree . . . if he is to create and uphold, he must be present . . . in every creature, in its innermost and outermost being, all around, through and through, above and below, behind and in front, so that there can be nothing more present, nothing more intimately connected with every creature than God and his power" (Luther [1527] 1961, 55).

38. Peters ([1993] 1996, 283) does not seem to see that this rendition of the Trinity implies pantheism, which he rejects.

39. I would suggest that Hefner explore the element of defiant protest in his treatment of theodicy (1993, 271).

40. Stuart Kauffman, a mathematical biologist who rejects the notion of a personal Creator, nevertheless appropriates the symbol of God for the creativity found in the evolution of the universe (2008, 281ff.). The same is true for theologian Gordon Kaufman (2004). In this sense they are close to Luther's *Deus in vita*. Three questions come to mind: (1) Creativity is a metaphor that demands a subject—Who or what is it that creates? For Kauffman God is "the unfolding of nature itself" (2008, 287). But then nature becomes absolute—which makes human freedom from and responsibility for nature problematic. (2) Can one escape fatalism, even cynicism, when confronted with the ambiguity of reality? In Luther the concept of the hidden God is transcended with the concept of the revealed God. (3) If the human being, as the peak of the evolutionary hierarchy, is not transcended toward a personal transcendent Other, does the human being itself not become its own ultimate authority and thus the owner and master of reality? This is the aspiration of modernity that has brought us to the brink of disaster.

41. In his Gifford lectures (2009) McGrath argues that Karl Barth's rejection of a natural theology juxtaposed an approach from above (revelation) and an approach from below (anthropology). In response, McGrath tries to develop a natural theology that presupposes revelation in Christ. This seems to be in line with Luther (and Barth). But in which sense does revelation in Christ describe the ambiguous nature of empirical reality? Does it cover depravity, suffering, death, and the law of entropy? What role does the cross play in this natural theology?

42. Frank Tipler's Omega Point is a metaphysical version of conditional acceptance: If not every decision follows the rule, there is no Omega Point (Drees 1990, 139).

43. For Calvin the law is foundational like the rail of a train. Sin is a derailment, and the gospel is the emergency measure that puts the train back onto the rail where it must continue to move. For Luther the gospel is foundational: We are supposed to be free like eagles. Not the gospel but the law is the emergency measure. When the eagle crashes into a power line he is put into a cage to prevent further damage. But when healed he is released into the open skies where he belongs (Nürnberger 2005, 112f.).

44. Barth was on track when he demanded that such guidelines must reflect divine intentionality as manifest in Christ, although Lutherans would not call them "the law" or a "third use of the law." See his essay "Gospel and Law" in Barth 1968, 71ff.

45. "The world was changed through the religion of love," namely through the three-pronged struggle between the gods, Christianity, and secular reality (von Weizsäcker 1990, 414f.).

46. For the evolution and inversion of the concept of sacrifice in biblical history see Nürnberger 2002, ch. 10.

47. "Entropy will be the price paid for depth" (Peters [1993] 1996, 274). Depth is here understood as "growth in organized complexity"—that is, evolution.

48. See Nürnberger 2002, 27ff.; 2005, 88ff. Modern evangelical versions are directly derived from the historical original. This original can be found, for instance, in Schmid [1875] 1961, ch. IV.

49. For a refutation of pseudoscience see, for instance, Ben-Ari 2005, 79ff.

50. "The catastrophic effects of these and many other evils are, if anything, enhanced by the irresponsible application of the technology that science engenders" (Peacocke, in Hefner 1993, ix). See also Heisenberg [1958] 1999, 192ff.

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