

Critical Faith: Theology in the Midst of the Sciences

An Essay in Honor of Dr. Jan Peters

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It is a special privilege to be able to honor Father Jan R.T.M. Peters, SJ, on the occasion of his retirement as Vice-President of the Radboud Universiteit Nijmegen. Dr. Peters' leadership in both church and academy is well known. He has served as chair of the department of Middle East Studies in what was then the Katholieke Universiteit Nijmegen, and as a member of its Board of Governors. His contributions at the national level include notable service on the Research Council for the Humanities in the Netherlands Organisation for Scientific Research and a period as Chair of the Council for the Humanities in the Royal Netherlands Academy of Arts and Sciences. Among many international honors Father Peters has served as president of the Federation of Catholic Universities in Europe and president of the International Federation of Catholic Universities.

Two features of Father Peters' long career in particular help to explain the dedication of this booklet in honor of his retirement. The first is his commitment as a Catholic scholar to the study of and dialogue with Islam. Following studies in Beirut, Father Peters received a degree in Arabic Studies in 1972 and completed his dissertation in 1976 which analyzed the conceptual system of the Muslim theologian 'Abd al-Jabbâr (*God's Created Speech*, Leiden 1976). Throughout his career he pursued and encouraged deep study of the Muslim traditions, both as a scholar and as a church leader. As a Catholic Islamicist, Dr. Peters has modeled an openness to and respect for other religious traditions that serves as an ideal for theologians today. The other ground for the dedication is Father Peters' role as one of the founders of the Heyendaal Institute for theology, sciences and culture at Radboud Universiteit Nijmegen, one of Europe's leading interdisciplinary research institutes. The Heyendaal Institute has the mission "to contribute, by means of selected interdisciplinary research constellations and themes, to concrete insight into the processes, forms and contents of meaning and religion in a context marked by both growing disorientation and an increasing need for reorientation." In the end, it is this set of ideals, in the formulation of which Dr. Peters played no small part, which has inspired the suggestions that follow concerning theology among the sciences.

This exploration is divided into eight sections:

- The new context for theology
- Theology concerned with the question of its own truth
- Theology beyond established conclusions: the model of Charles Sanders Peirce
- Theology, inquiry, and the nature of discursive communities
- Theology, the Academy, and stage-three discourse
- Theology in the midst of the sciences

- Three examples of theology among the sciences
 - (1) Quantum physics and metaphysics
 - (2) Emergence in biology
 - (3) The neurosciences and consciousness
- Should theology take the risk?
- Conclusion

THE NEW CONTEXT FOR THEOLOGY

In this essay I cannot match the concrete comparative work that Jan Peters has done across the course of his career. But it is my hope that this booklet will be able to honor it in a different way: by attempting to develop a programmatic model for theology that is consonant with Father Peters' career and contributions. Inspired by the work of Dr Peters and others, this essay expresses the ideal for a style of theology — of believing, critical reflection — that does not yet exist, or at least has not yet been formulated in a rigorous enough fashion that it can be consciously pursued and emulated. I thus mean this little booklet to offer nothing less than a *manifesto for a credible theology for the 21st century*.

"Credible" involves a *double entendre*. The first meaning of "credible" is *plausible*, that is, something we don't have reason to doubt, to impugn, or to discard. Thus the theology in question must be academically respectable; it must be one that can hold its face up in the Academy. The second meaning of "credible" is *worthy of confidence or believable*, and indeed *believable for good reasons* — or, as the dictionary puts it, "offering reasonable grounds for being believed," as in "a credible account of an accident" or "credible witnesses."¹

First then, the new context for theology. It is time for religious persons to acknowledge that there really are good reasons for questioning many traditional religious beliefs, and indeed for wondering whether religious truth claims are still viable in today's context, and if so how. These reasons include:

- the ascent and unprecedented success of the sciences;
- a consequent naturalism, which broadens the scientific way of thinking into a metaphysical stance, a worldview-level assumption;
- the context of religious pluralism, that is, multiple religions and multiple live options for religious belief. This plurality tends to have a self-cancelling effect when contrasted with the culture-transcending nature of science;
- the predominance of secular worldviews and lifestyles; especially,

- widespread secularism within the Academy in most countries, with the result that religious belief and practice tends to be identified with uneducated persons and atheism with the educated elite;
- the classic liberal distinction between the "public" and "private" spheres, with all matters of religious belief falling into the "private" realm;
- the tendency to equate public sphere matters with "objective" and private sphere matters with "subjective," leading to a pervasive relativism regarding all religious matters.

Note that most of these factors do not apply to the various disciplines that fall under the rubric of "religious studies" (*die Religionswissenschaften*), which have gained very significantly vis-à-vis theology within universities today. The growth of Religious Studies, while not directly about theology, tends to lend weight to the (now widely accepted) argument that theology no longer belongs as an academic discipline within the university today. Many intellectuals now take this conclusion to be obvious; indeed, many now question whether intellectuals should engage in theology at all, at least with anything more than archeological interest. Perhaps, they suggest, Christian beliefs should be studied only in the way in which we study the Greek gods: as an interesting part of the legacy of Western civilization, but not as a viable object of reasonable belief.

These and other challenges to the existence of theology within the university require us first to specify more precisely what we mean by "theology." Some years ago I defined Christian theology as "level-two discourse concerning level-one beliefs, attitudes, and practices of the Christian community."² More generally, then,

as critical inquiry, [theology] is concerned with redescribing the level-one data in a systematic and self-critical manner; it is therefore methodologically related to critical inquiry in other disciplines. Because theology results in clarification of beliefs and practice, it is of vital concern and assistance to the church, and may in this sense be said to work in the service of the church. Yet because this clarification of Christian belief necessarily involves dependence on categories not drawn from the Christian tradition, as well as the use of general notions such as truth, meaning, and reference, Christian theology will also find itself in vital discourse concerning material issues with science, philosophy, and other theologies.³

A theology of this type continues to presuppose the life of faith; it is thus, in some sense, believing reflection.

But in what sense? The life of faith that provides the “level one” for this new type of theology may look very different from the life of faith of our forefathers. (I do not find this difference threatening, but many do — even heretical.) For it is now a life of faith that does not exclude but includes doubt, and radical questioning, and sometimes even despair within the normative, everyday experience of faith. The phenomenology of this sort of faith has been worked out in the various publications of the Flemish philosopher of religion Louis Dupré, my doctoral advisor at Yale and one of the early advisors to the Heyendaal Institute.⁴ It’s a faith not defined by a pre-existing realm of the sacred, radically set off from the “profane” (hence corrupt, “fallen”, morally suspect) world. Rather, faith of this sort exists in, with, and through the world’s ambiguities and uncertainties. It is troubled by the problem of evil, though not completely destroyed by it; it is humbled before other religious traditions, though not ready therefore to proclaim the equivalence of all faiths; it is respectful of the power of scientific predictions and explanations, though not prepared to reduce the spiritual dimension to what science can grasp of it.

In *Explanation from Physics to Theology* I described this sort of believer as the *secular believer*:

The secular believer may address skepticism using the formulations of his religious tradition. But, because doubts are no longer external to his religious belief, the effort to answer them in a generally acceptable manner becomes an intrinsic part of the life of faith.... The point here is that this effort does not need to be external or reductionistic to religious belief, but *it can instead be internal to the dynamic of belief*. Secular believers might take the well-known quote from Diderot as their motto: “Doubts in the matter of religion, far from being acts of impiety, ought to be seen as good works, when they belong to a man who humbly recognizes his ignorance and is motivated by the fear of displeasing God by the abuse of reason.”⁵

Recall again the reciprocal relationship that exists between the life of faith and the manner in which one pursues and understands theology. A religious practice that depends upon the possession of absolute truths correlates with a theology that sees itself as the repository of unchanging dogmas and completed revelations. By contrast, a religious life that embraces doubt and ambiguity correlates with a theology that exists with humility in the midst of the sciences, one laborer among many.

Conservatives among my theologian friends criticize this view for dispensing with the certainty of faith, for encouraging what are to them unacceptable revisions to the content of theology, and for baptizing doubt (as it were) rather than exhorting believers to avoid it.⁶ The more radically liberal thinkers among my theological friends castigate the same position for its claim that believing reflection is still possible within the Academy. With attacks like these on both sides, one can easily feel like “the charge of the Light Brigade,” as recorded by Alfred Lord Tennyson:

Cannon to the right of them,
Cannon to the left of them,
Cannon in front of them
Volleyed and thunder'd;
Storm'd at with shot and shell,
Boldly they rode and well,
Into the jaws of Death,
Into the mouth of Hell,
Rode the six hundred.

Actually, though, it may be a good sign when one is shot at from both sides: resistance and hostility from certain sides may serve as evidence that the theology of believing doubt is on the right track. We *should* respond to our more absolutistic brethren by reminding them that, whatever level of certainty they may experience on the inside, the public face of a theology appropriate to today's Academy and society must dispense with *a priori* certainty and the accompanying dogmatism. At the same time we should respond to our critics on the other side that our openness — to science, to other religions, and even to the possibility of final skepticism and nihilism — is not the antithesis of believing and does not make the life of faith and practice impossible. The first step is actually to construct, and to live, a viable model of critical faith. The second step, and the major emphasis in what follows, is to advance a credible account of the sort of theological reflection that corresponds to this critical faith. If we are successful in both steps, we will have shown that the throw-up-your-hands-in-despair hopelessness of our post-religious colleagues is neither norm nor necessity. Many have ceased to believe, and many more will; it behooves us to take seriously the reasons that have compelled them to their unbelief. But, I suggest, the skeptics are mistaken in concluding that abandoning belief altogether is the only recourse for modern, educated men and women today.

What is the most honest response to these concerns and worries? It is, I suggest, to *acknowledge the possibility of the impossibility of theology*. What many believers fear but are hesitant to acknowledge publicly, and what many nonbelievers presuppose as a fait accompli — it is this possibility with which theologians today must grapple. Indeed, perhaps it's necessary for us to consider an even more radical possibility: *perhaps we must build the problematic nature of theology into theology itself as a fundamental feature of how theological reflection is carried out in the academic context today*.

THEOLOGY CONCERNED WITH THE QUESTION OF ITS OWN TRUTH

A key step in this direction was taken by Wolfhart Pannenberg, whom I acknowledge as my mentor and as the inspiration for many of the ideas developed in this proposal. Pannenberg begins his *Systematic Theology* with the claim that theology must thematize the question of its own truth:

If the dogmas of Christians are true, they are no longer the opinions of a human school. They are divine revelation. Nevertheless, they are still formulated and proclaimed by humans, by the church and its ministers. Hence the question can and must be raised whether they are more than human opinions, whether they are not merely human inventions and traditions but an expression of divine revelation. Thus there arises once again, this time with respect to the concept of dogma, the truth question that is linked more generally to the concept to theology...⁷

From the start of this work Pannenberg insists that Christian theology include its own prolegomenon within itself, insofar as the authority — and truth! — of scripture cannot be presupposed at the outset but must be attested in the process of doing theology. For the collapse of the scripture principle in modern thought “simply invalidated the attempt to use the idea of verbal inspiration to establish the divine truth of scripture in all its parts as a presupposition. This thesis ... could no longer be maintained in the face of new scientific, historical, and geographical evidence” (ST 1:46). Instead, scripture must be viewed as a historical record of the origins of Christianity, and in this sense as an indirect authority. Nor can individual experience provide an absolute authority in questions of truth:

Individual experience can never mediate absolute, unconditional certainty. At best it can offer no more than a certainty which needs clarification and confirmation in an ongoing process of experience. This subjective certainty does indeed experience the presence of truth and its unconditionality but only in an ongoing process (ST 1:47).

The disputed nature of Christian truth claims thus provides the context in which the Christian theologian works today.

Pannenberg's career, especially in the early years, exemplifies this program. By 1961 his break with Karl Barth led him to reject the appeal to a separate, epistemically privileged "salvation history" (*Heilsgeschichte*) in favor of a search for signs of universal patterns in history that might reflect its divine source. Likewise, his 1963 Christology substituted careful historical-critical work for the traditional account of Jesus as seen through the eyes of faith. Pannenberg's powerful methodological requirement deserves citation in full:

As long as historiography does not begin dogmatically with a narrow concept of reality according to which "dead men do not rise," it is not clear why historiography should not in principle be able to speak about Jesus' resurrection as the explanation that is best established of such events as the disciples' experiences of the appearances and the discovery of the empty tomb. If, however, historical study declares itself unable to establish what "really" happened on Easter, then all the more, faith is not able to do so; for faith cannot ascertain anything certain about events of the past that would perhaps be inaccessible to the historian.⁸

True to this methodological commitment, the first volume of Pannenberg's systematic theology turns first to the history of the world religions, arguing for the fundamental nature of the human religious impulse on the basis of the early and universal appearance of religious beliefs and practices in human history. For example, atheism cannot account for or support belief in the oneness of humanity and the value of all human being:

The question arises, however, whether the concept of the unity of humanity as a point of reference for the plurality of cultures and religions does not still have monotheism as its premise. The alternative is not polytheistic religion but an atheistic version of the idea of humanity on the basis of our equality by nature. ... But is it really possible to establish human unity and equality atheistically? Can we simply presuppose unity and equality as simple facts? (*ST* 1:151).

Once humans have found reasons for looking beyond naturalism for a possible divine revelation in the midst of human history, it becomes natural, even urgent, to look to the world's religions as a locus of this revelation. Yet each of these religions has a historical existence, having been born, developed, and spread through time in response to specific historical and cultural developments. If Christianity is to merit belief on the part of

men and women today, it must show that its claims about history, as *incarnated in the life of Jesus and the history of the church*, better explain human history and human experience as a whole than do its competitors:

Religious perceptions are thus exposed to the question whether they properly fulfil their function of bringing to light the infinite in the finite. In other words, the gods of the religions must show in our experience of the world that they are the powers which they claim to be. They must confirm themselves by the implications of meaning in this experience so that its content can be understood as an expression of the power of God and not his weakness (ST 1:167).

Note that Pannenberg's insistence that Christianity (and all other religions) must establish its credentials is *not* a return to natural theology:

In this process of experience, and the awareness of God that it brings, we do not have primarily the natural theology of the philosophers. What we have is the religious experience of God by means of a sense of the working and being of God in creation. There has not been a philosophical natural theology from the beginning of creation. But in the history of humanity there has always been in some form an explicit awareness of God which is linked to experience of the works of creation (ST 1:117).

Christian proclamation is not reduced to a philosophical theory, of which Christianity is merely an example; rather, Pannenberg's concern is with the actual events of the life of Jesus. On this basis he seeks in the remainder of the *Systematic Theology* to work out the logic of this event and its implications for our understanding of humanity, the world and history.

In Pannenberg's theological method, the key question is whether theology will respond to contemporary skepticism and naturalism by "privatizing" Christian truth claims, relying on subjective religious experiences and appeals to the authority of scripture, or whether it will enter boldly into the debates about what constitutes knowledge, making the best case that it can for the indispensability of theological knowledge. The latter approach presupposes the Intersubjective Principle (to which we return below) — the principle that only those assertions should count as knowledge that are able to win support within existing discussions in and between the academic disciplines. This implies that theological assertions must have the status of hypotheses:

Theology is therefore subject to the requirement of scientific integrity which demands that theoretical models should be explicit and systematic. These, and the statements connected with them, then have the form of hypotheses.⁹

After all, "theology deals with the philosophical question of reality and must meet the criteria which apply to philosophical statements" (*TPS*, p. 339). It follows, further, that *criticizability* will serve as a criterion for knowledge, for only those assertions that can be criticized and supported within the context of an organized field of inquiry deserve the appellation knowledge.

Most crucial here is that Pannenberg accepts *the contested nature of theological truth claims*. In today's cultural context, as we have seen, claims about God can no longer be advanced with epistemic certainty. Believers *may* still experience an inner certainty in conjunction with their belief in God, but this does not justify them in claiming that their religious beliefs are equally as certain as knowledge about the empirical world. Unless we engage in what W. W. Bartley calls "the retreat to commitment,"¹⁰ we must acknowledge that Christian claims about God are indeed contested and open to dispute in the context of multiple world religions and the ongoing advance of science. Theology makes claims about the end of history, about the second coming of Christ, and about the coming kingdom of God – all future claims which remain disputable (*strittig*) until they actually occur:

An important part of this view is that it is only the end of all history which can bring a final decision about all claims about reality as a whole and thus about the reality of God and the destiny of man. Nevertheless, since assumptions about reality as a whole are unavoidable for the lives of persons in the present, it is necessary here and now to work out criteria which will make possible at least a provisional decision between them. Such a decision can be based only on the success or failure of assumptions about reality as a whole, such as are made explicit in religious traditions and philosophical models, to prove themselves in the various areas of our actual experience (*TPS*, p. 343, trans. modified).

Pannenberg's opus offers a good example of what theology looks like when it is understood to be a matter of contention (*strittig*) and to include within it the question of its own truth.¹¹ His well-known and influential position moves a quantum leap beyond traditional theologies, which usually attempt to settle the question of their own truth in advance in one of three ways. The best traditional theologies precede their doctrinal

conclusions with a prolegomenon that offers reasons to take their core assumptions as true; then, having dealt once and for all with the truth question, they think they can proceed with calmness and assurance to spell out its various implications. (Although the position of Thomas Aquinas in *ST Q2 a3* is more profound and more complicated than this, the “five ways” do lend themselves to being read in this fashion.) Another group, among which the American evangelicals are perhaps the best known today, offers arguments in their prolegomena for the authority of Scripture and then, having settled that question, appeal with assurance to that scripture to ground the truth of all further theological assertions. As the materials of the famous American evangelist, Billy Graham, put it: “God says it in His Word. I believe it in my heart. That settles it forever.” Finally, the third group — into which a surprising number of systematic theologians fall — presuppose the truth of their own theologies without ever pausing to say what they mean by this truth or why we should accept it as true.

THEOLOGY BEYOND ESTABLISHED CONCLUSIONS:

THE MODEL OF CHARLES SANDERS PEIRCE

Pannenberg’s theology is based on the fundamental conviction that God has already both revealed *and accomplished* the end of history in the life, death, and resurrection of Jesus Christ. In one sense, history waits only for the final manifestation of that proleptic event. For Pannenberg, one presumes, belief that the end of history was present in Jesus represents the minimal condition for an adequate Christian theology.

But what if we are not persuaded by his arguments for the historicity of the resurrection and the superiority of Christianity among the world religions? For those who remain unpersuaded, a more radical model of theological reflection becomes necessary. At the center of this model lies the conviction that *the life of faith is possible even in the absence of knowing* — such as knowing that the end of history has already been accomplished in the Christ event. For example, Christian discipleship might be based instead on the belief that a divinely inspired spiritual rebirth took place in the hearts of the disciples, as Edward Schillebeeckx holds¹⁷, or, more robustly, on the belief that a spiritual resurrection occurred in which the identity of Jesus was preserved “through the Holy Spirit” after his death and experienced by the disciples. A religious life based on these or similar beliefs *hopes* for an end of history where there will be “a new heaven and a new earth” and where “he will wipe every tear from their eyes; there will be no more death or mourning or crying or pain, for the old order of things has passed away” (Revel. 21:1, 4) — an end for which, in the beautiful words of Dame Julian of Norwich, “All shall be well, and all shall be well, and all manner of thing shall be well.” But it is cautious about the transition from hope to knowledge.

Now Pannenberg would be right to protest that hope alone is not sufficient for spiritual practice. And I concur: we should speak instead of an attitude of "hope-plus-faith," that is, a stance of sincere hope for a particular outcome, combined with the sort of religious life that acts as if that hope were a certainty.¹³ The obligation, moreover, is to continue to look for data and arguments that might make a still stronger case for the reasonableness of faith — or, conversely, that may undercut its reasonableness. Yet, I suggest, this stance is possible even when believers are themselves unsure whether their arguments establish the superiority of their belief position over its competitors.

To show the viability of a critical faith, two further things are necessary. First, it must continue to be a religious stance that is able to impart meaning to believers, manifesting sufficient stability to constitute a religious form of life. I am convinced that a critical faith can meet this "level-one" requirement, even if space is not available to make that case here. Second, one must develop a workable model of theological reflection appropriate to such a religious life, a model that avoids both the Scylla of dogmatic certainty and the Charybdis of a religious life without content or conviction.

The work of Charles Sanders Peirce, which combines a sophisticated theory of critical inquiry with an underlying commitment to realism, offers a crucial resource for this task. Peirce argued famously that "truth is the character which ... we may justifiably hope will be enjoyed by beliefs that survive however long or far inquiry is pursued or prolonged."¹⁴ This led him, despite (or perhaps because of) his deep religious convictions, to sharply challenge theology, which he claimed "masqueraded as a science while it was, in essence, antithetical to the spirit of science."¹⁵ As Douglas Anderson comments:

Theology thus embodies all that Peirce resisted: tenacity, authority, closure of inquiry, and absence of growth. It has repeatedly proved itself a danger to humanity, and, as Parker aptly states, theologians are "to be chastised as much for muddying the waters of religion as they are for obstructing the scientific spirit."¹⁶

Peirce believed that theology was essentially exclusive and that its primary task "was to demand adherence to a specific doctrine and to reject, usually in an articulate fashion, any deviation from this doctrine."¹⁷ After all, didn't Peirce claim that "religious truth having been once defined [theologically] is never to be altered in the most minute particular" (CP 1.40)?¹⁸

But on what grounds did Peirce conclude that theology is beyond all reform? Is it not possible to theologize in a manner that corresponds to a more open model of the religious life? Peirce described the religious life beautifully: "if religious life is to

ameliorate the world, it must ... hold an abiding respect for truth. Such respect involves an openness to growth, to development. Thus, as ideas develop through the community of inquirers, they will have a gradual effect on religious belief and subsequently on religious practices."¹⁹ He thus thought it completely reasonable, as Michael Raposa notes, "that certain religious beliefs should be revised or even discarded as a result of new scientific discoveries."²⁰ But why then believe that theology *could* never be a part of this same ongoing, open-ended process? Hence the theological program that I am defending accepts the opposite conclusion. Peirce is right to insist that respect for truth can lie at the heart of faith, allowing religious beliefs to be revised, and sometimes discarded, in light of new scientific discoveries. *But, contra Peirce, theology can be an intellectual guide to help believers determine when revising or discarding is justified and when it is not.*

I began this section by resisting Pannenberg's claim that the *sine qua non* of the Christian life is the assertion that the end has already been accomplished in Jesus Christ. We began instead to formulate a vision for theology that includes, in a more radical fashion, the possibility of its own impossibility. On this view theologians can engage in research and reflection without presupposing in advance that their research will finally confirm what they hope to be true. For example, one might engage in dialogue with other religious traditions without knowing in advance that the comparisons will favor the superiority of one's own tradition over the others. Similarly, one can engage closely with scientific results, and with the spirit of naturalism, without at present knowing that the best arguments will in the end favor the theistic position.

THEOLOGY, INQUIRY, AND THE NATURE OF DISCURSIVE COMMUNITIES

What is the epistemology, the *Wissenschaftslehre*, behind this conception? On the view advanced here, truth and the ongoing process of inquiry are deeply intertwined. Famously, Peirce held that truth is "the opinion which is fated to be ultimately agreed to by all who investigate"; correspondingly, reality is "the object represented in this opinion" (CP 5.407). Or, in his more precise formulation:

Truth is that concordance of an abstract statement with the ideal limit towards which endless investigation would tend to bring scientific belief, which concordance the abstract statement may possess by virtue of the confession of its inaccuracy and one-sidedness, and this confession is an essential ingredient of truth... Reality is that mode of being by virtue of which the real thing is as it is, irrespectively of what any mind or any definite collection of minds may represent it to be (CP 5.565).

The debate surrounding Peirce's realism and theory of truth is technical, but his basic vision of inquiry is easy to grasp — and compelling. Peter Skagestad gives it powerful expression in his classic *The Road of Inquiry*:

To Peirce, knowledge is no longer regarded statically as a body of propositions resembling a more or less finished building, but dynamically as a process of inquiry. Peirce at times described this process as a march forward towards truth as an infinitely distant goal. During this march we never have firm rock beneath our feet; we are walking on a bog, and we can be certain only that the bog is sufficiently firm to carry us *for the time being*. Not only is this all the certainty that we can achieve, it is also all the certainty that we can rationally wish for, since it is precisely the tenuousness of the ground that constantly prods us forward, ever closer to our goal.... Science "is not standing upon the bedrock of facts. It is walking upon a bog, and can only say, this ground seems to hold for the present. Here I will stay till it begins to give way" (CP 5.589).²¹

All reflection, on this view, inherently brings with it certain norms, as in Jürgen Habermas's famous concept of the "ideal speech situation." In particular, inquiry presupposes *truth* as its regulating goal: all thinking is right or wrong, good or bad, depending on whether or not it leads toward that outcome.²² Christopher Hookway puts the point nicely:

Since Peirce identifies the truth with what anyone is fated to believe, if she only inquires for long enough, it is natural to conclude that his account of reality depends upon identifying a single fundamental aim for inquiry, that of contributing to the growth of finished knowledge.²³

In the end, we must credit Peirce with recognizing two of the most basic assumptions of inquiry. First, private claims to knowledge are not enough; validity claims must be "redeemed" through critical discourse. (Habermas, following Peirce, refers to these as *einlösbar Geltungsansprüche*). The goal of the truth-seeker, as Hilary Putnam nicely puts it, is to find "a coherent system of beliefs which will ultimately be accepted by the widest possible community of inquirers as a result of strenuous inquiry."²⁴ Second, the inquirer must presuppose that inquiry is moving toward a final hoped-for consensus, even while she may be rather skeptical concerning the current results of inquiry. Peirce puts the point concisely: "Undoubtedly, we hope that this, *or something approximating to this*, is so, or we should not trouble ourselves to make much inquiry. But we do

not necessarily have much confidence that it is so" (CP 5.432).²⁵ Theology, and with it all other disciplines, exists in this ongoing *Spannungsfeld* of hope, faith, doubt, and skepticism.

THEOLOGY, THE ACADEMY, AND STAGE-THREE DISCOURSE

These Peircean insights can be developed into a full theological methodology, a new (or at least not yet widely accepted) model for theology. The demands of "procedural rationality" (J. Habermas), I will argue, involve what we might call a "third stage" understanding of the relationship between theology and the natural and social sciences.

Obviously, a "stage-three" dialogue between science and theology is meant to be contrasted to two other types of interaction. *Stage one* occurs as soon as one initiates a dialogue between the methods or theories of these two different human activities. Admittedly, initiating a sincere dialogue was no simple matter: the fact that a dialogue exists at all in our culture, and that it is now becoming important to many scientists and theologians today, already signals significant cultural changes from the earlier period of the "warfare" between science and religion. Thus stage-one dialogue represents some acknowledgment of the post-Enlightenment context for theological reflection today — an acknowledgment that was, for example, still resisted by Karl Barth and his followers and is still viewed with suspicion by a significant number of contemporary theologians. From the standpoint of stages two and three, however, a stage-one understanding of theological method is "too little, too late."

The *stage-two* dialogue between theology and the sciences adds a clear commitment to withdraw those assertions that are counter-indicated by the available evidence. This type of dialogue one associates with the spirit of Karl Popper — or better, perhaps, with the spirit of Popper corrected by the greater realism and accuracy of his student, Imre Lakatos. Like Popper, Lakatos defended a philosophy of science according to which there may be "crucial counter-evidence," although it is recognized "only with hindsight." There is falsification, but it is dependent on the emergence of better theories. Finally, there is a testing of theories against evidence, but this test involves a "reflective equilibrium" (John Rawls) or broad coherence between bodies of theory, rather than an unambiguous falsification of a specific theory by a specific set of data. As Lakatos commented, "It is not that we propose a theory and Nature may shout NO; rather, we propose a maze of theories, and Nature may shout INCONSISTENT."²⁶

Those unfamiliar with the science-religion discussion may ask, "But why do you distinguish between stage one and stage two? Is it not obvious that any theologian who engages seriously in this dialogue must already accept the commitment to withdraw those claims that are counter-indicated by the evidence?" Yet this commitment to revise claims that are resisted by the experts in various scientific fields is *not* in fact accepted by all who participate in the science-religion dialogue. Many theologians who engage in the dialogue care very little about achieving real "traction" between theology and the sciences. From their publications one infers that they are actually engaged in something closer to a process of self-discovery. They are interested in seeing what light the discussion with science might shed on their own personal beliefs — perhaps in the way that a Christian might engage in an extended dialogue with a Buddhist, not in order to raise any questions about the truth or falsity of her position, but instead only to see more clearly what it means to be a Christian. In short: in a process of self-discovery the *truth* of one's beliefs is not in question, whereas stage-two discourse is deeply concerned about distinguishing true and false beliefs. Examining the texts suggests that much of the recent theology-science encounter is more like the Christian-Buddhist dialogues than one might have suspected — even though the rhetoric used by the authors seems to promise readers something more. Real stage-two discourse in this field is harder to find than you would think.

What then is stage-three discourse? This more demanding type of science-religion scholarship embraces the full intent of the Peircean/Habermasian procedural account of rationality. Here one not only expresses the commitment to withdraw those claims that are counter-indicated by the total evidence, but one actually *seeks out* those discursive contexts in which maximum "traction" between science and theology can be obtained. Consider, for example, the relation between Jesus and history. In stage-three discourse the Christian theologian seeks to construct interchanges with contemporary historical-critical work that have the potential to maximize traction and lead to consensus among the relevant experts, whatever their faith position. One attempts to find agreement among participants concerning the life of Jesus, even when the resulting agreement may clash with the expectations brought to the table by the participants themselves.

Of course, it may well not be possible to *resolve* the various debates, at least not in the short-term. Stage-three debate is not about short-term rational resolution, but about long-term efforts to reach intersubjective agreement and reflective equilibrium. Both Peirce and Habermas acknowledge that the final convergence lies in an indeterminate

future, one that may be indefinitely deferred. Still, stage-three dialogue recognizes that the discourse obligations are present-tense. As Habermas writes: "in communicative action we orient ourselves to validity claims that we can raise only as a matter of fact in the context of *our* language, of *our* form of life, whereas the redeemability implicitly co-positing points beyond the provinciality of the given historical context."²⁷ One makes this commitment even though one cannot prove in advance that the "convergence of expert opinion" will be sufficient for truth. The link between truth and the ultimate consensus of experts thus represents a wager for all the participants.²⁸ It is a justified wager, however, since humans have no better means at their disposal for ascertaining (probable) truth and eliminating errors from among our beliefs.

In short, in stage-one discourse between science and religion, nothing is really "at stake." One hopes for better self-understanding, perhaps, but one should not otherwise speak of real "traction" with the sciences. In stage-two discourse, by contrast, one does face the potential of falsification with fear and trembling. This is the minimal commitment for a theology that can claim intersubjective rationality — that is, a rationality that is anything more substantial than "faithfulness to one's object," as T. F. Torrance so charmingly put it. Only stage-three science-religion discourse, however, represents a full investment in procedural rationality, for only at this level is one actively engaged in maximizing traction wherever possible. At this level *one's own self-conception as a theologian* motivates the need for a circle of informed (and sometimes critical) discussion partners, people who can provide more of the feedback necessary for one to evaluate one's own self-conception. Indeed, in stage three theologians actively seek out scientists and others in order to engage with them in dialogue.²⁹ This truly is theology *qua* public discourse, for here it becomes part of one's own inner theological motivation to construct and participate in the communities of discourse that provide this feedback.

One might wonder what impact stage-two and stage-three relations with science may have on the phenomenon of faith. Clearly, a religious life that is compatible with this sort of commitment to rationality will not be satisfied with quick appeals to authority; such a religiosity can co-exist with high levels of uncertainty and openness to change. Already Paul Tillich anticipated this result when he argued that there can be no true faith without an admixture of doubt: "If doubt appears, it should not be considered as the negation of faith, but as an element which was always and will always be present in the act of faith. Existential doubt and faith are poles of the same reality, the state of ultimate concern."³⁰ For those who inhabit this perspective — and they are many more than the critics of traditional religious belief acknowledge — a genuine fusion occurs between faith and the commitment to deep and ongoing criticism.

THEOLOGY IN THE MIDST OF THE SCIENCES

I have intentionally emphasized the inner dimension of critical faith, since the primary level of belief and practice is altered by the inclusion of doubting, questioning and inquiring within the heart of the religious life. But, as we've seen, the changes do not stop there: the nature of theological reflection concerning this belief and practice is also transformed. Stage-three dialogue of theology with the sciences is perhaps the clearest example: it both defines the new methods of proceeding and leads to some of the most important results.

Indeed, the stage-three commitment changes more within theology than at first meets the eye. First, theology's relationship to its own history is transformed. In the fundamentalist impulse there is an immense antipathy toward changing what theologians of the past have stipulated as the "essentials" of the faith. (The same is true of many of the pietist traditions within Europe, as well as of fundamentally creedal traditions, whether Orthodox and Catholic.) If one's primary commitment is to remain faithful to "the truth once given," then of course aiding and abetting revisions can only mean a downward slide from that truth. By contrast, the theology I endorse comes closer to the sixteenth-century *semper reformata*: revisions are a constant requirement for any tradition that wishes to speak to its contemporary intellectual and social context. While costly, they are also necessary.

Second, theology's relation to other religious traditions is likewise transformed. As the career of Jan Peters shows, it is possible to be committed both to one tradition and to the study of another; indeed, one can even *express* one's commitment to his or her tradition by studying another. Francis Clooney has formulated this point powerfully in his theses on "comparative theology":

8. As faith seeking understanding, however, comparative theology eventually involves the theologian in questions of faith, particularly in finding a response to the other tradition's faith experiences and its "articulation" of the world in scripture. For understanding cannot stop neatly at the edge of experience; nor can a close reading of theological texts ward off the possibility of beginning to see the world in part through the scriptures of that other tradition.³¹

Finally, theology's relation to science is transformed. Indeed, the principles that motivate work in "comparative theology" or religious studies are closely related to the core principles of the theology-science dialogue. I know my own tradition only by contrasting it with others, and I can evaluate the reasons on behalf of my own tradition only by imagining how they would be received by adherents of other traditions — or

even better, by presenting my reasons and hearing how others actually respond. The same is true of theology's dialogue with the natural and social sciences today. Both areas of study dispute that sharp lines can be drawn between the "inside" and the "outside" of religious belief today.³² The contemporary religious context for belief is a radically *inter-religious*, pluralistic context. And the *non-religious* context for belief is science, that is, the specific conclusions of the various sciences on the one hand, and the more general assumptions that underlie them, such as naturalism and empiricism, on the other. It no more makes sense to advance theological truth claims in ignorance of the results of the sciences than it does to argue the superiority of one religious tradition over others without knowing what they claim and what are the reasons to which they appeal.

Before we move to three specific examples, it's important to pause for a moment to consider two popular but inadequate reasons that are sometimes given for theology-science dialogue. The first runs: "*theology is a science, so it's natural that it be in dialogue with its fellow sciences.*" It's true that in Latin theology is a *scientia* and that the treatment of theology as a science was basic to much medieval and Scholastic reflection. It's also true that in the 20th century Thomas F. Torrance and other significant theologians have defended the notion of "theological science."³³ Most recently Alister McGrath has relied on similar arguments from Torrance and Barth in defending the epistemic status of theological assertions.³⁴ But an etymology doth not an epistemology make.³⁵ In *today's* context, the natural sciences are able to proceed in radically different ways and to acquire results with a different status than any theological work. Theologians have no choice but to acknowledge these differences and to defend their discipline in its distinctiveness from the way that theories are tested in the natural sciences.

The second reason runs: "*Christians can and should use science to prove the truth of Christian assertions.*" Although I happen to be doubtful that any of the classic philosophical proofs for the existence of God actually succeed as proofs, there is nothing wrong in principle with attempting to formulate philosophical proofs. By contrast, the attempt to provide a *scientific* argument for the existence of God is profoundly confused. I take it that this last claim will seem so obvious to most European readers that giving reasons for it will seem superfluous. But, amazingly, one of the most popular portions of the theology-science discussion today in the United States, called Intelligent Design (or "ID" for short), does exactly this. According to Michael Dembski,³⁶ the best *scientific* explanation for the evolution of increasing complexity in the universe is that the universe was created by an Intelligent Designer. The goal of science, I suggest, is to explain the order that we discern in the empirical world, using fundamental natural laws, traceable causal histories, and replicable experiments where possible. Any moves

to levels of argumentation at higher levels of abstraction — any arguments on “meta”-levels — are inherently philosophical moves. There is nothing wrong with philosophy, but it is not science. One does not have to be a Kantian to agree that asking about the order or purpose of the whole, or asking for the cause of the whole, or about its origin, means moving from the empirical to the metaphysical dimension.

THREE EXAMPLES OF THEOLOGY AMONG THE SCIENCES

So, then, the question concerns not theology as a science, but theology among the sciences — or better, theology in a scientific age. Having already specified the methodological requirements for such a theology and explored its epistemic status, we turn now to three specific examples. The goal is not to substitute for full treatments of these themes, for these can be found easily in the literature, but rather to trace some of the relationships between individual sciences, the philosophy and history of science, metaphysics, and theology proper. This particular goal will force us to concentrate on the transitions: between actual scientific work and results, their philosophical interpretations, the metaphysical frameworks presupposed in turn by these interpretations, and the theological positions that are compatible and incompatible with these results. To understand these transitions, I will argue, just is to understand the place of theology among the sciences.

(1) *Quantum physics and metaphysics.* One of the most interesting, and most contentious, questions in science concerns the interpretation of quantum physics. James Cushing is right to identify quantum theory as “a *partially* interpreted formalism,”³⁷ which suggests a continuum from completely uninterpreted to fully interpreted. Doing quantum physics obviously requires enough interpretation of the mathematical formalism to apply it to the micro-physical systems in question. Yet, as Cushing’s work demonstrates, doing physics does not require the degree of interpretation that allows one to choose (say) between deterministic and indeterministic theories of the world.³⁸ And it *certainly* does not require such a full interpretation that the metaphysical status of the observer is fully specified. When physicists debate the questions, “Can Schrödinger’s cat collapse the wave function, or does it take a human being (‘Wigner’s friend’) to constitute an adequately robust observation of the system?” or “Would God’s observation of a quantum mechanical system force an end to a quantum superposition?”³⁹ they have moved into the domain of clearly metaphysical debate.

Because the various interpretive questions raised by quantum physics form a continuum, one can conceive of a point — or, better, a region — between the minimal interpretation required to apply the formalism within science and the high level of interpretation presupposed in debates about a divine observer of the quantum world.

Only from within this intermediate region can one engage in rational discussion of “physics and divine action” or related theological questions. At levels of abstraction below this region of the continuum, one can make scientific statements, but they are not really perspectives on divine action. And above this region, the perspectives on divine action under discussion are not really *scientific* perspectives at all.

This example shows that the line between “scientific” and “metaphysical” is not absolute. More precisely, the transition between them actually consists of a *number* of transitions. Consider the diverse steps that are involved in the following progression: One writes down a set of quantum mechanical equations and does calculations. One interprets a specific experimental apparatus or result in light of the equations. One interprets these results as consistent or inconsistent with a broader interpretation of quantum mechanics (say, Bohm or Copenhagen). One defends Bohm or Copenhagen as “the best” interpretation of quantum mechanics. One comments on the significance of one of these interpretations for an overall understanding of quantum mechanical reality, as in the important work of Bernard d’Espagnat.⁴⁰ Finally, one interprets these conclusions in turn for their contribution to our understanding of God and divine action.

When in this progression was a metaphysical dimension introduced? Was it only with the final step? Or did it begin already with the movement from the quantum mechanical formalism to the first interpretive statement about experimental results? An “either-or” interpretation of science and metaphysics leads to a black-and-white analysis that does not do justice to the complexity of the actual discussion. Conversely, to *equate* science and metaphysics obscures the gradual progression in which scientific factors steadily play a smaller, and metaphysical factors an ever larger, role. For this reason it is best to interpret the discussions of quantum physics as progressing gradually along a spectrum from minimally to maximally metaphysical.

(2) *Emergence in biology.* Some historical perspective is required in order to see the interplay between the biological sciences at their various stages of development and the metaphysical frameworks that are correlated with them. In the early modern period taxonomy predominated; biologists worked to understand the interrelationships between species and genera. Lacking the tools to tell the evolutionary story, they created a static picture of structural interrelationships between species. The metaphysics seemed obvious: a Being of great power and perfection must have created the entire biosphere, filling it with life forms at every possible level. Since each organism appeared beautifully adapted to its own environment, biology seemed to demonstrate God’s

omniscience, providential concern for each species, and care for the beauty of the system as a whole, understood as a single timeless structure, a *plenum* of being.⁴¹

By contrast, in Darwin's account change was pervasive. Since random variation and natural selection were now responsible for all adaptations in the biosphere, no need remained for a cosmic Designer; indeed, some took the theory to rule it out. Darwin could wonder at the incredible beauty and fecundity of the adaptive responses, as in this famous passage:

It is interesting to contemplate an entangled bank, clothed with many plants of many kinds, with birds singing on the bushes, with various insects flitting about, and with worms crawling through the damp earth, and to reflect that these elaborately constructed forms, so different from each other in so complex a manner, have all been produced by laws acting around us. . . . There is grandeur in this view of life, with its several powers, having originally breathed into a few forms or into one; and that, whilst this planet has gone on cycling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being, evolved.⁴²

Indeed, from here one could (and some did) postulate a sort of life principle (*elan vital*), or perhaps a creative deity who delighted in the rich, even chaotic variations and the complex adaptive solutions with which organisms answer the challenges presented by their environments. But such a Being does not appear to be either omnipotent or omniscient, and the bloody struggle for survival within a "nature red in tooth and claw" leaves little ground for inferences to divine benevolence.

By the middle of the 20th century the so-called New Synthesis was firmly in place. It still relied on Darwin's two core tenets — random variation and selective retention by the environment — but now, biologists believed, the new science of genetics would offer a complete account of the basic units and, through them, an explanation for all biological phenomena. In its classical form, familiar through popular works by Jacques Monod and Richard Dawkins, this was a completely reductionist account: genetics plus selection should be sufficient to explain all biological change. As Dawkins correctly points out, on the reductionist model the process of variation and selection *must be* random. Tinkering by any divine force, or any ultimate purpose, is ruled out. Perhaps some weak form of deism might be advanced, where the physical basis for the process might be established; otherwise the prospects for theologians are dim indeed. There is simply no place, Monod argued, for a God who interacts with the

biosphere over the course of its history: "man at last knows that he is alone in the unfeeling immensity of the universe, out of which he emerged only by chance. Neither his destiny nor his duty have been written down. The kingdom above or the darkness below: it is for him to choose."⁴³

Today it seems obvious that genetic reductionism is not the entire picture, and biology is moving into a third stage. Systems biologists are now working out in non-reductive fashion the interactive relationships between genes and the cell environment, between individual cells, and between micro-organisms and their environments. If genetic material does not even determine the ontogenesis of a unicellular organism, why would we expect that complex organisms are "nothing more than" complex vehicles designed by their genes for the genes' own self-perpetuation? Instead, a picture of nature is now emerging that involves extremely complex forms of interdependence among living systems running from the bottom to the top of the complexity scale. It now appears that systems of ever-increasing complexity develop over natural history, with properties and causal powers of ever-increasing richness and diversity. At this point emergence theorists are able to draw significant links between patterns of emergence at various levels of complexity and at various stages in natural history.⁴⁴

Emergence theory raises somewhat more positive prospects for theology. One can at least imagine an emergent deity – not present from the start, perhaps, but gradually emerging over the course of cosmic history. Exactly this was the position defended by Samuel Alexander in his famous Gifford Lectures, *Space, Time, and Deity*. Alexander argues that Deity is to human mind, taken as a whole, as each of our minds is to (the parts of) our bodies. God's "body" consists of the minds in the universe, and Deity emerges as a product of these minds:

One part of the god's mind will be of such complexity and refinement as mind, as to be fitted to carry the new quality of deity... As our mind represents and gathers up into itself its whole body, so does the finite god represent or gather up into its divine part its whole body" [viz., minds]... For such a being its specially differentiated mind takes the place of the brain or central nervous system with us.⁴⁵

Alexander's emergentist panentheism presents itself as the metaphysics perfectly suited to the sciences of emergence. "As actual, God does not possess the quality of deity but is the universe as tending to that quality," because "only in this sense of straining

towards deity can there be an infinite actual God" (2:361). What really exists is the natural world: "The actual reality which has deity is the world of empiricals filling up all Space-Time and tending towards a higher quality. Deity is a *nisus* and not an accomplishment" (2:364).

(3) *The neurosciences and consciousness.* Empirical work in neurophysiology works to reconstruct causal sequences within the brain, for example the progression of neural impulses from the optic nerve into the first stages of image processing in the brain. There can be no scientific study of cognition without the study of neuroanatomy, including its structures, functions, developmental histories, and causal correlations. Indeed, it might appear that such studies replace and supersede the old debates about the nature of mind.

Yet philosophical issues arise earlier in this area of study than one would think. Take the binding problem, for example. One still needs to know how assemblies of cells are "bound together" in order to function as a representation of some external state of affairs, say, the tree that is in one's visual field.⁴⁶ As it turns out, the contributions not only of neuroscientists but also of philosophers of mind are crucial to finding a solution to the binding problem. Similarly, the thesis of neural Darwinism (G. Edelman⁴⁷) applies theoretical concepts of evolutionary biology to understand the ontogenesis of individual brains. In the case of (*inter alia*) the neurobiologist Terrence Deacon, neural Darwinism has become the foundation for a broad, and *deeply philosophical*, theory concerning the nature of humanity as "the symbolic species."⁴⁸ Of course, some of today's philosophical questions will eventually be resolved by empirical studies; after all, the so-called question of consciousness is not a monolith and many of its component questions are becoming researchable. Still, there is no good reason to expect that science will eventually reduce the entire domain of consciousness and folk psychology to a predictive science written only in the language of neuroanatomy.

The philosophical implications of the neurosciences are even stronger when it comes to understanding the connection between neural states and *qualia* (subjective experiences). Some philosophies dismiss the question of the neural correlates of consciousness from the outset. Thus dualists argue that thought is the product of the soul, understood as a mental or spiritual entity (*res cogitans*) causally independent of the brain, and hence that neuroscience sheds no real light on cognition. And reductive materialists argue that, since consciousness does not really exist anyway (or at least is not causally efficacious), there is no point in trying to correlate it with neural processes.

But these are the least attractive answers. In each of the more plausible views that lie between these extremes one finds complex interactions between philosophical speculation and empirical research. All these positions presuppose — as seems hard to deny — that consciousness is associated with specific neural activities. Neural firings and action potentials, taking place in a particular brain with a particular structure and history, play a causal role in producing the rich phenomena of the individual's first-personal world: her experience of joy, her knowledge that $5 + 7 = 12$, her intimations of transcendence, her longing for immortality. Exactly *what* are the neural correlates of consciousness becomes a fascinating research topic lying at the boundary between neuroscience and consciousness studies. Here, undeniably, one's religious or theological convictions will deeply influence the way in which one approaches the question. Conversely, the conclusions from scientific research will have important implications for one's philosophical and theological beliefs about human persons, our mortality, and our relationship with the divine.

SHOULD THEOLOGY TAKE THE RISK?

Much more could be said about these three examples, which raise complex and subtle issues (and difficulties!) that I have not even begun to touch upon here. There is room in closing to make only one (perhaps controversial) observation about them.

Notwithstanding certain errors and overstatements on the parts of both scientists and theologians in these three separate debates, by and large theologians were (and are) correct in attempting to take account of and respond to the scientific developments in these fields. Of course, there is some risk that theology will align itself with a scientific insight that turns out to be spurious. One recalls that theologians in the past did embrace the theological implications of perpetual motion, the ether, physical determinism, and a complete reduction to genes or atoms. One must acknowledge the real danger of making similar mistakes in the future.

But, I suggest, the alternative is worse. The alternative is to put forward and embrace theologies that are based on outdated scientific cosmologies and empirically false claims about the world, rather than basing theological reflection on the best available knowledge we have about the universe. Surely the scriptures of one's religious tradition should not function as a dike that serves to protect one against advances in human knowledge. Therein lie the Dark Ages indeed!

Few pictures of this damaging anti-scientific appeal to authority in theology are more evocative, and more painful, than Bertold Brecht's famous scene in *The Life of Galileo*. Galileo points his telescope at the moons of Jupiter and bids the papal astronomers simply to observe that some heavenly bodies orbit objects other than the sun. Standing on the roof of Galileo's house in Florence under the starry sky, with the evidence only inches away, the papal astronomers launch into a long discourse, using Aristotle and scripture to prove *a priori* that no heavenly body *can* orbit any other object than the sun. It follows, they conclude, that the telescope must be a tool of the devil.

Even today one can find theological treatises which contain analogous, albeit more subtle, arguments. But nature has a way of winning in the end. It is far better to accept the risks of aligning oneself with the best human efforts at knowledge, and then when necessary to admit mistakes and move on, than to remain "suckled on a creed outworn" (Wordsworth). Recall again a later moment from Brecht's play. Galileo is condemned for his heresies and sentenced to house arrest. After the verdict is read, the representatives of the papal inquisition depart. Alone on a darkening stage, condemned for his heretical claim that the earth moves around the sun, Galileo stands for a time in silence. Finally, though, he shakes his fist in the direction of the authorities who have just condemned him, and yells triumphantly, "aber sie bewegt sich doch!"

CONCLUSION

What then have we learned about the place of theology among the sciences? Some will say it is a precarious place indeed! Developments outside of theology's control — some of which will later turn out to be mistaken — can undercut classical theological positions, can require radically new ways of thinking about God, and can even cast the credibility of theism as such into question. Yet there are several reasons for saying that this position is not only *not* untenable, but is actually the right place for theology to locate itself. First, theists are fundamentally committed to the belief that in the end there is only one truth. One of the lowest moments in the history of theology was the advent of the "two truths" doctrine, which held that the truths of revelation may stand in opposition to the truths of observation and empirical experimentation. Theologians respond positively to scientific advances because we believe that at the end of the day *all* means of ascertaining truth are means of the self-revelation of God. In the end the many shall become one.

We live and work among the sciences, second, because we no longer accept the Scholastic claim that theology's rightful place is to rule as queen of the sciences. The Jesuanic ethic is, "He who would be first must be last of all and a servant to all" (Mark

9.35). The theology that exists in the midst of the sciences is a *kenotic* discipline, from the Greek κένωσις, “self-emptying”:

Your attitude should be the same as that of Christ Jesus:
 Who, being in very nature God,
 did not consider equality with God something to be grasped,
 but made himself nothing (εκένωσεν),
 taking the very nature of a servant,
 being made in human likeness.
 And being found in appearance as a man,
 he humbled himself
 and became obedient to death –
 even death on a cross (Philippians 2:5-8, NIV).

The stance that is *most* foreign to theology is to “lord it over” others (Mk 10:42) to stand, as it were, above the fray of the human pursuit of knowledge and to claim for oneself, a mere mortal, that final position of authority that belongs to God alone. Yet is that not precisely what one does when one dismisses the best results of the human pursuit of knowledge from the standpoint of (one’s particular understanding of) divine revelation? Far better to have acted in humility and to have claimed less for oneself than one might otherwise have done, leaving it to history and to the progression of knowledge to vindicate, or to falsify, one’s own position in the end.

It is this uncertainty that should make one cautious about Robert J. Russell’s advocacy of a fully symmetrical “creative mutual interaction” between theology and the sciences.⁴⁹ It is true that a metaphysical or theological framework can give rise to scientific hypotheses, or at least to heuristic principles that help guide scientific research programs. Over and over again in the history of science a philosophical stance has oriented scientific inquiry; and in many cases opponents of one stance have advanced another in its place, arguing that *their philosophy* would produce better scientific work and results. What distinguishes my interpretation of “creative mutual interaction” from Russell’s is that it remains merely heuristic, in Webster’s sense of the term: “helping to discover or learn; ... using rules of thumb to find solutions or answers.”⁵⁰

So there is room for humility. Yet there is room for boldness as well. Theological voices may be bold because we recognize that human reflection must eventually make the transition from empirical and scientific results to philosophical and metaphysical

questions. Critical faith dwells in the region of this transition and is nurtured by its inevitability. Were it not inevitable that the human mind should turn to questions of meaning, value, and ultimate reality, our conclusions here would represent a one-sided victory for science: science would set the parameters for theological reflection, whereas theology could at best offer a heuristic to assist scientists in their work.

What makes science successful is its ability to ask highly constrained questions. Topics are scientific only when they can have an empirical answer; theories are scientific only when they face the bar of experience (either directly, or mediated through other theories) in order to be corroborated or falsified. Nor can "experience" here mean mystical experience; it is that shared realm of intersubjective discourse that we defined in examining Peirce and Habermas above. *Any claim that is not empirically and intersubjectively testable in this way is one that stands outside the sciences.* Such claims are *metaphysical* claims. (Of course, the division need not be permanent: today's metaphysics may be part of tomorrow's empirical science.)

What scientists and philosophers of science discovered in the late 20th century, though they should have known it from centuries past, is that the spheres of the empirical and the metaphysical are not autonomous. Knowledge in one is incomplete unless one also understands the contribution of the other. Empirical results raise urgent metaphysical questions, and metaphysical positions frame empirical research. Only those who know both can sort out the confusions that arise in each. Moreover, many claims that sound like scientific claims are in fact not. Those who argue for physicalism, for example, may sound like the consummate scientists. But physicalism is the claim that all things that exist are physical things, which presumably means that all existing things are composed of physical matter and energy. It doesn't take much reflection to realize that this claim quickly involves one in complex philosophical arguments — arguments of the sort not likely to be published in *Physical Review Letters*.³¹

A full discussion of the topics therefore moves along an unbroken line from actual scientific results to philosophical questions to metaphysical or theological hypotheses. There should be nothing troubling about this fact. The tight constraints that allow us to gain ever more scientific knowledge of the world beg for analysis, yet it's obvious that the conditions of the possibility of scientific inquiry cannot themselves be objects of scientific inquiry. Over and over again, scientific results usher in speculations about the most appropriate metaphysical position on the topic. Indeed, over history some of the greatest and most fascinating — and most productive — metaphysical reflection has taken place at the boundaries of science.

This fact does not by itself win any battles for theology, but it is good news for theology. For it provides a rationale and an agenda for those who wish to do theology in the midst of the sciences. It encourages us to grasp the scientific debate deeply enough that we can comprehend the questions that arise on its boundaries. When we do, we can't help but wonder about the best philosophical views to hold in response. The most rational course of action is then to formulate appropriate metaphysical positions, including theological positions, and to defend them as well as one can. If one pursues this process with all the subtlety it requires – not throwing God immediately into the fray, but following the chain of philosophical questions as they arise in the discussion – then one eventually finds oneself involved in the metaphysical quest. And, I venture to add, in this broadest of all contexts the theological response is certainly not less profound than many of its competitors.

- 1 Mirriam-Webster Online, *loc. cit.*
- 2 Philip Clayton, *Explanation from Physics to Theology: An Essay in Rationality and Religion* (New Haven: Yale University Press, 1989), p. 167.
- 3 *Ibid.*
- 4 See, among many publications, Louis K. Dupré, *The Other Dimension: A Search for the Meaning of Religious Attitudes* (Garden City, NY: Doubleday, 1972). I owe to Prof. Dupré my introduction to the great Dutch phenomenologist, G. van der Leeuw, and through him to the phenomenology of religion. A recent interview with Dupré, "Seeking Christian Interiority," is available at <http://www.religion-online.org/showarticle.asp?title=214>, verified July 28, 2005.
- 5 *Explanation from Physics to Theology*, p. 138f., italics added, quoting Diderot, *Addition aux Pensées philosophiques*, par. 1, in Diderot, *Oeuvres Complète* (1875), 1:158.
- 6 The classic position that doubt is a sin is defended by Gary Gutting, *Religious Belief and Religious Skepticism* (Notre Dame: Univ. of Notre Dame Press, 1982).
- 7 W. Pannenberg, *Systematic Theology*, 3 vols., trans. Geoffrey Bromiley (Grand Rapids, MI: Eerdmans, 1991-98), 1:9f. Subsequent references to this work are prefixed by "ST".
- 8 Wolfhart Pannenberg, *Jesus – God and Man* (Philadelphia: Westminster, 1963/1968), p. 109. Note that the Afterword to the Christology already begins to move away from the strong anti-Barthian tone. It also somewhat weakens the reliance on a "Christology from below" by adding a role for "theology from above" (*Theologie von oben*). The switch is also in evidence in Pannenberg, *Grundfragen systematischer Theologie. Gesammelte Aufsätze*, vol. 2 (Göttingen: Vandenhoeck & Ruprecht, 1981); see my review article, "The God of History and the Presence of the Future," *The Journal of Religion* 65 (1985): 98-108.
- 9 Pannenberg, *Theology and the Philosophy of Science*, trans. Francis McDonagh (Philadelphia: Westminster Press, 1976), 332. Henceforth *TPS*.
- 10 W. W. Bartley, *The Retreat to Commitment* (New York: Alfred A. Knopf, 1962).
- 11 Although this is the intent of all three volumes of the *Systematic Theology*, I must say that I see the footprints of this method less clearly in the second volume, and even less clearly in the third, than I see it in many of Pannenberg's earlier writings, especially in the early defense of "universal history," in the hypothetical nature of theology in his *Wissenschaftstheorie*, and in his anthropology. See Pannenberg, *Anthropology in Theological Perspective*, trans. Matthew J. O'Connell (Edinburgh: T&T Clark, 1985, 1999).
- 12 See the works by Edward Schillebeeckx, especially *Jesus: An Experiment in Christology*, trans. Hubert Hoskins (New York: Seabury Press, 1979); but also *Christ, the Sacrament of the Encounter with God*, trans. Paul Barrett (New York: Sheed and Ward, 1963); and *Christ: The Experience of Jesus as Lord*, trans. John Bowden (New York: Crossroad, 1980).
- 13 A phrase first coined by Steven Knapp at Johns Hopkins University and used by both of us in our work in religious epistemology. See e.g. our "Belief and the Logic of Religious Commitment," in Godehard Bruntrup and Ronald K. Tacelli, eds., *The Rationality of Religious Belief* (Dordrecht: Kluwer Academic Press, 1999): 61-83, and our forthcoming *Minimal Christian Belief*.

- 14 David Wiggins, "Reflections on Inquiry and Truth Arising from Peirce's Method for the Fixation of Belief," in Cheryl Misak, ed., *The Cambridge Companion to Peirce*, henceforth CCP (Cambridge: Cambridge Univ. Press, 2004), 114.
- 15 Douglas Anderson, "Peirce's Common Sense Marriage of Religion and Science," in CCP, 181.
- 16 Anderson, 182. The reference is to Kelly A. Parker, "C. S. Peirce and the Philosophy of Religion," *Southern Journal of Philosophy* 28 (1990): 193-212. See also Parker, *The Continuity of Peirce's Thought* (Nashville and London: Vanderbilt University Press, 1998).
- 17 Although the words are Anderson's, they accurately represent Peirce's position.
- 18 *The Collected Papers of Charles Sanders Peirce*, 8 vols., ed. Charles Hartshorne and Paul Weiss (Cambridge, MA: Harvard Univ. Press, 1931-58), henceforth "CP".
- 19 *Ibid.*, 184.
- 20 Michael L. Raposa, *Peirce's Philosophy of Religion* (Bloomington: Indiana University Press, 1989), 13.
- 21 Peter Skagestad, *The Road of Inquiry: Charles Peirce's Pragmatic Realism* (New York: Columbia University Press, 1981), 18.
- 22 Skagestad, *The Road of Inquiry*, 39.
- 23 Christopher Hookway, "Truth, Reality, and Convergence," in CPP, 127.
- 24 Hilary Putnam, *Realism with a Human Face* (Cambridge, MA: Harvard Univ. Press, 1990), 221.
- 25 This notion of inquiry as self-correcting is linked to Peirce's equally important work on semiotics. Signs are never exhaustive of meaning, and meaning is always self-corrected by those constructing and receiving signs. As Skagestad note in *The Road of Inquiry*, "The sign user's understanding, namely, is modified by further experience and is not complete until there is nothing left to experience. Hence the precise meaning of a sign is something which we can ascertain only when we have attained omniscience; indeed, only then will the sign have a precise meaning" (165).
- 26 See Imre Lakatos, "Falsification and the Methodology of Scientific Research Programmes," in Lakatos, *Philosophical Papers*, ed. John Worrall and Gregory Currie (Cambridge Univ. Press, 1978), vol. 1, pp. 34-36, 45.
- 27 Jürgen Habermas, *Religion and Rationality: Essays on Reason, God, and Modernity*, ed. Eduardo Mendieta (Cambridge, MA: MIT Press, 2002), 108.
- 28 See *Explanation from Physics to Theology*, esp. chaps. 3-4, and Clayton, *The Problem of God in Modern Thought* (Grand Rapids: Eerdmans, 2000), esp. chap. 1.
- 29 See Philip Clayton and Steven Knapp, "Ethics and Rationality," *American Philosophical Quarterly* 30 (1993): 151-61; *idem*, "Is Holistic Justification Enough?" and "Rationality and Christian Self-Conceptions," in Mark Richardson and Wesley Wildman, eds., *Religion and Science: History, Method, Dialogue* (London: Routledge Press, 1996).
- 30 Paul Tillich, *Dynamics of Faith* (New York: HarperCollins Perennial, 1957, 2001), 25.
- 31 See Clooney's theses in "What is Comparative Theology?" at <http://www2.bc.edu/%7Eclooney/Comparative/ct.html>, verified July 25, 2005.
- 32 *Explanation*, 133ff.

- 33 See Thomas F. Torrance, *Theological Science* (Oxford: Oxford University Press, 1969, 1978).
- 34 See Alister E. McGrath, *A Scientific Theology*, 3 vols. (Grand Rapids, MI: William B. Eerdmans, 2001-03). The three volumes are *Nature*, *Reality*, and *Theory*.
- 35 See my critique of Barth in *Explanation from Physics to Theology*, chapter six, and my review of Alistair McGrath's *A Scientific Theology: Reality*, vol. 2, in *Theology Today* 61/1 (April 2004): 121-2.
- 36 William Dembski, *The Design Inference: Eliminating Chance Though Small Probabilities* (New York: Cambridge University Press, 1998); *Intelligent Design: The Bridge Between Science and Theology* (Downers Grove, IL: InterVarsity Press, 1999); *No Free Lunch: Why Specified Complexity Cannot be Purchased without Intelligence* (Lanham: Rowan and Littlefield, 2002); and *The Design Revolution: Answering the Toughest Questions about Intelligent Design* (Downers Grove, IL: InterVarsity Press, 2004).
- 37 James Cushing, "Determinism Versus Indeterminism in Quantum Mechanics: A 'Free' Choice," in Robert Russell, John Polkinghorne, Philip Clayton, and Kirk Wegter-McNelly, eds., *Quantum Mechanics*, vol. 5 of *Scientific Perspectives on Divine Action* (Vatican City: Vatican Observatory, and Berkeley: Center for Theology and the Natural Sciences, 2002), 99, emphasis added.
- 38 James Cushing, *Quantum Mechanics: Historical Contingency and the Copenhagen Hegemony* (Chicago: University of Chicago Press, 1994).
- 39 Raymond Chiao, "Quantum Nonlocalities: Experimental Evidence," in Russell et al., *Quantum Mechanics*, 17-39.
- 40 See Bernard d'Espagnat, *In Search of Reality* (New York: Springer-Verlag, 1983); *Realism and the Physicist: Knowledge, Duration, and the Quantum World* (New York: Cambridge University Press, 1989); and *Veiled Reality: An Analysis of Present-Day Quantum Mechanical Concepts* (Reading, MA: Addison-Wesley, 1995).
- 41 See Arthur Lovejoy, *The Great Chain of Being: A Study of the History of an Idea* (New York: Harper and Row, 1936, 1965).
- 42 Darwin, *Origin of Species*, final paragraph.
- 43 Jacques Monod, *Chance and Necessity* (New York: Collins, 1971), 110, 167.
- 44 For a survey of emergence across the natural sciences and into theology see Philip Clayton and Paul Davies, eds., *The Re-emergence of Emergence* (Oxford: Oxford University Press, forthcoming 2006). See also Harold Morowitz, *The Emergence of Everything* (Oxford: Oxford University Press, 2002); Stuart Kauffman and Philip Clayton, "On Emergence, Agency, and Organization," *Philosophy and Biology* (forthcoming 2006); and Clayton, *Mind and Emergence: From Quantum to Consciousness* ((Oxford: Oxford University Press, 2004).
- 45 Samuel Alexander, *Space, Time and Deity: The Gifford Lectures at Glasgow, 1916-1918*, 2 vols. (Gloucester, MA: Peter Smith, 1979), 2:355.
- 46 See e.g. the articles by Adina L. Roskies, Charles M. Gray, and Wolf Singer in *Neuron* 24 (1999).
- 47 Gerald M. Edelman, *Neural Darwinism: The Theory of Neuronal Group Selection* (New York: Basic Books, 1987).
- 48 Terrence Deacon, *The Symbolic Species: The Co-evolution of Language and the Brain* (New York: W.W. Norton, 1997).

- 49 See Robert J. Russell, "The Relevance of Tillich for the Theology and Science Dialogue," *Zygon* 36 (2001): 269-308, esp. the diagram of "creative mutual interaction" on p. 275.
- 50 Webster's *New World Dictionary*, Third College Edition, *loc. cit.*
- 51 There are more complex arguments that aim to show that physicalism is the only worldview that is in the end compatible with scientific inquiry. I take these arguments extremely seriously. But, whatever their strengths and weaknesses, they are certainly philosophical arguments, not statements of empirical results.