

Theology and science: The quest for a new apologetics

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Abstract

This paper claims that the hazy intersection between the diverse fields of theology and the other sciences is not to be clarified in the first place by exploring methodological parallels or degrees of consonance between theology and the sciences. What should be explored first is the epistemological question of the nature and status of explanations and of explanatory claims in theology and science. The similarities, as well as important differences between theology and science, will thus be highlighted when we focus this discussion on the shaping of rationality in theology and science, on the hermeneutical problem of relating context and meaning, and on the fallibilist nature of both theological and scientific truth claims.

1. INTRODUCTION

For those who are serious about living the Christian faith in the context of our contemporary postmodern world, the task of doing theology in a way that might really make a difference presents itself as a daunting and even confusing challenge. Deeply affected by contemporary cultural and political issues, by the successes of the natural sciences and technology and the pervasive presence of especially the psycho-

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logical and social sciences in our daily lives, this challenge translates as follows: Do we still have good reasons to stay convinced that the heart of the Christian message does indeed provide the most adequate interpretation of our experience with our world, our culture(s), and ourselves? Put in a different way, does the postmodern world, with its radical religious and cultural pluralism, its spectacular technology and its values that also force us to confront the realities of environmental destruction, political, economic, racial, and sexual injustice, still ultimately make sense in the light of Sinai and Calvary?

Our world has, of course, been fundamentally changed by an all-pervasive scientific culture that shapes the rationality of the way we live our daily lives. The advent of modern thought has in fact led to an unparalleled transformation in the way we as human beings have come to regard the natural world and our relation to it. In a way it could even be argued that, in the history of Western thought, the advent of scientific culture outshines everything since the rise of Christianity (cf Peacocke 1990:27).

Today theologians and scientists, whether they agree or not, and whether they even talk or not, are together in their awe for the way the powers of human reason and imagination manage to far exceed our demands for biological survival, and for the extraordinary ability of the human mind to represent aspects of the world that are inaccessible to our ordinary senses. But scientists are also teaching theologians something today: the baffling and puzzling incompleteness of all our attempts at finding meaning and intelligibility in our world. Our knowledge of the natural world stretches out in two directions: to the basic constituents of physical reality on the one hand, and to the higher levels of biological complexity on the other (cf Peacocke 1990:82). We should indeed be in awe in the face of the amazing and inventive creativity of the world in which we have evolved: the elusive and unpicturable basic sub-atomic entities out of which everything is made, including ourselves, have potentialities unknown and undescrivable in terms of the physics that discovers and the mathematics that symbolizes them. Therefore, at both the extremes of our comprehension - the sub-atomic and the personal - we face such baffling depths that even scientists today speak of the mystery of the universe.

Arthur Peacocke (1990:83ff) has recently convincingly argued for the merging of this search for intelligibility with the search for ultimate meaning in life. Science today forces us to contemplate the future of our planet since we have to reckon with its certain disappearance. The energy of our sun, which sustains life on earth, is finite: The sun is about halfway through its life and the time left for the existence of the earth is about the same as the length of time it has already existed. Thus, the demise of all life on earth, including our lives as humans, is really quite certain. Science today therefore forces us to ask: What is the meaning of this universe and of

our presence in it? These are the ultimate questions that bring theology and science closer together for they are questions that cannot be answered through the resources of science alone. Thus, the scientifically observed and understood character of the natural world, including our existence as human beings, is today of immense theological importance: for what nature is like, what the meaning of human life is, what God is like, indeed whether or not God exists, have become questions that are so interlocked that they cannot be considered in isolation anymore.

For theology today, an all-important focus of its dialogue with our contemporary culture is therefore not only the tremendous problems that would arise if theology should choose to retreat to the insular comfort of an exclusivist theological confessionalism, but also and precisely its uneasy relationship with the sciences. In fact, as theologians we find ourselves confronted with a special challenge: First, we have to try our best to keep together, in a meaningful whole, a very specific sense of continuity with the Christian tradition and a respect for religious and cultural pluralism, as well as a resisting of any form of political or confessional authoritarianism (cf Taylor 1990:31ff). Second, postmodern thought also challenges us to explore again the presupposed continuity between Christian theology and the general human enterprise of understanding the world rationally.

In trying to do this, however, we soon discover that not only theology, but also the sciences have been profoundly influenced by our postmodern culture. This gives an unexpected and complicating twist to the centuries-old theology and science problem: not only theology, but also postmodern science and philosophy of science have moved away quite dramatically from positivist and technocentric conceptions of scientific rationality with its closely aligned beliefs in linear progress, guaranteed success, deterministic predictability, absolute truths and some uniform, standardized form of knowledge. Some contemporary philosophers of science now argue for a postmodern philosophy of science which, along with feminist interpretations of science, focuses on trust in local scientific practice while, at the same time, all global interpretations of science are rejected (cf Rouse 1991). This kind of postmodernism in science not only sharply deconstructs and rejects the autonomy and cultural dominance of especially the natural sciences in our time, but seriously challenges any attempt to develop a meaningful and intelligible relationship between science and Christian theology today.

In certain significant ways postmodernism, with its clear-cut option for pluralism and diversity (cf Harvey 1989:9ff), seems therefore to leave both theology and science fragmented. And this seems to be the perplexing challenge we have to deal with: Is it at all possible to meaningfully relate the fragmented, specialized world of contemporary science to the equally fragmented intellectual world of contemporary

theology? In spite of its postmodern guise, the theology-and-science problem has of course been with the Christian church for centuries. In his important publication, *Creation and the history of science* (1991), Christopher Kaiser recently argued that the problem of the God-and-science relationship in the Judaeo-Christian context goes back at least as far as the second century BC. This essentially grew into the enduring question: Can Christians reconcile their faith in God with their scientific work in the laboratory?

In addition to this, it is well known that theology has been fundamentally influenced by both the philosophical cosmology of the ancient world and the scientific discoveries of our time. The natural sciences, however, have also been seriously influenced by theological presuppositions throughout its long history. From the days of the early church, through the revival of Aristotelian thought in the Middle Ages and the beginning of modern science in the Renaissance and the Enlightenment, up to post-Newtonian mechanics in the nineteenth century with its conclusions ultimately in the theological implications of the thoughts of the founders of twentieth century physics, Niels Bohr and Albert Einstein. From the beginning of the Christian era to the late eighteenth century, an operational faith in God as Creator certainly was an essential factor in the development of all branches of science. This created a kind of matrix in which theologians and scientists could coexist in a way that we can only dream about today.

The nineteenth century, with the triumph of individualism in religion and professionalism in science, obviously changed all that when science, under the surge of Darwinism, moved away from theology rather dramatically. Even in our complex world today, however, Christian theologians who are looking for ways to interpret the idea of creation meaningfully still hang on to some very basic commitments: the idea that nature is intelligible; that nature is relatively autonomous; and that reality, as created by God, has some intrinsic unity as God's creation. For many in the contemporary theology-and-science debate, especially with the abandonment very often of the traditional idea of a Creator God, this has become a driving force behind all their reflection: Even if the origin of the cosmos may ultimately be unintelligible, nature itself is eminently intelligible and reflects the same rationality as the human mind. Human intelligence in the end seems to go hand in hand with an intelligible universe. Moreover, an act of faith always seems necessary for the scientist too: a commitment to the metaphysical belief that the world is intelligible and open to rational exploration (cf Polkinghorne 1991:49).

A fundamental commitment to this kind of intelligibility has no doubt been the impetus behind an intense revival of worldwide academic interest in the troubled relationship between theology and science, especially during the past decade. In the

United States, such institutions as the Center of Theology and the Natural Sciences in Berkeley, the Institute for Religion in an Age of Science, the Chicago Center for Religion and science, and, in Princeton, the Center of Theological Inquiry have certainly become leaders in the task of nurturing the emerging discipline and various centers of theology and science, and also in introducing it the podiums of the American Academy of Religion and the American Association for the Advancement of Science. Princeton Theological Seminary followed suit by establishing the first, and at this time, the only Chair in Theology and Science in the world. In all of these instances, the ground-breaking work of American and British scholars like Ian Barbour, Arthur Peacocke, John Polkinghorne, and Thomas Torrance, is being carefully analyzed and built upon by a host of younger scholars in fields as diverse as philosophical theology, philosophy of science, cosmology, evolutionary biology, neurobiology, genetics, physics, astrophysics, quantum physics, ecology, biochemistry, anthropology, technology, and the cognitive and social sciences.

2. THE QUEST FOR INTELLIGIBILITY

In spite of this tremendous diversity, the theology and science debate today is dominated and held together by an inspiring quest for intelligibility. Most of us would agree that God transcends our final grasp, and that encounters with God obviously involve deeper levels than that of the rational, enquiring mind alone. But, as many scientists and theologians today will acknowledge, the quest for intelligibility, or the search for understanding at the deepest possible level, will be incomplete if it does not include within itself the religious quest for ultimate meaning, purpose, and significance.

This mutual quest for intelligibility has not only created exciting new areas of discussion between theology and science, but also again brought theology and science closer together. In this mutual quest for intelligibility and consonance, scientists, philosophers, and theologians in the field increasingly realize that both theology and science are responses to the way things are: both appeal to the coherent intelligibility that each achieves through its insights. Each can be seen as an attempt to understand our world of experience and in the light of this experience to establish possible points of contact and also possible points of conflict. In this sense theology and science can indeed be seen as mutually illuminating approaches to one and the same reality. For this reason the current debate between theology and the sciences converges on the understanding of the human person as a psychosomatic unity in both science and religion, and on the integration of evolutionary-biological ideas with a sense of God as a transcendent but also an immanent, ever-working

Creator. Roger Trigg recently argued that it is no more a miracle that the human mind can understand the world than that the human eye can see it: evolution in a sense explains both, also demonstrates why we are so at home in the world (cf Trigg 1989:212) and why superior intelligence corresponds with a highly intelligible world. For the same reason so much of the current debate is focusing on relating the origins of our cosmos, in the light of contemporary astrophysics and cosmology, to the Judaeo-Christian doctrine of creation. Not just questions such as 'what is the theological significance of the Big Bang theory?' but also the implications of the novel features of quantum physics and relativity are now part of the daily and ongoing discussion of those who are working in theology and science.

The current theology and science discussion thus very much presents itself as contemporary apologetics for the Christian faith, and as such it will fundamentally shape our expression of the Christian experience of God. It also shapes our intellectual expression of the Christian faith and cautions us to greater epistemological and methodological sophistication. Theologians, however, will have to be careful to protect the integrity and unique character of theological reflection in this important discussion. And, perhaps more importantly, theologians will have to be extra careful not to create the impression that, while science appears to be very rational and open to correction, theology seems to always be ready to play the trump card of unquestionable and self-authenticating revelation. Indeed, in the case of the natural sciences, we are offered knowledge of what the physical world might really be like: science here imposes conditions or constraints that theologians should respect when they give accounts of what is regarded as God's relationship with this world.

3. THEOLOGY, SCIENCE AND EPISTEMOLOGY

The question of how theology and science should relate to one another is, of course, neither a theological nor a scientific issue. It is, rather, an epistemological issue, i.e. an issue about how two very different claims to knowledge are to be related (cf McMullin 1981:26). What is at stake here is basically the nature of knowledge, and the way it presents itself in the often very divergent claims resulting from religious and scientific worldviews. Our conviction that our world is highly intelligible, however, at least partly motivates us to search for some form of unified theory. There is no way that we could be content with a plurality of unrelated languages if they are in fact languages about the same world - especially if we are seeking a coherent interpretation of all experience (cf Barbour 1990:16). In our attempt to integrate a single world-view that would incorporate both theology and science, the obvious question is therefore going to be: what is the status of scientific claims about our

cosmos, and what sort of knowledge claims, if any, do we make in theology? If, furthermore, any form of 'revelation' is to be seen as the basis of religious knowledge claims, what kind of knowledge do we have here? What is more, is it at all possible - or even desirable - that our theological perspectives may be able to assist us, for instance, in choosing between different scientific theories that may be more or less compatible with biblical world-views?

The complexity of these issues is very well illustrated when, for a moment, we briefly look at the history of the relationship between scientific cosmology and the Christian doctrine of creation. At the beginning of the early medieval period Jews, Christians and Moslems were agreed on at least one theological 'given': the universe had a beginning in time. This, of course, was based on the Genesis story of the creation, and Augustine, who in principle was willing to take the road of metaphor to avoid any conflict with 'demonstrated truths', was keen to show that there was no conflict here: creation was seen as a single timeless act through which time itself came to be (cf McMullin 1981:28).

The rediscovery of Aristotle, however, first in Islam and then in the Latin West, introduced a new challenge to the doctrine of creation: Aristotle argued strongly that neither matter nor time could have a beginning. This led to a serious confrontation between a 'pagan' cosmology and Christian theology which, as Ernan McMullin (1981:29f) argues, brought about the most serious intellectual crisis the church had faced in almost a thousand years. In 1215 the Fourth Lateran Council attacked the Aristotelian position and defined it as a doctrine of faith that the universe had a beginning in time. Later, Aquinas would show that neither side of the debate could be demonstrated philosophically. With the coming of the 'new science' in the seventeenth century, however, the terms of the debate changed when Newton's mechanics appeared to allow for a compromise position: the absolutes of space and time were without beginning, but also without content. Creation meant that God brought matter to be within the confines of space at a finite time in the past.

However, the numerous traces of historical development on the earth's surface (eventually followed by the establishment of geology as a new science at the University of Cambridge in 1870), and the discovery later of the second law of thermodynamics, made the Aristotelian notion of an unchanging, eternal cosmos seem quite implausible (cf McMullin 1981:30). Even later Einstein's general theory of relativity, combined with Hubble's 1929 discovery of the galactic red-shift led to the widely acclaimed postulate of an expanding universe, or the so-called Big Bang-theory, according to which a singularity is postulated about 15 billion years ago from which the expansion of our universe began. The importance of the Big Bang theory is easily recognized: for the first time physics was led by its own resources to some-

thing that sounded like a beginning of time (cf Drees 1990:17ff, 211ff). This was followed by theological responses that ranged from positions like that of Pope Pius XII who hailed the theory as unqualified support for the Christian idea of creation, to rejection because it either looked too much like creation, or conflicted with the fundamentalist or literalist notion of a creation a few thousand years ago. It is clear, however, that none of these positions take the complexities of the relationship between scientific and theological epistemology into consideration at all. Not only can the Big Bang not automatically be assumed to be either the beginning of time or of the universe, or can it be taken for granted that the lapse of time since the so-called Big Bang is necessarily the age of the universe (cf McMullin 1981:35): The Big Bang theory and scientific cosmology in general - as Willem Drees has recently pointed out - is not in the first place about the origin of the universe, but rather about its subsequent evolution. Stephen Hawking's question 'did the universe have a beginning, and what is the nature of time?' (cf Hawking 1988:1) thus has to be very carefully defined both scientifically and theologically. But in the same careful way we have to realize that the intent of, for instance, the Genesis passages is to underline the dependence of an intelligible and contingent universe on a Creator (cf Migliore 1991:95), and not necessarily to specify a first moment in time, at least in the technical sense of contemporary cosmology.

This example from the history of Western thought alerts us to the epistemological fallacy of directly inferring from contemporary science to theological doctrine. It would be a serious category mistake to infer directly from, for example, the Big Bang to creation, from field theory to the Spirit of God, from chance to providence, from entropy to evil, or from the anthropic principle to design. The Big Bang model, for instance, does not entitle us to infer - theologically or scientifically - an absolute beginning in time. On the other hand, there's nothing scientifically or philosophically inadmissible about the idea that an absolute beginning might have occurred. And if it did occur, it could look something like the horizon-event described by the Big Bang theory. To describe this horizon-event as 'the Creation', however, is to explain it in terms of a cause that would not be scientific anymore.

What could a theologian then rightly infer from this highly successful theory? It would be possible to say, theologically, that if our universe had a beginning in time through the unique act of a creator, from *our* point of view it would look something like the Big Bang cosmologists are talking about. What one cannot say is that the doctrine of creation 'supports' the Big Bang model, or that the Big Bang 'supports' the Christian doctrine of creation (cf McMullin 1981:39). As Christians we should therefore take very seriously the theories of physics and biology: not to exploit or to try and change them, but to try to find interpretations that would suggest con-

sonance with the Christian viewpoint. Theology can, therefore, never claim to be capable of scientific theory appraisal, but should rather been seen as one element in the constructing of a broader cultural world-view (cf McMullin 1981:51). The Christian can never separate her or his science from her or his theology, but he or she should also learn to distrust epistemological short-cuts from the one to the other. One way to do this would be to find a paradigm that would yield a fine-tuned epistemological consonance.

Thus are revealed the philosophical and epistemological complexities involved in trying to relate theology and science today. In fact, I think that it is safe to say that until fairly recently, theological discussions, in particular, on the relationship between theological and scientific epistemology have been notoriously vague, imprecise and even confused. Since the Enlightenment and the days of Immanuel Kant, right through to the thought of D F Strauss, Feuerbach, Freud and Marx, science was seen to be in conflict with religion, in fact as the great alternative to religion. This inevitably led, as is wellknown, to the stark opposition of a foundationalist empiricist/positivist conception of science to an equally foundationalist conception of biblical literalism. This also reveals that genuine conflicts between science and theology are exceedingly difficult to detect, and specify accurately. In retrospect many of these serious clashes turn out to be not between religion and science, but between incompatible, even incommensurable world-views or philosophies (cf Lash 1985:277).

The current focus on the relationship between theology and science - some prefer to talk of the emerging discipline of theology and science - suggests, however, a fall from epistemological innocence regarding this complex and fascinating issue. For the philosophical theologian this presents a challenge to his or her personal commitments and beliefs: a challenge that also implies a quest for a plausible model of theological contextuality, because it thrusts to the front questions about the status of religious claims to knowledge and about the rationality of belief in God.

Currently, however, the relationship of theology and science is as vague and confusing as ever: some see them as fundamentally in conflict with one another; others as independent of one another, others as in creative dialogue and consonance with one another, while still others thinkers wants to integrate theology and science in terms of either a theology of nature or some form of natural theology.

4. FOUNDATIONALISM IN THEOLOGY AND SCIENCE

What we are certain about today, at least, is that in any contemporary evaluation of the relationship between theology and science a foundationalist view of either

science or theology would be epistemologically fatal. Foundationalism holds that, in the process of justifying our knowledge-claims, the chain of justifying evidence cannot go on ad infinitum if we are ever to be in a position to claim that we have justified our knowledge (cf Steuer 1987:237). Thus, foundationalists specify what they take to be the ultimate foundations on which the evidential support-systems for various beliefs are constructed. The sort of features most frequently mentioned are self-evidence, incorrigibility, being evident to the senses, indubitability and being self-authenticating and properly basic, i.e. foundational.

Foundationalism, as the thesis that our beliefs can be warranted or justified by appealing to some item of knowledge that is self-evident or beyond doubt, certainly eliminates any possibility of discovering a meaningful epistemological link between theology and the other sciences. To claim that knowledge rests on foundations, is to claim that there is a privileged class of beliefs which is intrinsically credible and able, therefore, to serve as ultimate terminating points for chains of justification. These 'givens' could be anything from sense data to universals, essences, experience, and God's revelation. In this sense the 'doctrine of the given' can indeed be called the comrade-in-arms of all foundationalism (cf Frankenberg 1987:6). In the natural sciences, foundationalism implies a positivist empiricism or scientific materialism that per definition renders all religion, and certainly all theology and theological reflection, meaningless (cf Barbour 1990:4). In theology, foundationalism implies biblical literalism or, on a much more sophisticated level, a self-authenticating 'positivism of revelation' that isolates theology because it denies the crucial role of interpreted religious experience in all theological reflection: here the theologian is left speaking a language whose conceptuality might be internally coherent but which at the same time is powerless to communicate its content because it is unrelated to all non-theological discourse (cf Green 1989:34).

Philosophers like Ludwig Wittgenstein, Thomas S Kuhn and Richard Rorty today represent a strong non-foundational response to traditional epistemological questions. Instead of a model of knowledge as an entity resting on fixed and immutable foundations, they offer a picture of human knowledge as an evolving social phenomenon within a web of beliefs. Belief systems are here discovered within a contextual matrix that is itself groundless. Justification becomes a matter of accommodating those beliefs that are being questioned, to another body of accepted beliefs. Whatever theories we might have about anything that might be 'given' in religious or scientific experience, epistemic justification will not have an unproblematic, uninterpreted 'given' at its foundation. With this in mind it not only becomes clear that in theology all forms of foundationalism and fideism go hand in hand, but

also that non-foundationalism will present a very special challenge to the Christian concept of revelation.

Neither theology nor science, then, is based on incontrovertible grounds of knowledge. Each demands a commitment to a corrigible point of view and to the fact that an element of the unexplained will always remain (cf Russell 1989:201). Both theology and science, furthermore, have to speak of entities which are not directly observable and both must therefore be prepared to use models and metaphors as heuristic devices. This is also the context within which John Polkinghorne can state that mathematics is the natural language of physical science, while symbol and metaphor can be seen as the natural language for theology (Polkinghorne 1991:2).

The epistemological move beyond foundationalism in science points to the biggest revolution in physics since the days of Newton: the discovery of the elusive and fitful sub-atomic world of quantum theory. Here our world has been proved to be strange beyond our powers of anticipation. If this is true for physics, it undoubtedly can be true for theology as well. The quantum world exhibits a counter-intuitive non-locality, a togetherness-inseparability which provides a powerful image of holistic solidarity which may even be a suggestive consonant image for the field of theology. Quantum theory has indeed taught us to be open to the totally unexpected, even to the initially apparently unintelligible (cf Polkinghorne 1991:3ff).

To reject foundationalism in theology, however, is not to embrace non- or anti-foundationalism per se: in any case not a type of anti-foundationalism which claims that one can engage in theological reflection without attention to the explanatory nature and epistemic status of theological truth-claims. In fact, it could be convincingly shown that the whole debate between foundationalism and anti-foundationalism is based on the false dichotomy of an outdated epistemological dilemma (cf Bernstein 1983; also Clayton 1989:152). Moreover, a post-foundationalist shift to a fallibilist epistemology, which honestly embraces the role of traditional experience, personal commitment, interpretation and the provisional nature of all of our knowledge claims, avoids the alleged necessity of opting for either foundationalism or anti-foundationalism.

Leaving behind the dichotomy that framed the older faith/reason debate, now opens the way to a postmodern holist epistemology which may have a major influence on theological methodology: it is no longer necessary to hold that the traditional project of theological prolegomena is always ancillary to theology, functioning (as in fundamental theology) as a foundation to be dealt with prior to theological reflection and then always assumed in what follows (cf Van Huyssteen 1989:xi). In a postfoundationalist theology the epistemological link between theology and the

other sciences can be left open because the project of theological methodology and 'prologomena' now becomes part of theological reflection as such (i.e. as part of an ongoing interdisciplinary inquiry within the practice of theology itself).

5. THE SHAPING OF RATIONALITY IN THEOLOGY AND SCIENCE

What will be needed in this interdisciplinary theology-and-science discussion is a methodological approach that not only recognizes theology as an explanatory discipline, but also takes seriously the epistemological problem of the shaping of rationality in theology and science, the hermeneutical problem relating context and meaning, the explanatory role of religious experience and beliefs, and the fallibilist and provisional nature of both theological and scientific truth-claims. To this end the discussion of the problem of rationality in contemporary philosophy of science has recently more and more proved to be an important guide to theology, and perhaps the most fruitful theology-and-science link to date. This discussion not only opens up broader definitions of rationality and indicates the sort of criteria needed to govern theological assertions: it also highlights the centrality of experiential and practical factors in rational explanation and therefore in rationality in general. For this reason the recovery of the hermeneutical dimension in the natural sciences, the social sciences, and in theology, focuses on a postempiricist conception of science in which science is understood as a historically dynamic process in which there are conflicting and competing paradigm theories, research programmes and research traditions (cf Bernstein 1983:171f.).

The problem of the shaping of rationality in theology to a great extent centres on the possible role of explanatory justification in theological thought and will therefore eventually force us to address the difficult epistemological issues of degrees of truth and the objectivity - if any! - of our statements. Generally speaking, the nature of rationality consists of the intelligent pursuit of certain epistemic values, of which intelligibility is the most important. Theology obviously shares the quest for intelligibility with all other sciences, whatever the differences or similarities between theology and the other sciences might be.

Now, if rationality is a means to the goals of science (cf McMullin 1988:25) and as such primarily consists of pursuing intelligibility by making the most progressive theory choices (cf Laudan 1977:121ff), intelligibility itself can be seen as a quest for understanding at the deepest possible level. In theology, as in the other sciences, this will be attained by inferring - through evaluation and argument - to the best possible explanations. Rationality is thus primarily shaped by the quest for intelligibility, and in theology this intelligibility is attained through the explanatory role of

religious experience and beliefs in our theological reflection. In both theology and in science we therefore should beware of an overly narrow and rationalistic conception of rationality. Rationality as such is complex, many-sided, extensive and as wide-ranging as the domain of intelligence itself.

Following the lead of Nicholas Rescher (1988) we can now identify at least three contexts of rationality that are highly relevant not only for theology, but also for the social, human and natural sciences: the cognitive context, the evaluative context, and the pragmatic context. What this means for theological reflection is, that in theology as well we have good reasons for hanging on to certain beliefs, good reasons for making certain moral choices, and good reasons for acting in certain ways. Within a holist epistemology these three contexts go together as a seamless whole and also can be regarded as the three resources for rationality in theology: they merge in the common task of uniting the best reasons for belief, evaluation and action. We therefore act rationally in matters of belief, action and evaluation when our reasons 'hang together', (i.e. are cogent). In theology, rationality implies the capacity to 'give account', to provide a rationale for the way one thinks, chooses, acts and believes. Theory-acceptance, then, has an epistemic dimension. When we ask, however, what else other than belief is involved in theory-acceptance, the pragmatic and evaluative dimensions of theory-acceptance are revealed (cf Van Fraassen 1989:3ff).

In both theology and science, rationality therefore pivots on the deployment of good reasons: believing, doing, choosing the right thing for the right reasons. Being rational is therefore not just a matter of having some reasons for what one believes in and argues for, but having the best or strongest reasons to support the rationality of one's beliefs within a concrete context. Rationality in theology and science, as we saw earlier, is shaped primarily by the quest for intelligibility. And this understanding at the deepest possible level is attained by inferring to the best possible explanations. In this sense rationality and explanation go together very closely.

The hazy intersection between the diverse fields of theology and the other sciences is therefore not in the first place to be determined by exploring methodological parallels or degrees of consonance between theology and the sciences. What should be explored first is the epistemological question of the nature and status of explanations and explanatory claims in theology and the other sciences, since theological doctrines and constructs, as well as scientific theories aim at giving the best possible explanations in their respective fields. In this reflection we should be wary of dangerous epistemological short-cuts: rationality should never be reduced to scientific rationality, and scientific rationality should never be reduced to natural scientific rationality.

6. EXPLANATIONS IN THEOLOGY AND SCIENCE

In theological explanations religious beliefs play a central role. Religious beliefs of course have important functions for the believer. They describe the rites and practices of believing communities, express in the language of faith psychological and sociological needs, and also answer philosophical questions in religious terms. In short, religious beliefs help to explain the world and the place of believers in it. In doing this, religious beliefs reflect a general sense of meaningfulness on the part of the believer: a meaningfulness that extends from an existential level to the level of particular theories and dogmas (cf Clayton 1989:1f). But of central importance among the various functions of religious beliefs is that of explanation.

The question that now arises is whether there is a unitary theory of explanation that would allow us to speak of explanation in the singular when referring to the broader spectrum of academic disciplines. Eventually it will become clear that there are important parallels between explanation in the sciences and in theology. However significant these parallels might be, religious and theological explanations do have unique aspects as well: they are normally all-encompassing and deeply personal, they often arise from vague and elusive questions concerning the meaning of life, and as religious answers they provide ultimate meaning in life. Religious - and eventually theological explanations - thus provide a context of security for the believer and also involve a faith-commitment to God. This implies that both the scope and content of theological explanations may set them apart from explanations in other areas. In assessing the explanatory role of religious experience and beliefs we therefore should assess the continuities as well as the discontinuities between theological and other types of explanations. Scientific explanations, of course, are never completely impersonal, but they are capable of achieving a high degree of interpersonal agreement. Art and ethics are much more personal than science and as such may not represent areas in which universal agreement is attainable. Even more personal is the realm of religious experience, where also the refracting influence of culture is powerfully present (cf Polkinghorne 1991:54).

The central goal of natural scientific theories is to explain the empirical world. To call an explanation 'scientific', is to say that the explanation draws on science for its information, and that the criteria of evaluation of how good an explanation it is, are being applied, using a scientific theory (cf Van Fraassen 1989:156). Theories of explanation, however, have been directly influenced by important shifts in the problem of natural scientific rationality, especially since the advent of Thomas S. Kuhn's revolutionary paradigm theory (cf Van Huyssteen 1989:47-70). This contextualist shift in the philosophy of the natural sciences clearly indicates that a very specific hermeneutical awareness, as well as the realization that criteria for explana-

tion function only within a particular paradigm. Seen in the light of this contextualist shift, explanations in science are relativized and become an element within the broader hermeneutical task of science (cf Clayton 1989:39).

In the social and human sciences a long and learned tradition has opposed explanation to emphatic understanding. Explanation in the social sciences, however, does not need to be down-played in the light of the broader hermeneutical purpose of the social and human sciences. It also would be incorrect to claim that, because of their subject matter, the social and human sciences are more subjective than the natural sciences: the role of subjective factors in the formulation of natural as well as social scientific explanations is today widely accepted. Eventually we shall see that not only in theology, but also in the social, human and natural sciences, the subjectivity of interpreting belongs right in the heart of the explanatory task. On another level the explanatory task in the social sciences is closer to explanations in theology than to explanations in the natural sciences. Both in the social and human sciences and in theology the object of research is itself already symbolically structured, mainly as a result of a long and ongoing history of interpretation. Therefore, if all science then is hermeneutical, in the human and social sciences, and especially in the history of theological ideas, we encounter what some scholars have called a 'double hermeneutic' of having to interpret again the already pre-interpreted world of our experience (cf Clayton 1989:88).

From this we may conclude that explanation - whether in the natural, social or human sciences or in theology - is always a form of rational reconstruction, that rational thought is never purely objective, that context greatly influences the interpretive theoretical process, and that any research program and its explanations can only be partially evaluated at any given time. And in our quest for intelligibility, coherence - although a necessary criterion for rational thought - can by itself never be a sufficient condition for the stories in which we articulate our hope and symbolically unify our fragmented experience (cf Lash 1985:277).

Our quest for some form of epistemological consonance between theology and science thus brings us to philosophical explanations. Philosophical explanations, like other explanations, aim to address and coherently answer some specific question. They are philosophical in that they are not limited in scope to any particular discipline, or aspect of experience (cf Clayton 1989:104). In trying to understand the explanatory role of religious experiences and the beliefs that constitute them, it is important to note that religious explanations share some very significant features with philosophical explanations. The most important of these are their greater generality or depth and an emphasis on systematic coherence and meaningfulness.

For philosophical and religious (and eventually also theological) explanations, both the context principle of rationality and the coherence theory of meaning are of prime importance: from the perspective of a coherence theory of meaning, a philosophical or a religious explanation is not all that different from other explanations. When therefore we reflect on a portion of our experience, it is possible to put this reflection on a problem within an ever-broadening horizon of contexts until we reach a context that reaches out to the whole of human experience. At this level one is involved in making sense of total experience, and this broadest context could be labelled metaphysical or religious. Within this broader context of religious experience, Philip Clayton (1989:5, 113ff) has recently identified at least three types or forms of explanation:

- *Private explanations:* these explanations are warranted solely by the fact that they make sense of experience for the individual believer. Private explanations can be quite comprehensive in scope and can account for broad areas of human experience, but the justification of these explanations is rooted in personal value alone.
- *Communal explanations:* here the standards of adequate explanations are set by the particular believing and practising community.
- *Intersubjective or transcommunal explanations:* this category of explanation supposes that religious beliefs can be justified in a way that transcends the boundaries of the individual religious community. Within the Christian community apologetics and natural theology fit this notion of transcommunal justification. Christian beliefs are held as a rational and best-available explanation that the believer takes to have more than merely communal validity.

The importance of these distinctions for theology is apparent: any comparison between theology and science would be meaningful only if a form of transcommunal explanation is at least one viable form of epistemic justification in theological reflection.

As far as theological explanations go, theologians should first and foremost beware of the fideist misconstrual where faith is seen as evidence for the truth of religious or theological propositions. Faith - as the 'heart' of religion - implies a total commitment to the object of one's belief. In the context of rational argumentation, however, faith does not make the object of faith more probable and thus should be seen neither as an epistemic virtue nor, of course, as an epistemic vice (cf Clayton 1989:143). It now becomes clear that the believer's efforts to understand and come to terms with her or his faith display a structure quite similar to scientific rationality. Seen against this background theological explanations attempt to establish a link

between the inherited beliefs and practices of a specific religious tradition and the contemporary experience of its adherents (cf Van Huyssteen 1989:200ff). These explanations arise out of traditional experience and can be phrased in terms of traditional doctrines, the practices (liturgies and rites) of a religious community, and its norms or codes of behaviour, or they can be constructed in terms of the broader intellectual, social and ethical intersubjective life-experience of believers.

As such theological explanations function to continually ensure a tradition's relevance to the challenges posed by contemporary contextual questions. Clayton (1989:149) is therefore right when he states that theology is not primarily a descriptive (first-order) but an explanatory (second-order) endeavour. There are indeed good reasons for theology to pursue explanatory adequacy and academic excellence. All theological explanations should therefore be open to intersubjective examination and criticism, which means that theological statements should at all times be construed as hypotheses (cf Van Huyssteen 1989:143ff). And since all attempts to clarify Christian beliefs necessarily involve dependence on categories not drawn from the Christian tradition, as well as use of general notions such as truth, meaning, coherence and reference, Christian theology will always find itself in necessary discourse with other theologies, and with the science and philosophy of its times.

In conclusion I would therefore like to claim that the quest for intelligibility and explanatory progress in theology is also dependent on the evolving nature of the epistemic values that have shaped theological rationality in history. This implies that the realist assumptions and commitments of experienced Christian faith are relevant epistemological issues to be dealt with seriously in the theology and science discussion. By doing this, theology could move away from the absolutism of foundationalism as well as from the relativism of anti-foundationalism. This can further be achieved by showing that because theology is an activity of a community of inquirers, there can be no way to prescribe a rationality for that activity without considering its actual practice.

The theology-and-science discussion in a very specific way reveals how the explanatory role of interpreted experience in theology can only be adequately explained in terms of an experiential epistemology. This means not only that religious experience is better explained theologically, but also that, in explaining the role of experience, the philosophical theologian will have to move from the question of rationality to intelligibility, from intelligibility to the question of personal understanding, and from personal understanding to personal experience. This is something the scientist need never do. Dealing with personal commitment in this way may show that the rationality of theology is often shaped by epistemic values different from those of science. The dependence of theology on experiential adequacy

for determining and maintaining its explanatory adequacy need, however, never again mean that theology is less rational or less contextual than science.

The nature of the ongoing discussion between theology and science should help us to realize that, in spite of a promising and emerging new field of study, the complex relationship between scientific and religious epistemology is more challenging than ever. This becomes all the more clear when we keep in mind not only the deconstruction and discovery of the limitations of the natural sciences in the post-Kuhnian era, but also when we focus carefully on the nature of the natural sciences. The sciences are eminently competent when it comes to theory-construction and to experimental and pragmatic enterprises, but they are incompetent when it comes to finding answers to our deepest religious questions.

The fundamental differences between theology and science should therefore be respected, as well as the difference between different forms of explanations not only in the different sciences, but also between theology and the other sciences. However, in spite of important differences and sometimes radically different levels of explanation, theology and science do share a common ground of rationality. A theology and a science that come to discover this mutual quest for intelligibility, in spite of important differences will also be free to discover that nothing that is part of, or the result of, natural scientific explanation, need ever be logically incompatible with theological reflection. Stephen Hawking's (1988:140f) disturbing question 'what place would there be for a creator in a universe without a beginning in time?' could then be answered as follows: in principle, every possible place; a 'place' that might even shatter all our conventional (and unconventional) models for depicting the transcendence and immanence of God. Whether the universe had a beginning in time or not does not affect our reading of the Genesis story in its depiction of the complete dependence of the universe on God. God is not a God of the gaps, or a God of the edges (cf Polkinghorne 1991:81) but is the Christian theologian's answer as to why there is something rather than nothing. Science can tell us little or nothing about our experience of subjectivity, about the astonishing emergence of personhood, and about why we have an intelligible universe. God is the name that we give to the best available explanation of all that is (cf Peacocke 1990:134).

In focusing on the importance of the natural sciences, we should then have an openness for that which reaches beyond the world of the natural sciences (i.e. to the world on which the social sciences, history, philosophy and theology focus). In this wider context we could discover that theology and science both share not only a mutually enriching quest for intelligibility, but also the importance of tradition and the explanatory role of interpreted experience. An honest analysis of the differences between the sciences, and between theological and scientific explanations, might

then just yield more intelligibility in the apologetic attempt to understand our post-modern world as truly God's own world.

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