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ANNE L.C. RUNEHOV, NIELS HENRIK GREGERSEN AND JAKOB WOLF (eds.)

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Religion Vol. I

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Copenhagen University Discussions in Science and Religion Vol. I

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SCIENCE AND RELIGION**

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Edited by:

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Copenhagen University Discussions in Science and Religion Vol L

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9th June 2010

Anne L.C. Runehov, Director

Introduction to the series

By

Niels Henrik Gregersen:

The Human Project in Science & Religion is the first volume in a new series of Copenhagen University Discussions in Science and Religion.

Copenhagen is often associated with two major figures in theology and science: *Søren Kierkegaard* (1813-1855), the forerunner of philosophical existentialism, and the physicist *Niels Bohr* (1885-1962). By happenstance this publication antedates the jubilee year of 2013, when Copenhagen University will celebrate the bicentennial of Kierkegaard's birth as well as the centennial of Niels Bohr's famous atomic model of 1913. Here, Bohr introduced the theory that electrons travel in orbits around the nucleus of the atom. While Kierkegaard spoke of leaps of faith, Bohr referred to electronic jumps between the orbits; in both cases discontinuity prevails over continuity.

Against this background, it is perhaps more than a coincidence that the Copenhagen discussions on science and religion since 2001 have taken place under the name *Forum of Existence and Science*¹ – a somewhat unusual title, perhaps, but a very apt one in a Danish context. In general, Nordic philosophers, theologians and scientists tend to be sceptical about too high a claim for a unified world-view amalgamating science and religion. Existential first-hand perspectives cannot very easily be accommodated within a scientific third-person perspective. Thus, either models of complementarity (in the wake of Niels Bohr) or models of a discipline-based dialogue are preferred over and against more extravagant claims of grand-scale metaphysical synthesis in our *Forum of Existence and Science*. We prefer to speak about interdisciplinary inquiry than about trans-disciplinary unification.

Since 2005, the Forum became part of the *Copenhagen University Network of Science and Religion* in collaboration with the *Department of Systematic Theology* and the *Centre for Naturalism and Christian Semantics*. This move was facilitated by two generous grants from the *Metanexus Institute*

¹ www.forumforeksistensogvidenskab.dk

and the *John Templeton Foundation*. We are grateful to these institutions for supporting our research as well as for giving us the opportunity to be a part of the *Global Local Societies Initiative*. We also thank Teol. Dr. Anne L.C. Runehov, who in 2008 took over the leadership of the Network. Without her commitment this series would not have been initiated.

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Science and Theology as an Instance of Reflection

Introduction by Lluís Oviedo

Introduction

What does science have to do with theology and vice versa? Why would the one care about the other? Furthermore, why would science care about religion? Apparently different branches of the natural sciences are concerned with religion. One reason is perhaps that religion belongs to the faculty of being human which has provided the most interest for scientific investigation. Due to today's advanced equipment, scientists are now able to study subject matter such as consciousness and emotions. Previously, these subjects remained the domain of the philosophers. Religion offers a wide range of interesting features to study: higher states of consciousness; rituals; religious experiences; religious emotions; religious cognition; religious behaviour, etc. These topics are of interest for different branches of the natural sciences: neuroscience; cognitive science; behavioural psychology and evolutionary psychology to name only a few. Reflecting Willem B. Drees' words, due to the successful progress of the scientific enterprise in providing reliable knowledge of the universe and its content, theologians have felt the need to consider these findings but also to reconsider their theology. Scientists and scholars taking the debate seriously face the following questions. Firstly, the question of how to relate scientific theories and findings to questions of faith, meaning and purpose as raised by theology. Secondly, the question of how to relate empirical questions and answers to ethical and existential questions and answers. On the one hand there is the scientific quest for reliable knowledge that is not dependent on cultural constraints and subjective preferences (even though one may ask if this is entirely possible) and on the other hand there is the religious quest, which concerns meaning and orientation in our lives but is a quest that is to a larger extent dependent on cultural constraints and subjective existence.

These questions and reflections and the quest for finding adequate understanding of the world that does justice to what it is to be a human being embedded in oneself, the world, and for many, in God, led to a new discipline being born: Science and Theology. As the name suggests, academics working

in this field are interested in both science and religion in one way or another. They may belong to the academic field of the natural sciences, the social sciences, the human sciences, theology or religious studies. It was during the 1960s that major developments in the philosophy of science and the philosophy of religion, new theories and discoveries in the natural sciences, as well as complex shifts in the theological landscape, made possible constructive interaction between often separate or even hostile intellectual communities (Russel and Wegter-McNelly 2003, 746).

One could perhaps say that it was Ian Barbour with *Issues in Science and Religion* who built the first bridge between the two fields (Barbour, 1996). He accounted for the mutual aspects he found in the methodology, linguistics and epistemology of the two disciplines of science and theology, namely “[b]oth made cognitive claims about the world expressed through metaphors and models, and both employed a hypothetic-deductive method within a revisionist, contextualised, and historicist framework” (Russel and Wegter-McNelly, 2003, 746). Thus Barbour maintained that what both disciplines have in common is that they need to work with hypotheses, metaphors or other figurative language, explanatory models, etc. to construct theories about our world.

However, some esteemed voices are concerned about some of the recent developments in this new discipline. There is some unease about the consequences of an excess of specialisation, which would render this new field too “professional” and too far removed from the traditional interests and methods of scientific as well as theological communities.

These opponents argue that the disciplines of *science* and *theology* remain distinct. One reason for the concern that the disciplines distance themselves from their traditional interests might be that the academic programme of *Science and Theology* is confused with the programme called *Theology of Science* on the one hand and the programme of *Scientific Studies of Religion* on the other. Science and Theology is ideally an intellectual venture that aims at informing scientists about the theological relevance of their work as well as informing theologians about the meaning and impact of scientific progress for their religious hermeneutics.

Seen as such, a specialisation of the academic field of Science and Theology seems unavoidable. Hence, to put it in the words of Willem B. Drees, “there is not only a need for serious study of ‘Religion and Science’, as an object to be studied [by theologians], but also for serious reflection *in* ‘Religion and Science’” (2010, 150). This, however, does not prevent the

programme of Science and Theology from comprising several dimensions. We can mention at least four. (1) A dimension concerned with establishing the

Theology of Science. (2) A scientific dimension concerned with Studies of Religion. (3) A professional interdisciplinary dimension of Science and Religion concerned with studying specific topics of religion from an interdisciplinary point of view. This dimension is more *reflective* and ambitious, and reflects true academic specialisation. (4) A dialogic dimension of Science and Religion, which is more *dialogic*, which renders science understandable for theologians and theology for scientists but has the ambition of deepening the debate between science and theology by an emphasis on religion.

The present collection of essays is the result of several lectures organised by the *Copenhagen University Network for Science and Religion* during 2008. In my opinion, the lectures especially mirror the third and fourth dimensions of Science and Theology mentioned above. The present collection of studies represents a professional level of analysis that aims at accounting for some of the current questions arising in the interface of science and theology. In my opinion, the most interesting point in these essays is that they clearly show how one of the ambitions of Science and Theology is to raise the standard of debate thereby supplying a meta-platform for discussion. Obviously this ensemble of intellectual reflections mirrors the reflective dimension of Science and Theology: when both fields come into contact, a second or third order of reflection is required to deal with the impending challenges.

Presentation of the Chapters

Let us now look at the main essays and the responses which resulted in fruitful discussions. All the authors are well known specialists in the field of *Science and Theology*, with highly acclaimed publications and careers in attempts at bridging both sides of the perceived divide. The idea of organising this project is really interesting and appears promising, since the respondents to the main essays manage to develop the reflection still further, showing the relevance and limits of the proposed points. If at least one aspect of scientific progress is measured by the level of discussion reached here, then these essays will clearly contribute to the advancement of the field, prompting further development.

In *chapter one* the well known English Theologian, Alister McGrath, pleads for the revival of Natural Theology, after a cosmetic operation pointing

to a change of identity and mission. Indeed, part of the essay aims at reviewing the history, achievements and flaws of that theological project, and proposes a new kind of natural theology more in keeping with the current conditions. The flaws are located in modern times: the bad influence of the Enlightenment, which settled a wrong agenda; the destructive criticism of Karl Barth of the entire project; and the inability to deliver what was promised: rational access to the divine. The alternative connects in some way with the medieval tradition of universals and with Trinitarian theology. Natural theology would become a more confessional programme of how believers see and feel the natural world, including – beyond the cognitive dimension of truth – the other two less empirical aspects left somewhat behind: beauty and goodness. The narrative appears plausible, even if this history has been told before: Enlightenment has ruined the theological tradition, and looking at more remote sources of inspiration, in the great Christian tradition, it is probable that better ways can be found to revitalize the prospect of theology engaging with nature.

In the second chapter, Anne Runehov shows that she has done her homework well as respondent, and has applied her analytical skills to better frame McGrath's proposal. In her view, the new project is clearly distinct and distant both from its medieval and modern versions. Then she engages in the thorny issue of nature and our experience of it, which admits several approaches, social construction being just one of them. As a result of the critical revision, Runehov proposes to call McGrath's project a Theology of Nature and the Natural, instead of a Natural Theology. Following the criteria of McFague, a similar programme finds great plausibility and actuality, as it is able to connect Christian revelation with the scientific and ecological sensitivity of our time. In my view this is more than a semantic question: how to deal theologically with nature and its scientific and technological management. This becomes a big challenge for a more engaged theology. Medieval inspiration seems inadequate for the job.

It would be extremely useful to continue the dialogue in order to ascertain which would constitute the best theological programme both for making space for the recent developments of science, and for keeping the provision of hope, truth and love revealed in the Christian tradition. What seems clear is that things cannot continue in the same vein and that even at the curricular level, a new model of the Theology of nature and creation needs to be developed to keep pace with the events of our time. If a more reflective theology needs to have an impact, a good case is found here. The efforts of

trying to renew the theological understanding of the natural world – which is more than just our environment, since we are embedded in it – should point to a renewed teaching programme in our faculties.

Chapter three presents the criticism that Mikael Stenmark raises regarding scientism in its epistemological version. The topic is very much related to the close programmes of naturalism and reductionism. It is obvious that these questions are at the centre of the basic agenda of Science and Theology. Indeed if the method assumed by scientism or naturalism is accepted, any engagement between science and theology will suffer immensely. It is a priority of the current programme of the sub-discipline to dismantle every attempt to reduce our theological knowledge of the real to what can be obtained only through scientific scrutiny, a strategy that automatically dismisses the methods of theology as an invalid form of understanding. Stenmark manages in a magisterial way to do the job, and provides convincing arguments to refute the epistemological reductionism linked to that version of scientism. The self-referential paradoxes of that programme are well exposed, even in their weaker versions. Furthermore the evidence points to a set of ideas that are obtained outside of the scientific realm, to the specificity of intentional conscious knowledge, and to its social forms, transcending scientific patterns. No privilege can be conceded to the purely scientific approach when a phenomenology of real life is taken into account.

In chapter four Niels Gregersen builds on further distinctions regarding the programme of scientism, this time between a worldview and a precept. The result is called preferential scientism, a programme at work inside the sciences as well, in the form of “minimalism” or what others have called “reductionism”. However, the results delivered seem more “science fiction” than real science; more an aspiration than true achievements. There is surely all the realm of human behaviour requiring a more hermeneutical approach, beyond sheer scientific treatment. Nevertheless the dreams of scientism could push some research programmes towards useful results.

The issues being put forward in this discussion are far reaching, and allow me to think about the consequences of scientism for the study of religion. On one hand, several of these studies provide useful insights, allowing for a better understanding of religious phenomena. But on the other hand, their extreme reductionist positions appear as a blow for traditional wisdom, including theology. The challenge presented lies in the capacity to integrate both approaches, which could be mutually enriching. Furthermore,

some theologians presuppose some items of *preferential scientism* in their aim to conduct a more scientifically informed theology that reaches beyond rhetorical excess and aprioristic impasses. They have learned from the scientific ideals of tangibility, conciseness, and verification how to better focus theological points. In my opinion, it is not impossible to pursue an even more “experimental theology” if one were to follow the path of the similar programme of “experimental philosophy”. The field of theological anthropology offers many possibilities in which to explore this method. I assume that some degree of scientism may be healthy, even for theology, once the excesses have been avoided.

The issue under examination in *chapter five* corresponds to “meaning” and how it is built into Science and Religion. The author, John Teske, develops an interesting line of argument showing how meaning requires patterns and that these are often built in a narrative form. This essay makes a good case for the narrative form of self identity. It borrows from several scientific and philosophical areas as well as from neuroscience and the past decade’s long discussion on personal identity. The author clearly limits his scope, aware of how broad and onerous is the issue of identity, focusing on the role played by memory and its narrative patterning. More interesting is the way in which myths and religions re-enter this schema, as meta-narratives able to frame life events and provide new meaning. The point is that these broad narratives are complementary to science and fill some areas out of the reach of more methodological approaches. They clearly provide an imaginative incentive to moral commitment and offer to enlighten our understanding of the eschatological future.

In *chapter six*, René Rosfort opens three critical fronts: first against too sharp a separation between scientific accounts and the narrative form, both for science, and in the formation of meaning; second, the revision of the narrative pattern as the origin of consciousness on the base of phenomenological reflection and psychopathological evidence; and third, the normative doubts concerning the reliability of narrative versions of self and others. Curiously, Rosfort’s claim identifies the weakness of narrative reconstruction of self in two opposite forms: the inability to express some affective dimensions; and the need to complement a more scientific explanation.

Reflecting on some of the important questions raised in this collection of essays, it appears that the centre of the discussion on science and religion clearly turns on anthropology. I mean by this that the issue of personal identity and consciousness, being one of the most discussed in the cognitive sciences

and philosophy of mind, points inevitably to the centrality of human beings and the difficulties in rendering a complete account of this most mysterious dimension. Such a perception clearly calls for theology to be able to say how a radical reflection on human identity ultimately leads to theological topics, in a free and almost fictive version of the ontological argument.

The subject matter of inquiry of *chapter seven* appears less immediately theological, but nevertheless highly relevant: the role of understanding. It clearly brings to the fore the old discussion between explaining and understanding, as a way of specifying the roles of science and human hermeneutic disciplines, including theology. Peter Gärdenfors rightly identifies understanding as seeing a pattern. He develops a model started in Gestalt psychology, identifying patterns of causality as the way the human mind works. The “intentional stance” of Dennett comes to mind too. This drive makes us apt to read others’ minds and to identify agents behind every event. The approach also finds clear applications in education and science, where understanding follows the same schema of identifying patterns. We miss, amongst the several possible applications, the religious field in which this strategy could offer interesting insights.

In chapter eight, Christine Tind Johannessen-Henry tries to fill the gap, and offers valuable comments on how theology can be inserted into this cognitive programme. She wisely poses the question on the existence of maxi-patterns which are able to include in a holistic way most of reality and human experience. Drawing on Pannenberg’s suggestions, the respondent reminds us about the *given nature* of some fundamental patterns, which are not the result of subjective activity, but are rather acquired through some form of learning. This model fits better with the theological approach, which appears as complementary to the scientific one, as the first evokes some form of transcendence.

These last essays and the discussion they promote are highly inspiring, and – together with the two preceding ones – have the merit of returning to old-fashioned issues in theology and philosophy of religion, such as the question of meaning and purpose in life, which are constitutive elements of personal identity. The striking point is that this exercise on updating old topics can be perceived as the result of the recent interaction with science and the scientific treatment of some cognitive and anthropological activities. This seems encouraging, since it contends that transcendental approaches, too characteristic of former seasons of theological discussion, are returning to centre stage at the hand of an unexpected protagonist, one that seemed rather

to question traditional theological views. As has been said many times: science apparently closes some doors, but unexpectedly opens other doors and windows to theology, offering surprising views of new landscapes, helping us to think more deeply about our long term ideas on the human condition, our future, and the future of the entire world.

Bibliography

- Barbour, I.G. (1996). *Issues in Science and Religion*. New York: Harper and Row.
- Drees, Willem B. (2010). *Religion and Science in Context: A Guide to the Debates*. New York: Routledge.
- Russel, R.J. and K. Wegter-McNelly. (2003). "Science and Religion." In *Encyclopedia of Science and Religion*, ed. Wentzel J. van Huyssteen, New York: Mcmillan Reference, 747-748.

Truth, Beauty and Goodness. A New Vision for Natural Theology

Alister E. McGrath

Abstract

The increasingly influential dialogue between natural sciences and religion has led many natural scientists to become interested in the traditional theological discipline of “natural theology”. Yet many theologians, especially within Protestantism, now regard natural theology as outdated and discredited. This paper considers three main factors which appear to have contributed to the crystallization of this negative perception: a growing awareness of the extent to which modern approaches to natural theology have been shaped by the agendas of the Enlightenment; the severe criticisms directed against natural theology by the leading Protestant dogmatician Karl Barth; and a lack of persuasive outcomes concerning natural theology’s alleged capacity to “prove” the existence of God. An alternative approach to natural theology is proposed, which involves both its dogmatic relocation and its conceptual expansion. It is argued that these adjustments give natural theology both intellectual integrity and a new lease of life. Natural theology is to be seen as the Christian way of “seeing” nature, which involves more than the mere “making sense” of nature. Rather, natural theology is to be considered as the affirmation and exploration of the truth, beauty and goodness of the natural world, when seen through the interpretative framework of a Trinitarian vision of God. This does not “prove” the existence of God, but nevertheless points to the capacity of the Christian faith to provide a satisfactory account of the human experience of nature.

Keywords: Natural theology; Karl Barth; William Paley; Nature; Science and Religion; Proofs for God’s existence; Enlightenment; Philosophical Theology; Beauty.

Introduction

One of the most intriguing aspects of the burgeoning interest in the relationship of science and religion has been the recent emergence of a new interest on the part of many natural scientists in what is traditionally termed “natural

theology” (Wilkinson 1990; Polkinghorne 2006; Vidal and Kleeberg 2007). Yet paradoxically, natural theology seems to be experiencing something of a crisis within its traditional theological homelands. That, it seems, is the dominant – though not the universal – opinion within much of western theology, particularly within Protestantism (Kock 2001; Swinburne 2004). There seems to be no consensus within Protestantism over the past merits or possible future of natural theology (Fischer 1983; Westermann 1987; Kapper 1995; Kock 2001, 295-390).

Yet obituaries of natural theology within the theological community are decidedly premature. In this paper, we shall argue that the project of natural theology is open to dogmatic relocation and conceptual expansion, opening up new ways of understanding and undertaking the theological engagement with the natural world. This project, of considerable theological importance in its own right, has been given new importance in recent years on account of the growing interest in the relationship of Christian theology and the natural sciences, which has led many to want to reopen the entire question of the status and potential of natural theology. This paper is written in the conviction that there is a real case to be made for the renewal and reorientation of natural theology, involving both its dogmatic relocation and conceptual expansion.

But first, it will be helpful to review some of the reasons why natural theology, traditionally understood as “the enterprise of providing support for religious beliefs by starting from premises that neither are nor presuppose any religious beliefs” (Alston 1991, 289), has encountered such difficulties in recent years. Without wishing to suggest that these exhaust the issues, I believe that three principal factors have led to the intellectual impoverishment and theological marginalization of natural theology in some theological circles:

- (1) Recent forms of “natural theology” have often been heavily influenced by the agenda of the Enlightenment, which is increasingly seen as a past memory rather than as a present reality;
- (2) Karl Barth’s critique of natural theology has proved influential, leading some to conclude that the revival of Trinitarianism entails the rejection of natural theology;
- (3) Traditional approaches to natural theology are widely believed to have failed to provide reliable foundations for belief in God.

We shall consider each of these concerns briefly, before moving on to consider how natural theology might be given a new lease of life through its reconceptualization and redirection.

Natural Theology and the Enlightenment

Western theology has been deeply shaped by the ideas of the Enlightenment – both its positive emphasis upon the competency of reason and the possibility of objectivity of judgement, and its negative critiques of both the coherence of the concept of divine revelation, and the capacity of Scripture to disclose truths that allegedly lie beyond human reason (Harrison 1990; Beiser 1996). In recent years, critical scholarship has demonstrated that the term “Enlightenment” needs to be used with some caution, in that this movement in western thought is better conceived as a “family of Enlightenments”, sharing a common commitment to a core of ideas and values, yet demonstrating variegation at other points (Schmidt 1998; Umbach 2000, 25-78).

Despite this diversity, however, a number of shared concerns are generally agreed to lie at the heart of the Enlightenment. Perhaps one of the most significant of these was a quest for a public, invariant, and reliable foundation of knowledge. While recent critics of the Enlightenment project have questioned whether such elevated norms of objectivity can actually be sustained, whether theoretically or practically (Schmidt and Wartenberg 1996; Gutting 1999; Pinkard 2003), there can be little doubt of the commitment of the “Age of Reason” to such a belief, and its defining influence on western culture.

A primary motivation for this search for objectivity of judgement was growing pessimism about the capacity of religion or prevailing cultural norms to provide a secure, universal basis for knowledge. Growing suspicion of both the intellectual foundations and ethical consequences of religious belief led many to establish truth on the basis of an appeal to pure human reason, untainted by the foibles of outdated traditions, arbitrary prejudice, or cultural and historical location. Reason was held to transcend all human boundaries, offering the only secure foundation for valid human beliefs and values (Gellner 1992).

Given this climate of growing confidence in the capacity of reason to uncover the deeper structures of reality on the one hand, and growing suspicion of leading theological resources of the Christian churches on the other, the churches’ public defence of the existence of God on the basis of an appeal to doctrinal tradition or the Bible became increasingly problematic. The emer-

gence of biblical criticism eroded confidence in the text of Scripture, the growing influence of “doctrinal criticism” challenged its traditional interpretations, and the rise of rationalism called the need for divine revelation into question (Reventlow 1980). One apologetic strategy to emerge from this situation was the development of arguments for the Christian faith based purely upon reason. Descartes, Spinoza and Leibniz thus all developed approaches to natural theology which were ultimately based on *a priori* concepts of divine perfection (Webb 1989; Ribas 2003).

Yet there was another possible approach, which gained increasing plausibility through Newton’s demonstration of the intrinsic regularity and rationality of the natural world – to make an appeal to nature itself. This development took place primarily within England during the late seventeenth century, and proved to be particularly influential subsequently in France and Germany (Harrison 2006). Writers such as John Ray (1627-1705) and William Derham (1657-1735) developed an extensive and sophisticated defense of belief in God through an appeal to the order and apparent design of the natural world. These approaches stressed the importance of the providential ordering of nature and the consequent lawful operation of the universe as evidence of divine creation and superintendence of the natural order (Gillespie 1987; Zeitz 1994; Mandelbrote 2007). This development can be seen as marking a decisive shift towards envisaging natural theology as an *empirical*, rather than a *theoretical*, undertaking. Reason now reflected on the structures of the external world, not its own internal deliberations.

The primary motivation for undertaking natural theology within English Christianity during the late seventeenth and eighteenth century was thus in no small part due to apologetic concerns. The church itself did not reject revelation; it realized that it needed to relate the gospel to a culture which no longer felt inclined to accept this notion. The church, realizing that it was increasingly difficult to base a dialogue with English academic thought upon the Bible, sought an alternative common ground for its apologetic discourse – and found it in an empirical engagement the realm of nature (Byrne 1999). Nature was a public resource, open to all, which was held to point reliably to the existence of a wise and good creator God. Natural theology thus rapidly became an apologetic tool of no small importance.

By the early nineteenth century, the concept of “natural theology” was firmly established within English religious culture as a way of demonstrating God’s existence without recourse to any religious beliefs or presuppositions (Gascoigne, 1988). This represented an adaptation of the concept to the reali-

ties of the English religious situation, primarily in response to the agenda of the Enlightenment. Yet the constant inhabitation of this way of thinking over an extended period of time led to the formation of certain habits of thought, which came to be seen as self-evidently true. The abiding influence of the Enlightenment's agenda upon western theology until relatively recently led to this situation-specific understanding of "natural theology" being assumed to be normative. In fact, it is only one possibility – and one heavily shaped by modernist assumptions, now increasingly being called into question. It is open to revision, and it needs to be revised.

Karl Barth's Critique of Natural Theology

The influence of Karl Barth (1886-1968) upon the shaping of the modern Protestant mind is widely conceded. It is often argued that an integral part of Barth's theological programme is the subversion of any notion of natural theology (Prenter 1952; Torrance 1970; Kock 2001, 23-102). The situation is slightly more complex than this, as natural theology represents one specific instantiation – but by no means the only one – of the human tendency to construct anthropologically-shaped notions of God (Macken 1990; Gundlach 1992). Barth's formal critique of natural theology dates from the 1930s, and is not strictly speaking part of his explicit agenda in his Romans commentary or earlier writings (Szekeres 1966). In the second edition of his Romans commentary (1922), the polemic which Barth would later direct against natural theology is directed against the slightly different category of "religion," which Barth critiques as a human construction erected in opposition to God (Barth 1922). In 1927 Barth declared that the target of his criticisms was fundamentally "Schleiermacher's conversion of theology into anthropology" (Barth 1927, 82-7). Yet natural theology is still not identified as the enemy of Barth's theological programme. It may be true to suggest that "Karl Barth's battle against natural theology was in respect of content a conflict with the theology of the nineteenth century" (Berkhof and Kraus 1978, 39); yet this specific manner of conceptualising this conflict does not appear to have crystallized in Barth's writings until around 1929-20.

While a critique of natural theology is at least implicit in the development of Barth's early dialectical theology, it is not until *Church Dogmatics* II/1 §26 that Barth offers an extended, systematic and *explicit* critique of natural theology, which he defined as a theology "which comes to humanity from nature" and which expresses humanity's "self-preservation and self-affirmation" in the

face of God. Natural theology now becomes the paradigmatic instantiation of the human longing for self-justification, with the appearance of a controlling dialectic between a true theology based upon revelation and human self-justification based upon anthropology.

Barth's mature hostility towards natural theology thus rests on his fundamental belief that it undermines the necessity and uniqueness of God's self-revelation. If knowledge of God can be achieved independently of God's self-revelation in Christ, then it follows that in principle humanity can dictate the place, time and means of its knowledge of God. Natural theology, for Barth, represents an attempt on the part of humanity to understand itself apart from and in isolation from revelation, amounting to a deliberate refusal to accept the necessity and consequences of revelation. One of Barth's central concerns is to expose the myth of human autonomy, and identify its consequences for theology and ethics. The human desire to assert itself and take control over things is seen by Barth as one of the most fundamental sources of error in theology, leading to the erection of theological towers of Babel – purely human constructions, erected in the face of God.

Barth's critique is, however, actually directed against a *specific understanding* of natural theology – the attempt to prove God's existence or gain access to knowledge of God under conditions of humanity's choosing. But what if natural theology is understood as the attitude to nature that is mandated and facilitated by the Christian revelation? What if natural theology is itself seen as a subordinate aspect of revealed theology, legitimated by that revealed theology rather than by natural presuppositions or insights? What if the legitimation of natural theology is understood, not to lie in its own intrinsic structures nor in an autonomous act of human self-justification, but in divine revelation itself. On this approach *theologia revelata* both legitimates *theologia naturalis* and defines its scope. This points to the possibility of a conceptual relocation of natural theology, with important implications for an understanding of its foundations and its scope.

The Perceived Failure of Natural Theology

To "prove" the existence of God.

It is widely agreed that the public credibility of natural theology – understood specifically as the attempt to provide a reliable basis for belief in God – reached its zenith in late eighteenth century England. The Boyle lectures, delivered over the period 1692-1732, are widely regarded as the most

significant public demonstration of the “reasonableness” of Christianity in the early modern period, characterized by that era’s growing emphasis upon rationalism and its increasing suspicion of ecclesiastical authority (Dahm 1970). English natural theology was given new intellectual energy through William Paley’s *Natural Theology* (1802), which rapidly became the most influential defence of the existence of God from the natural world (Brooke 1989; Fyfe 1997). For Paley, nature showed obvious signs of having been designed and constructed by God, who could be conceived as the cosmological watchmaker.

Yet by about 1860, English natural theology was in crisis, for two main reasons. First, it was widely agreed that the approach seemed to lead to decidedly deficient, if not downright heterodox, notions of God, rather than the triune God of the Christian faith (Brooke and Maclean 2005). This approach to natural theology led to a form of Christianity which seriously distorted the traditional orthodox understanding of the nature of God, and especially the critical issue of God’s continuing involvement in the world – in other words, the concept of providence. Natural theology came to be associated with a mechanistic worldview and a significantly reduced conception of God, in which “providence” is evacuated of much, if not all, of its traditional meaning.

Second, and perhaps more significantly for our purposes, the intellectual case for God associated with natural theology seemed increasingly vulnerable and flimsy as time progressed. The credibility of Paley’s natural theology depended heavily on the natural world having been fixed in its present form by an act of special divine creation. The rise of Darwinism destroyed the credibility of Paley’s approach, and plunged this form of natural theology into a crisis from which it has never fully recovered (Dawkins 1986). It is therefore entirely understandable that some have recently suggested that we ought to speak of a “natural atheology”, in that contemporary interpretations of Darwinism seem to point to atheism rather than to belief in God (Lustig 2004). Nature, once seen as a pointer towards God, is now held by many to point in a diametrically opposed direction.

These three representative considerations we have explored thus far, to which others might be added, would seem to lead to the conclusion that natural theology has had its day, and must now be recognized as a theological enterprise of purely historical or academic interest. Yet there is a growing view that natural theology can be given a new and productive lease of life (McGrath 2008 and 2009). This involves two reconceptualizing strategies.

First, the dogmatic location of natural theology needs to be shifted from outside the domain of *theologia revelata* to within it. In other words, natural theology is to be seen as an essentially Christian way of envisaging the world, grounded in and informed by a Trinitarian vision of reality. And second, the conceptual content of natural theology needs to be extended beyond the domain of the purely rational, to embrace the categories of beauty and goodness, rather than merely truth. We shall explore these two important points further in the remainder of this essay.

The Dogmatic Repositioning of Natural Theology

We have already argued that Barth's critique of natural theology is actually directed against a specific understanding of natural theology – namely, the attempt to prove God's existence or gain access to knowledge of God under conditions of humanity's choosing. But what if natural theology is understood as the attitude to nature that is mandated and facilitated by the Christian revelation? What if natural theology is itself seen as a subordinate aspect of revealed theology, legitimated by that revealed theology rather than by natural presuppositions or insights? What if the legitimation of natural theology is understood, not to lie in its own intrinsic structures nor in an autonomous act of human self-justification, but in divine revelation itself? If this were so, *theologia revelata* would both legitimate *theologia naturalis* and define its scope. The authorization for natural theology would then lie not in its own intrinsic structures, but in divine revelation itself. This points to the possibility of a conceptual relocation of natural theology, with important implications for an understanding of its foundations and its scope.

The traditionally received notion of “natural theology” as an apologetic strategy which proved God's existence from nature crystallized into its present form in the eighteenth century, initially in England, and subsequently in Germany. In response to the agenda of the Enlightenment, many turned to nature as an autonomous source of knowledge of God. The rise of Deism in England during the late seventeenth and early eighteenth century reflects a certain degree of discomfort with traditional orthodox Christian notions of divine revelation, which led it to seek alternative routes to the transcendent which were independent of the institution of the church, the clergy, and the Bible. As we have seen, the historical influence of these approaches to natural theology was so great that they have come to be seen as determinative of the genre as a whole. This specific approach to natural theology, heavily shaped

by modernist assumptions, has thus come to be seen as definitive. Where once this would have been regarded as one specific approach to natural theology, an essentially Darwinian process of selection and elimination has led to its alternatives being marginalized or treated as if they were extinct.

The outcome of this has been that the neutral term “natural theology” has come to be freighted with unhelpful undertones and associations reflecting the agendas of the Enlightenment project, introducing themes which were quite absent from earlier approaches (such as those found in writers such as Gregory of Nyssa or Thomas Aquinas). For Karl Barth, as we have seen, the most objectionable of these was that “natural theology” – that is to say, the specific approach to natural theology associated with the Enlightenment – was ultimately an assertion of the ability of humanity to encounter the divine under conditions of their own choosing and making, thereby subverting the role of divine revelation.

The need for the recalibration of the conceptual possibilities of natural theology is further emphasised by the growing realization that “nature” is a socially constructed notion, rather than being an autonomous intellectual entity in its own right. In part, the cultural triumph of the Deist approach to natural theology in the eighteenth century rested on a general inherited consensus that “nature” designated a reasonably well-defined entity, capable of buttressing philosophical and theological reflection without being dependent on any preconceived or privileged religious ideas. The somewhat generic notions of “natural religion” or “religion of nature”, which became significant around this time, are themselves grounded in the notion of a universal, objective natural realm, open to public scrutiny and interpretation.

Yet it is now widely realized that “nature” and “the natural”, far from being objective, autonomous entities, are conceptually malleable notions, open to multiple interpretations – none of which are self-evidently correct. The category of the “natural” is essentially a socially constructed concept. Concepts of nature and the natural – note the deliberate use of the plural – are themselves the outcome of a process of interpretation and evaluation, reflecting the social situation, vested interests, and agendas of those with power and status (Eder 1988; Evernden 1992; Cronon 1995). It is not a piece of “raw data,” but something which we choose to view in certain ways.

For these and other reasons, there is a need to reconceive natural theology, liberating it from its imprisonment to the agenda of the Enlightenment. To use the traditional language of systematic theology, these considerations point to the need for the dogmatic location of the concept of

natural theology to be transferred from the realm of “the natural” to “the revealed”. In other words, nature is to be interpreted from the standpoint of an incarnational, Trinitarian vision of a self-disclosing God.

Traditionally, *theologia naturalis* has been seen as independent of *theologia revelata*, suggesting that it is intended to subvert or displace divine self-revelation as a source of reliable knowledge of God. A reconceived natural theology is firmly located within the ambit of revealed theology, which both offers an explanation of the capacity of nature to disclose the divine, while at the same time defining its limits of operation and conditions of viability. The deistic concept of God associated with traditional approaches to natural theology is replaced with a distinctively Christian vision of God, with particular reference to the doctrine of the incarnation. Natural theology is to be undertaken on the basis of a specifically Christian notion of God. Yet this specific notion of God creates conceptual space for the form of natural theology associated with the Enlightenment, while at the same time determining its focus and identifying its limits and liabilities.

On this approach, natural theology is to be conceived and interpreted within the context of God’s revelation, as one of its aspects and not as its potential rival. Natural theology presupposes certain core elements of the Christian revelation, which it reinforces and illuminates, but does not itself establish. Far from being an alternative to divine revelation, natural theology is its consequence – an example of the general principle articulated by Thomas Aquinas, to the effect that grace does not destroy nature but perfects and fulfils it (Stoeckle 1962). God’s self-revelation thus brings into full light the significance of the creation.

It might therefore be objected that what has just been described is not natural theology, if this is understood, following Alston, to refer to “the enterprise of providing support for religious beliefs by starting from premises that neither are nor presuppose any religious beliefs” (Alston 1991, 289). It is certainly true that this is what natural theology *became* in response to the agenda of the Enlightenment, especially during the eighteenth century. Historically, however, it is not what natural theology always has been; theologically, it is not necessarily what it should be. An approach to nature that was once theologically legitimate and conceptually productive came to be overemphasized and distorted as a result of the agenda of the Enlightenment (Dupré 1993).

A Christian natural theology is thus undertaken on the basis of a Trinitarian vision of God and nature, which are in turn focused on the person

of Christ. This approach to natural theology allows nature to be “seen” in the light of the Christian tradition. That tradition raises certain significant questions concerning both the observer, and what is being observed. What if nature is fallen, so that its capacity to disclose God is diminished or distorted? What if human observers and interpreters of nature share its fallenness, entailing a double diminution of the glory of God? This point cannot be evaded by a selective reading of nature, which accentuates its beauty and orderedness, while disregarding its more ugly, chaotic aspects, particularly as seen in natural evil and suffering. A robust theological framework is thus essential if nature is to be engaged with coherently as an entirety, rather than adopting a highly eclectic, piecemeal approach to its interpretation.

The Christian faith makes possible a particular way of “seeing” the world, which allows the world to be seen as a created reflection of divine glory and wisdom. The matrix of interconnecting ideas that make up the web of Christian doctrine provide an intellectual framework that legitimates the enterprise of natural theology, *not* as an autonomous entity, capable of discovering God under terms and conditions of its own choosing, but as a derivative entity, deriving both its intellectual legitimization and its explanatory success from within the context of the Christian tradition. An authentically Christian approach to natural theology, which is both mandated and legitimated by divine revelation, holds that nature possesses a derivative capacity to disclose something of God’s wisdom, whether in an apologetic or dogmatic manner, without undermining or displacing divine revelation itself. A commitment to Trinitarianism does not entail the rejection of natural theology, which can be reconceived in a Trinitarian manner.

The Conceptual Expansion of Natural Theology

As we have seen, the grand themes of the Christian faith provide an interpretative framework by which nature may be seen, allowing it to be viewed and read in profound and significant ways. Christian theology is the elixir, the philosopher’s stone, which turns the mundane into the epiphanic, the world of nature into the realm of God’s creation. Like a lens bringing a vast landscape into sharp focus, or a map helping us grasp the features of the terrain around us, Christian doctrine offers a new way of understanding, imagining, and behaving. It invites us to see the natural order, and ourselves within it, in a special way – a way that might be hinted at, but cannot be confirmed by, the natural order itself. Nature is “seen” as God’s creation; the

“book of nature” is read as God’s story – and ours. It is as if a veil has been lifted, or a bright sun has illuminated a mental landscape. As C. S. Lewis put it so well: “I believe in Christianity as I believe that the Sun has risen – not only because I see it, but because by it, I see everything else” (Lewis 2000, 21).

A Christian natural theology thus provides an intellectual and imaginative framework by which nature can be *seen* as true, beautiful and good. Although this framework is intimated by nature itself, it is more fully and robustly articulated within the context of an incarnational, Trinitarian faith. Natural theology is therefore understood to embrace the traditional Platonic triad of truth, beauty and goodness. When properly understood, a renewed natural theology represents a distinctively Christian way of beholding, envisaging, and above all *appreciating* the natural order, capable of sustaining a broader engagement with the fundamental themes of human culture in general. While never losing sight of its moorings within the Christian theological tradition, natural theology both informs and transforms the human search for the transcendent, and provides a framework for understanding and advancing the age-old human quest for the good, the true and the beautiful.

Neither the capacity of nature to disclose God, nor the capacity of the divine self-disclosure to illuminate nature, is to be understood simply in terms of a rational making sense of things, as if the appeal of the Christian faith were limited to human reason. The implicit assumption of the primacy of the cognitive unquestionably serves to increase the alienation of theology from spirituality, driving a wedge between a “discipleship of the mind” and an equally important “discipleship of the imagination”. Where and how can conceptual space be created for the “natural theology of the imagination” so vigorously pursued by J. R. R. Tolkien and others, which has immense potential as an apologetic device – not to mention its capacity to stimulate conversations across traditional disciplinary boundaries? A broader vision of a natural theology, going beyond the realms of systematic theology, is clearly required, enabling an engagement of both the mind and the imagination.

One of the weaknesses of recent approaches to natural theology is that it has been seen almost exclusively as an enterprise of sense-making, having been placed within a rationalist straightjacket as a result of the intellectual agendas of both the Enlightenment and its critics. The waning of modernity allows the discipline to be liberated from this debilitating conceptual imprisonment, so that its deep intrinsic appeal to the human imagination may be reclaimed. Natural theology is to be understood to include the totality of the

human engagement with the natural world, embracing the human quest for truth, beauty and goodness (McGrath 2008, 221-313).

The created capacity of nature to point to God is therefore not limited to its rationality, but extends to its beauty and goodness. The conceptual interlocking of these notions was a commonplace in the theology and philosophy of the high Middle-Ages, which saw such notions as “intelligible beauty” as grounded in a Christian vision of reality. A Trinitarian theology of creation laid the foundations of a “pancalistic vision of the cosmos”, grounded in a “feeling for intelligible beauty” characteristic of this formative age (Eco 2002, 4-5 and 17-19). Rationality, beauty and goodness were each facets of the same creator, reflected in the divine creation, and discerned, if at times dimly, by humanity, who had been created in the image of that same God.

Yet it is not merely that a feeling for the rationality, beauty or goodness of the cosmos has the potential to elicit the quest for the divine, or intimate the nature of God. It is that a robustly Trinitarian theology has the potential to sustain and inform these notions, which otherwise run the risk of becoming subjective notions, determined by human convention. Such a theological framework provides conceptual stability to these notions, partly by grounding them in something still more fundamental – the nature of God – and partly by insisting that the human capacity to recognize and respond to them is grounded in humanity possessing the image of God, even if in a weakened and attenuated form. Within such a theological framework, accommodation can be made for both the apparent partial irrationality, ugliness, and evil of the world, and the human failure to respond appropriately to what can be known of the rationality, beauty and goodness of the world.

The linking together of the true, the beautiful, and the good has been a commonplace since the late eighteenth century. This three-fold concatenation of ideals, like a secularised trinity, has often been used to discuss the manner in which the transcendent is encountered, and the nature of its impact upon human perception, cognition, and action. Why is it so important to reconceive natural theology in terms of the quest for beauty, truth and goodness? In part, this is necessary to correct an unhelpful development which took place on account of the Enlightenment’s emphasis upon rationality, which led to the impoverishment of the theological engagement with the natural realm through an excessive preoccupation with the capacity of the human mind to make sense of things.

This extension of the notion of natural theology to embrace a wider vision of the human encounter with nature does not deny the importance of

making sense of things, but refuses to limit the enterprise of natural theology to rational reflection (Torrance 1993). It is clear, for example, that a recognition of the beauty of nature is common insight of humanity (Carroll 1993), which must be incorporated into any attempt to formulate a comprehensive natural theology. It is one of the more significant achievements of Hans Urs von Balthasar to have demonstrated that a natural theology can be extended far beyond an encounter with the purely natural world to embrace the world of human culture, focussed on the notion of “beauty” (O’Donaghue 1986). As Richard Viladescu has rightly pointed out, the beauty of the world cannot be finally satisfying in itself, but calls for completion in some deeper manner and mode. This natural theology of beauty can be extended to affirm the capacity of both art and music to point to, or create a longing for, the transcendent, which has important apologetic implications (Viladescu 1988; Viladescu 1999, 148-77).

Furthermore, the notion of “beauty” can be extended theologically to cope with the aesthetic variegation of the natural world. How can a natural theology accommodate the ugliness of much of nature, and reconcile this with nature’s more beautiful side on the one hand, and the idea of a good and wise creator on the other? At this point, we can begin to appreciate how a Trinitarian natural theology has a greater explanatory capacity than its deist alternatives. For a Trinitarian approach to the “economy of salvation” allows us to see nature as created yet fallen, retaining something of its pristine integrity yet at the same time being damaged or wounded by sin. As both Eberhard Jüngel and Hans Urs von Balthasar have pointed out, a true natural theology must be shaped by the cross of Christ, allowing its notion of beauty to be modulated and informed by this central image of the Christian faith (Jüngel 1977; Fields 2007). While much more needs to be done to explore this approach, it is clear that it opens up some promising and potentially productive lines of inquiry (McGrath 2007, 261-90).

Conclusion

This paper has set out a revisionary agenda for natural theology, arguing that the styles of natural theology which emerged during the Enlightenment have led to its conceptual impoverishment and intellectual destabilization. It is clearly now appropriate to call into question the continuing hegemony of such approaches, giving the waning of rationalism and a growing appreciation of the multi-levelled human response to nature. The rise of postmodernism has

led to erosion of the cultural plausibility of certain core assumptions of the Enlightenment, which had become embedded in such approaches to natural theology. Natural theology has had a long and distinguished history in the past; once it has been liberated from the intellectual straitjacket into which it was forced in response to the Enlightenment, it could also have a significant and fruitful future.

So might the renewal of a Christian natural theology lead to an enriched and deepened engagement between the natural sciences and Christian faith? It is my belief that a renewed natural theology has the potential to be an important, productive and intellectually rigorous interface between Christian theology and the natural sciences. Where some see boundaries as barriers, I see them as places of dialogue and exploration. This essay is offered as a small contribution to this dialogue, which has already achieved much – but which can surely achieve still more in the future.

Bibliography

- Alston, W. P. (1991). *Perceiving God: The Epistemology of Religious Experience*. Ithaca, NY, Cornell University Press.
- Barth, K. (1922). *Der Römerbrief*. Munich, Kaiser Verlag.
- Barth, K. (1927). *Die christliche Theologie im Entwurf*. Munich, Kaiser Verlag.
- Beiser, F. C. (1996). *The Sovereignty of Reason: The Defense of Rationality in the Early English Enlightenment*. Princeton, NJ, Princeton University Press.
- Berkhof, H. and H. J. Kraus (1978). *Karl Barths Lichtelehre*. Zürich, Theologischer Verlag.
- Brooke, J. H. (1989). "Science and the Fortunes of Natural Theology: Some Historical Perspectives." *Zygon* 24, 3-22.
- Brooke, J. H., and I. Maclean (2005). *Heterodoxy in Early Modern Science and Religion*. Oxford: Oxford University Press.
- Byrne, P. A. (1989). *Natural Religion and the Nature of Religion : The Legacy of Deism*. London, Routledge.
- Carroll, N. (1993). "On being moved by nature: Between religion and natural history," in Kemal, S., and I. Gaskell (eds), *Landscape, Natural Beauty, and the Arts*. Cambridge, Cambridge University Press, 244-66.
- Cronon, W. (1995). *Uncommon ground : toward reinventing nature*. New York, W.W. Norton.

- Dahm, John J. (1970). "Science and Apologetics in the Early Boyle Lectures." *Church History* 39, 172-86.
- Dawkins, R. (1986). *The Blind Watchmaker: Why the Evidence of Evolution reveals a Universe without Design*. New York, W. W. Norton.
- Dupré, L. K. (1993). *Passage to modernity : an essay in the hermeneutics of nature and culture*. New Haven, CT, Yale University Press.
- Eder, K. (1988). *Die Vergesellschaftung der Natur : Studien zur sozialen Evolution der praktischen Vernunft*. Frankfurt am Main, Suhrkamp.
- Edwards, M. J. (1990). "Porphyry and the Intelligible Triad." *Journal of Hellenic Studies* 60, 14-24.
- Evernden, N. (1992). *The Social Creation of Nature*. Baltimore, MD, Johns Hopkins University Press.
- Fields, S. (2007). "The Beauty of the Ugly: Balthasar, the Crucifixion, Analogy and God." *International Journal of Systematic Theology* 9, 172-83.
- Fischer, H. (1983). "Natürliche Theologie im Wandel." *Zeitschrift für Theologie und Kirche* 80, 85-102.
- Fyfe, A. (1997). "The Reception of William Paley's Natural Theology in the University of Cambridge." *British Journal for the History of Science* 30, 321-35.
- Gascoigne, J. (1988). "From Bentley to the Victorians: The Rise and Fall of British Newtonian Natural Theology." *Science in Context* 2, 219-256.
- Gellner, E. (1992). *Reason and Culture: The Historic Role of Rationality and Rationalism*. Oxford, Basil Blackwell.
- Gillespie, N. C. (1987). "Natural History, Natural Theology, and Social Order: John Ray and the 'Newtonian Ideology'." *Journal of the History of Biology* 20, 1-49.
- Gundlach, T. (1992). *Selbstbegrenzung Gottes und die Autonomie des Menschen : Karl Barths Kirchliche Dogmatik als Modernisierungsschritt evangelischer Theologie*. Frankfurt am Main, Lang.
- Gutting, G. (1999). *Pragmatic liberalism and the critique of modernity*. Cambridge, Cambridge University Press.
- Harrison, P. (1990). *'Religion' and the Religions in the English Enlightenment*. Cambridge, Cambridge University Press.
- Harrison, P. (2006). "Natural Theology, Deism, and Early Modern Science," in Eisen, A., and G. Laderman (eds). *Science, Religion, and Society: An Encyclopedia of History, Culture and Controversy*, New York, Sharp, 426-33.

- Jüngel, E. (1977). "Gelegentliche Thesen zum Problem der Natürlichen Theologie." *Evangelische Theologie* 37, 485-88.
- Kapper, M. (1995). "'Natürliche Theologie' als innerprotestantisches und ökumenisches Problem? Die Kontroverse zwischen Eberhard Jüngel und Wolfhart Pannenberg und ihr ökumenischer Ertrag." *Catholica* 49, 276-309.
- Kock, C. (2001). *Natürliche Theologie : ein evangelischer Streitbegriff*. Neukirchen-Vluyn, Neukirchener.
- Lewis, C. S. (2000). *Essay Collection*. London, Collins.
- Lustig, A. (2004). "Natural Atheology," in Lustig, A., R. J. Richards, and M. Ruse (eds). *Darwinian Heresies*, Cambridge University Press, 69-83.
- Macken, J. (1990). *The Autonomy Theme in the Church Dogmatics of Karl Barth and His Critics*. Cambridge, Cambridge University Press.
- Mandelbrote, S. (2007). "The Uses of Natural Theology in Seventeenth-Century England." *Science in Context* 20, 451-80.
- McGrath, A. E. (2008). *The Open Secret: A New Vision for Natural Theology*. Oxford, Blackwell.
- McGrath, A. E. (2009). *A Fine-Tuned Universe: The Quest for God in Science and Theology*. Louisville, KY, Westminster John Knox Press.
- O'Donoghue, N. (1986). "A Theology of Beauty", in Riches, J. (ed), *The Analogy of Beauty: The Theology of Hans Urs von Balthasar*. Edinburgh, T. & T. Clark, 1-10.
- Pinkard, T. (2003). "MacIntyre's Critique of Modernity", in. Murphy M. C. (ed.), *Alasdair MacIntyre*. Cambridge, Cambridge University Press, 176-200.
- Polkinghorne, J. (2006). "Where is natural theology today?" *Science and Christian Belief* 18, 169-79.
- Prenter, R. (1952). "Das Problem der natürlichen Theologie bei Karl Barth." *Theologische Literaturzeitung* 77, 607-611.
- Reventlow, H. (1980). *Bibelautorität und Geist der Moderne*. Göttingen, Vandenhoeck & Ruprecht.
- Ribas, A. (2003). "Leibniz' Discourse on the Natural Theology of the Chinese and the Leibniz-Clarke Controversy." *Philosophy East and West* 53, 64-86.
- Schmidt, J. (1996). *What is Enlightenment? : eighteenth-century answers and twentieth-century questions*. Berkeley, CA, University of California Press.
- Schmidt, J. and Wartenberg, T. E. (1994). "Foucault's Enlightenment: Critique, Revolution, and the Fashioning of the Self." in Kelly, M. (ed.), *Critique and Power: Recasting the Foucault/ Habermas Debate*. Cambridge, MA, MIT Press, 283-314.

- Stoeckle, B. (1962). "Gratia supponit naturam" : Geschichte und Analyse eines theologischen Axioms. Rome, Herder.
- Swinburne, R. (2004). "Natural Theology, its 'Dwindling Probabilities' and 'Lack of Rapport'." *Faith and Philosophy* 21, 533-46.
- Szekeres, A. (1966). "Karl Barth und die natürliche Theologie." *Evangelische Theologie* 24, 229-42.
- Torrance, T. F. (1970). "The Problem of Natural Theology in the Thought of Karl Barth." *Religious Studies* 6, 121-135.
- Torrance, T. F. (1993). "The Transfinite Significance of Beauty in Science and Theology." In Alonso, L. G., E. Moutsopoulos, and G. Seel (eds.) *L'art, la science et la métaphysique*, Berne: Lang, 393-418.
- Umbach, M. (2000). *Federalism and Enlightenment in Germany, 1740-1806*. London, Hambledon Press.
- Vidal, F., and Kleeberg, B. (2007). "Knowledge, Belief, and the Impulse to Natural Theology." *Science in Context* 20, 381-400.
- Viladesau, R. (1988). "Natural Theology and Aesthetics : An Approach to the Existence of God from the Beautiful?" *Philosophy & Theology* 3, 145-160.
- Viladesau, R. (1999). *Theological Aesthetics: God in Imagination, Beauty and Art*. New York, Oxford University Press.
- Webb, M. O. (1989). "Natural theology and the concept of perfection in Descartes, Spinoza and Leibniz." *Religious Studies* 25, 459-75.
- Westermann, C. (1987). "Karl Barths Nein. Eine Kontroverse um die *Theologia Naturalis*. Emil Brunner - Karl Barth (1934) in Perspektiven des Alten Testaments." *Evangelische Theologie* 47, 386-95.
- Wilkinson, D. A. (1990). "The Revival of Natural Theology in Contemporary Cosmology" *Science and Christian Belief* 2, 95-115.
- Zeit, L. M. (1994). "Natural Theology, Rhetoric, and Revolution: John Ray's Wisdom of God, 1691-1704." *Eighteenth Century Life* 18, 120-33.

Natural Theology or Theology of Nature and the Natural?

Anne L.C. Runehov

I have never looked upon ease and happiness as ends in themselves – such an ethical basis I call more proper for a herd of swine. The ideals that have lighted my way, and time after time have given me new courage to face life cheerfully, have been Truth, Goodness and Beauty (*Albert Einstein* [1931] 2006, 4).

Introduction

Based on arguments from applied mathematics, Albert Einstein also emphasized the ‘marvellous structure of reality’ and the ‘reason that manifests itself in nature’ (2006, 5). Also the philosopher Iris Murdoch writes in *The Sovereignty of Good*, that for some reason, we (believers and non-believers) are convinced that ‘there is a “true direction” towards better conduct, that goodness “really matters”, and does certainty about a standard not suggest an idea of permanence which cannot be reduced to psychological or any other set of empirical terms?’ She continues that a higher, inviolable perfect and absolute beautiful form ‘must’ exist (1970, 60). Beauty, truth and goodness are also concepts frequently used in mystical writings and narratives of advanced meditators who have experienced Ultimate Reality across religions and throughout history. To Alister McGrath, beauty, truth and goodness are divine realities revealed through nature and his theological exploration is to find a way to reopen the ‘entire question of the status and potential of [*Christian*] *natural theology*’. By natural theology he intends the ‘Christian way of “seeing”

nature, which involves more than the mere “making sense” of nature.’ His approach differs entirely from the previous ones; to him it is a matter of beginning all over again. McGrath’s natural theology is the theological enterprise of viewing the world through ‘the spectacles provided by Christian theology as a whole’ (Barrett 2011).

One concern is though that, renewing natural theology implies pulling a heavy historical load up a hill. For Anselm of Canterbury (11th century) natural theology implied finding convincing arguments for the existence of God by way of *deductive a priori ontological reasoning*. The same reason can be found behind Thomas Aquinas’ (13th century) natural theological endeavours. He, however, chose to explore the issue by way of *deductive a posteriori ontological reasoning* on cosmological and teleological grounds. During the 17th and 18th centuries and due to the prosperity of the natural sciences, a new method for doing natural theology was employed, namely *inductive reasoning* based on arguments from design. For instance, perhaps the best known advocate of such thinking, William Paley, argued that God’s design of the whole of creation could be seen in the general happiness, or well-being, that was evident in the physical and social order of thing (Barrett 2011). However, Paley’s analogy of the watchmaker, 1802 would receive a severe counter-argument in the work of Charles Robert Darwin in 1859.

Natural Theology from Within

In the 20th century, protestant theologian Karl Barth criticized the apologetic endeavour to prove the existence of God. Barth opposed the Enlightenment-related understanding of natural theology which proclaimed that human beings are able to encounter the divine ‘under conditions of their own choosing and making’ (as quoted by McGrath). This line of theological thinking undermines the role of the divine. It is against this background that McGrath invites us to see natural theology as an “essential Christian way of envisaging the world, grounded in and informed by a Trinitarian vision of reality”. In other words, we are invited to see natural theology as a *revealed* theology. However, we need to see this not from the perspective of the outside but from the perspective of within. If, he argues, the legitimation of natural theology

lies in divine revelation itself, '*theologia revelata* would both legitimate *theologia naturalis* and define its scope'. Nature reveals God but does not enclose God, God and nature are not the same, God 'perfects and fulfils it' by God's grace.¹ This implies that the categories of *divine rationality* (or *wisdom*), *beauty* and *goodness* are revealed in nature. In McGrath's own words, such a comprehension of natural theology 'holds that nature possesses a derivative capacity to disclose something of God's wisdom, whether in an apologetic or dogmatic manner, without undermining or displacing divine revelation itself'. According to McGrath, *nature* and the *natural* are socially constructed concepts rather than objective, autonomous entities. Nature, he maintains, is not 'a piece of "raw data"', but something which we choose to view in certain ways'.² Nature is God's creation and therefore the 'book of nature' is a book about God and us. Reading this book is seeing nature in a Christian way. A Christian Trinitarian understanding of natural theology embraces the human search for transcendence, goodness, beauty and truth. It combines the *rational* with the *capacity of imagination*. Rationality, beauty and goodness are all aspects of the same creator. These divine traits are reflected in the divine creation, and are able, although imperfectly, to be mirrored in the *imago Dei* (human beings). In answer to the question of how a view of a good, wise and beautiful creator, creating a good, wise and beautiful world, can be consistent with misery, poverty, ugliness, wickedness, etc., he responds that such a view allows us to see nature as created (wise and good and beautiful) but yet fallen. Nature is 'wounded by sin'. Hence, the doctrine of the 'cross of Christ' becomes essential to McGrath's version of natural theology. To summarize:

- (1) Nature is divine revelation.
- (2) God (the divine) is wise (rational) beautiful and good.
- (3) Hence, nature discloses something of God's goodness, wisdom (rationality) and beauty.

¹ Which I believe is a pantheistic view of the relationship between God and the universe.

² By 'choose', McGrath means that we can choose to see the world through different spectacles belonging to different world-views.

- (4) Human beings are part of nature and created as *Imago Dei*.
- (5) Hence, humans reflect (though imperfectly) divine wisdom (rationality), beauty and goodness
- (6) Nature has fallen, nature is wounded by sin.
- (7) Therefore, there is evil in nature.
- (8) Therefore, the doctrine of the Cross of Christ is essential.

Since I do not possess the theological background I would need to be able to address the doctrines of Christian theology properly, my reflection will be of an analytic philosophical nature. Hence I will analyse the concepts of nature and the natural and evaluate whether McGrath's theology is a type of natural theology or whether it should be understood as a theology of nature and/or of the natural.

Comparing Versions of Natural Theology

It is clear that McGrath's version of natural theology differs considerably from the versions put forward by Anselm of Canterbury and Thomas of Aquinas. Three major differences are: (1) McGrath does not use the principle of analogy; (2) he does not apply a deductive method and (3) his aim is not to prove the existence of God. Indeed, concerning the latter he writes that his version of natural theology does 'not "prove" the existence of God, but nevertheless points to the capacity of the Christian faith to provide a satisfactory account of the human experience of nature.' Furthermore, from his own writings we know that he wants to depart from Karl Barth's modernised or protestant natural theology.

However, one could still argue that his natural theology still follows William Paley's line of thinking, because McGrath's version of natural theology is, after all, a theology of divine revelation through nature. The difference is that McGrath's view of divine revelation through nature is to be understood from the *inside* rather than from the *outside* as Paley's version clearly advocates and this implies that McGrath's arguments do not derive from design. Indeed, to see nature from the inside is more than merely making sense of it. Furthermore, as mentioned above, McGrath does not apply the principle of analogy while Paley does, as evidenced in the watchmaker analogy. This analogy clearly reflects the *mechanical*

worldview of the period of the *Enlightenment*. The argument goes as follows.

The complex inner workings of a watch necessitate an intelligent designer (a watchmaker). In *analogy*, the complexity of *C* (be it the brain, a particular organism or the entire universe) necessitates a designer *D*.

Hence, as soon as we observe something that is rather complex, be it constructed as a watch or naturally shaped as snowflakes, we realize that *someone must have designed it*. This is again not what McGrath intends. Rather, his concern is to see God's revelation in nature, which is not the same as inferring a divine design in nature. Nevertheless, both Paley and McGrath have a pragmatic rather than theoretical interpretation of natural theology. Both apply the method of induction based on human experiences of nature, whether experiences from the outside (Paley) or experiences from the inside (McGrath). Still the difference between these two views is crucial. While Paley's pragmatic natural theology is about measuring or observing natural phenomena in order to understand how these are constructed in order to see the design or designer behind it, McGrath's version is considerably more refined and complex. As a matter of philosophical inquiry, the question is whether his theological reflection fits into the realm of natural theology or a theology of nature and/or of the natural?

Nature and the Natural

Before analysing this further we need to take a closer look at how McGrath understands nature and the natural, i.,e, as social constructs, not mere data. I agree with McGrath that *how* we come to apprehend nature and the natural is to some extent a social enterprise. Nevertheless, what is not socially constructed is that "a thing [a process or event] is what it is and not another thing", however it may have been produced' (Lamprecht 1944, 19). Sterling Lamprecht must have been inspired by Aristotle who, in his *Metaphysics*, argued that 'for any entity to be is for it to be what it is' (Stanford Encyclopedia of Philosophy). Hence if we follow this line of argument, it is the names, categorisations etc. that human beings have given to things that are the social constructs. Furthermore, these social constructs seem to be universal. For example, a flower (une fleur, en

blomma, etc.) is what it is, namely that which we have called a flower, *une fleur* or *en blomma* and nothing else. It is the same for the process of gravity or the event of a thunderstorm. But also the mind is what it is and nothing else.

This line of thought has its advantages. The first advantage is that, at the level of *being* everything is what it is, regardless of whether it is mental or physical. Lamprecht continues 'we empirically find both mind and matter, both ideas and things, both reflections and blind impulse; but the world still remains an interrelated whole without intrusions from some other "realm" or bifurcations or ontological gulfs' (Lamprecht 1994, 20). This means that even if things are what they are, they are not their own. In Sallie McFague's words, '[t]he evolutionary, ecological perspective insists that we are, in the most profound way, "not our own": we belong, from the cells of our bodies to the finest creations of our minds, to the intricate, ever-changing cosmos'. Moreover and importantly, this line of thought does not exclude God, because firstly, in analogy, also God would be what God is and nothing else and secondly, also God would be part of an interrelated whole. The second advantage is that in this view, the exact cause of things (events and processes) is not what is essential, which gives room for both religious and non-religious understandings of the world. In McGrath's words, it is possible to see the world through Christian spectacles.

Nevertheless, one of my concerns here is whether it is plausible to equate nature and the natural. From a scientific point of view, that what belongs to nature can be measured or observed by way of scientific methods, even though one of the fathers of Quantum Physics, Werner Heisenberg, has made it clear that our measurements do not provide a complete explanation. On a micro-level, and according to Heisenberg, when we measure a particle, the more precisely the position of a particle is given, the less precisely can one say what its momentum is and vice versa.³ However, as first argued by Heisenberg in 1927, 'the fact that

³ His view has been disputed. Indeed, some argue that what he intends is not an uncertainty of measurement but an unpredictability. The counter argument rests upon the fact that past measurements are known but future ones are not. Heisenberg does not dispute this but argues, in line with Niels Bohr, that nothing is known unless observed. Heisenberg's uncertainty principle is one of the cornerstones of the Copen-

quantum states do not admit simultaneously precise values of conjugate observables, such as position and momentum, does not necessarily imply an incompleteness of the theory, but rather is consistent with not being able to simultaneously determine such observables experimentally to an arbitrary accuracy' (Hall and Reginatto 2002, 3289).⁴ Hence, at the micro-level, the result of a measurement (observation) is directly linked to the observer. Obviously, an observer cannot observe everything simultaneously.⁵

On a macro level, the situation is not that much different. Neuroscientists, thanks to the advanced equipment they have at their disposal today, are able to measure the neural correlates of different experiences (including religious ones); they are able to measure the neural correlates of empathic action between beings; psychologists can measure dream states and, by way of gene technology, it is possible to draw a genetic map of a person. However, what is not possible to measure by scientific means is what exactly we are experiencing or dreaming. Neither is it possible to account for what it is to be a human person embedded, not only in biology and neurology, but also in the subjective self, environment, culture and religion. Scientists cannot

hagen Interpretation of Quantum Mechanics. There is unfortunately no space to dig deeper into this interesting discussion.

⁴ The paper by Heisenberg referred to here concerns the uncertainty principle and was first published in *Zeitschrift für Physik* 43:172-198, 1927.

⁵ However and importantly, there are several interpretations of Quantum Theory: the micro-macro interpretation along the Bohr line, better known as the Copenhagen Interpretation; the mind-body interpretation along the Wigner and Wheeler line, also known as the Princeton interpretation; The Many Worlds interpretation of Everett III and the Many Minds interpretation by Albert & Loewer and, later, David Deutsch; furthermore there is the interpretation by Penrose taking gravitation as the cause of the collapse; and there is the Pilote Wave interpretation along the de Broglie-Bohm line. Furthermore, there are the more recent interpretations, for example the modal interpretation and the interpretation based on decoherence. It is also important to note that concept collapse was mostly used by von Neumann (1995). Neither Bohr nor Heisenberg used the term collapse. Von Neumann had a more realistic view on the wave function. Criticism of the measurement problem concerned von Neumann. Bohr and Heisenberg avoided the measurement problem by having a non-realistic view of the wave function which made it possible to avoid the collapse. It is important to notice the distinction between the von Neumann view and the Bohr/Heisenberg view.

measure what it feels like to be a human person, what a flower smells like or how frightening a thunderstorm is. To put it in Thomas Nagel's famous words, science cannot measure 'what it is like to be a bat' (Nagel 1974, 436).

Hence, while photons and neurons belong to nature, *the experience* of observing photons and neurons at work does not belong to nature but rather to the natural. It is natural for an apple tree to produce apples in autumn, but the tree and the apples are tokens of nature. Similarly it is natural for human beings to imagine things, to dream, to laugh and cry, to observe and measure and to interpret things (processes, events and behaviours, etc) in a certain way.⁶ Briefly, nature could be described as that which we can grasp while the natural would be that through which we grasp nature. Lamprecht's thesis still stands, a *thing* is what it is, a dream is what it is, namely a dream, regardless of its cause, but they are not social constructs. As such, things do not have intentions or meaning. Meaning and intentions come about because it is natural for human beings to attribute meaning and intentions to things, a process that is, at least partly, socially constructed. To put it differently, it is natural for human beings to attribute meaning etc. to the world and anything in it. However these human traits are not socially constructed. What is socially constructed however is the way in which the meaning etc. is interpreted.

Theology of Nature

Can we answer the question raised above of whether McGrath's theology is a natural theology? The versions of natural theology stated in the introduction clearly show that natural theology is a theology that is done from the outside. The notion of God is presupposed but the existence of God needs to be proven. To achieve this, as is most obvious in Paley's version, scientific discoveries are used alongside human reasoning and analogy. God is seen as the designer, amongst other things, of evolution. However it is not at all clear whether God is involved in the process of evolution in any way. In other words, it is not clear whether God acts in

⁶ In a previous article I argued that being an experiencer is the essence of human existence (Runehov 2010, 160).

creation or has left creation to itself. Indeed, it is not clear whether natural theology is deistic, a position that leaves no room for sacred revelation. If I have understood McGrath correctly, this is not what he intends. The focus of his theology lies more on the natural (interpreted experiences of revelation through nature) than on nature itself (as observed by science and the object of rational thought). Perhaps McGrath's theology is more in line with the theological position termed *the theology of nature*. Theology of nature accepts the truth of the Bible and Christian revelation. However, the way those truths are explained depends on scientific discoveries, which makes the theology of nature a dynamic line of theological thought. The idea is that the universe is not created perfect, static and eternal; rather, in line with scientific discoveries, the universe is changing, something God revealed to us through grace. Hence, there is a common platform for scientists and theologians. David Tracy and Nicholas Lash viewed this platform as a possibility in order to 'establish plausible "mutually critical correlations" not only to interpret the world but to help change it' (Tracy and Lash 1983, 91). Hence, it is not a matter of inferring God by analogy of nature. As Salie McFague writes, 'there is a focus on the cosmos with the intent both to understand it better -- and to orient our praxis within it more appropriately -- [this] is one collaborative effort for science and theology in our time' (McFague 1990).

What are the criteria for a theology of nature? According to McFague four criteria are essential. Firstly, a theology of nature needs to correspond to contemporary scientific understandings of nature. Secondly, human beings should not be seen as separated from the rest of creation but deeply integrated with it. Thirdly, it has to be creation centred and focus on the incarnational presence of God in the world. Fourthly, it needs to 'acknowledge and press the interconnectedness of peace, justice, and ecological issues, aware that there can be no peace or justice unless the fabric of our ecosystem is intact' (McFague 1990). This means that we need to take responsibility for the world that is revealed to us. This also means that we need to see God's intention in God's revelations. Indeed, revelation only makes sense when it is intentional. Hence, it needs to be received by agents capable of capturing the intention of what is revealed to them. Imagine you are watching a beautiful sunset, or a young person helping an old person to cross the

street, or an ant-hill. These are examples of beauty, goodness and rationality in nature. However, in order to understand these experiences of nature as God's intention to reveal Godself to us (or God's intention to awaken our capacity of empathy, for example), something more is needed. Firstly, we need to *believe* in at least the possibility of God and, secondly, we need to *believe in our belief* that God has intentions. The latter is so because we can only really *know* our own intentions. Nevertheless, due to our capacity of theory of mind we can believe that another agent has such and such an intention. When it comes to natural agents, and provided the neurocorrelations of the capacity of theory of mind are intact, there is no problem. However, when the agent is God, we need to imagine God's relationship with the world and hence God's intention in God's revelations through the world. However, that is not to say that our belief of the intention of God cannot be justified.

Such a theology could be called heuristic theology, because, similar to scientific endeavours, as Arthur Peacocke argues,

[t]here is increasing awareness not only among theologians, but even more among ordinary believers that, if God is in fact the all-encompassing Reality that Christian faith proclaims, then that Reality is to be experienced in and through our actual lives as biological organisms who are persons, part of nature and living in society (Peacocke, 1979, 16-17; 1987, 1-11).

According to McFague, such a heuristic theology, like science, performs experiments; it puts itself in an as-if thinking mode; it is not afraid to imagine new possibilities and new angles of reasoning; it is creative and dares to think differently. Hence, heuristic theology or a theology of nature is not fixed by religious or scientific authorities, but it is constrained to find convincing and persuasive models for understanding the Christian faith in the age of science. It is through revelation that we are able to see meaning and intention in nature; that there is room for hope, goodness, beauty and wisdom. As the Russian theologians

Vladimir Solovyov and Nikolai Lossky argue, evolution is ‘a gradual revelation of the interrelated ontological principles of truth, goodness and beauty’ (Sládek 2010, 14). According to them, it is divine wisdom that reveals this integral and universal truth about creation.

Conclusion

Perhaps it is plausible to see McGrath’s theology as a theology of nature rather than as natural theology. Furthermore, taking into account the distinction that rules between nature and the natural and the importance McGrath puts on the role of the *imago Dei*, his theology is also a theology of the natural. In my opinion, we are relieved of the unavoidable historical burden, which allows us to better understand the novelty in McGrath’s theology. We can better understand the premises that God reveals Godself in the world and, since God is wise, beautiful and good, the world discloses something of these divine traits. While entirely interrelated with the world, humans are also created as *imago Dei*, which implies that they mirror (though imperfectly) divine wisdom or rationality, beauty and goodness. However, the world, including humans, is also ugly and wicked. According to the Christian faith, ugliness and wickedness came about through sin but the Christian doctrine of the cross also tells us that there is a solution. The solution is to take up our cross, i.e. to see God’s intentions revealed through the process of evolution (which includes ourselves) and to take responsibility as *imago Dei* for and in that evolution. Being *imago Dei* means that human beings are ‘creative creatures, beings who creatively act in creation’ (Drees 2010, 123). The more we develop our creativity and surpass our limits, the more God becomes God. As Willem Drees argues, human created technology is a tool to manifest the central themes of theology, justice and love, e.g. to ‘feed the hungry, to clothe the naked, to care for the sick’, to the world (2010, 119). Seen from within the framework of McGrath’s theology, one could say that technology is not about playing God but rather about *obeying God’s intentions revealed in nature, using the capacities that come naturally to us.*

Bibliography

- Barrett, Peter. (2010). "Natural Theology." In *Encyclopedia of Sciences and Religions*, eds. Nina, Azari and Anne L., C. Runehov, New York: Springer, forthcoming 2011.
- Drees, Willem B. (2010). *Religion and Science in Context: A Guide to the Debates*. New York: Routledge.
- Einstein, Albert. ([1931] 2006). *The World as I See it*. New York: Citadel Press Books.
- Lamprecht, Sterling P. (1944). "Naturalism and Religion." In *Naturalism and the Human Spirit*, ed. Yervant Hovhannes Krikorian, New York and London: Columbia University Press.
- McFague, Sallie. (1990). "Imaging a Theology of Nature: The World as God's Body." In *Liberating Life: Contemporary Approaches in Ecological Theology*, eds. Charles Birch, William Eaken and Jay B. McDaniel, New York: Orbis Books, 201-277.
- McGrath, A. E. (2008). *The Open Secret: A New Vision for Natural Theology*. Oxford: Blackwell Publishers Ltd.
- Murdoch, Iris. (1970). *The Sovereignty of Good*. London: Routledge and Kegan Paul.
- Nagel, Thomas. (1974). "What is it Like to Be a Bat?" *Philosophical Review*, 83(4): 435-450.
- Peacocke, Arthur. (1979). *Creation and the World of Science*. Oxford: Clarendon Press.
- Peacocke, Arthur. (1987). "Creation, Humanity and God." *Journal of Beliefs & Values: Studies in Religion and Education* 1469-9362 (8:1): 1-11.
- Peacocke, Arthur. (2004). "Articulating God's Presence in and to the World Unveiled by the Sciences in In Whom We Live and Move and Have Our Being," eds. Philip Clayton and Arthur Peacocke, Cambridge: Eerdmans Publishing Co.
- Sládek, Karel. (2010). "The View of Creation through the Eyes of Vladimir Solovyov and Nikolai Lossky." *European Journal of Science and Theology*, 6(2): 13-27.
- Tracy, David and Nicholas Lash. (1983). Eds. *Cosmology and Theology*. Edinburgh and New York: T. & T. Clark and Seabury Press.

von Neumann, John. (1995). *Mathematical Foundations of Quantum Mechanics*. Princeton: Princeton University Press.

Walach, Harald and Anne L.C. Runehov. (2010). "The Epistemological Status of Transpersonal Psychology." *Journal of Consciousness Studies*, 17(1-2): 145-165.

The best remedy for those who are afraid, lonely or unhappy is to go outside, somewhere where they can be quiet, alone with the heavens, nature and God. Because only then does one feel that all is as it should be.

Anne Frank

In Science (Alone) We Trust?

Mikael Stenmark

Abstract

Some people have an almost unlimited confidence in science and about what can be achieved in the name of science. The term “scientism” is frequently used to cover such a viewpoint. In this essay, different forms of scientism are identified, distinguished and analyzed. The particular focus is on epistemic scientism, which states that science sets the boundaries for what we human beings can ever know about reality. It is argued that epistemic scientism is a problematic position to take, one that in the end ought to be rejected. There are good reasons to believe that the world is bigger than the world of science and that we can obtain knowledge about this bigger world that cannot be reduced to scientific knowledge. We must, in fact, know many things before we are able to undertake any scientific endeavour or obtain scientific knowledge, because scientific knowledge actually depends on other sources of knowledge.

Keywords: Atkins, Dawkins, Dennett, knowledge, rationality, religion, science, scientism, Wilson.

Introduction

Some people seem to think that there are no real limits to the competence of science; no limits to what can be achieved in the name of science. There is no area of human life to which science cannot successfully be applied. A scientific account of anything and everything constitutes the full story of the universe and its inhabitants. Or, if there are limits to the scientific enterprise, the idea is that, at least, science sets the boundaries for what we human beings can ever know about reality. This is the view of *scientism*.

From a historical perspective, perhaps the most well-known proponent of scientism is the French social philosopher Auguste Comte, with his attempt to create a religion based on science—the “Religion of

Humanity” (Comte 1988). Another interesting and far-reaching attempt to have science take over many of the functions of religion, and thus itself become a religion, was undertaken by the German chemist and Nobel prize-winner Wilhelm Ostwald. He argued for science as an “Ersatzreligion”—a substitute religion (Ostwald 1912).⁷ Yet, many different forms of scientism have emerged over the last three centuries, and during the most recent decades a number of distinguished natural scientists, for instance Peter Atkins, Richard Dawkins, Carl Sagan and Edward O. Wilson, as well as philosophers such as Daniel C. Dennett and Patricia Churchland, have advocated scientism in one form or another.

In this essay I shall provide an overview of some forms of scientism, but in particular I want to focus on one version of it: the idea that only science can give us knowledge about reality. I shall discuss whether this is a reasonable position to adopt, or whether we should think that there are other forms of knowledge that human beings can attain, aside from scientific knowledge. Are there aspects of human life that are beyond the competence of science, but which nevertheless are aspects of life about which we might still obtain genuine knowledge? Is science more competent to deal with some things than others? Or, is science omniscient?

Different Forms of Scientism

Let me give some recent examples of spokespersons for scientism. Daniel C. Dennett writes that Darwin’s “dangerous idea” (that is, evolution by natural selection) bears “an unmistakable likeness to universal acid: it eats through just about every traditional concept, and leaves in its wake a revolutionized world-view, with most of the old landmarks still recognizable, but transformed in fundamental ways” (Dennett 1995, 63). Dennett believes that “Darwin’s dangerous idea is reductionism incarnate, promising to unite and explain just about everything in one magnificent vision” (Dennett 1995, 82).

⁷ See Hakfoort (1992) for an excellent presentation of Ostwald’s theories and ideas.

Richard Alexander talks about the most recent discoveries in evolutionary biology as being “the greatest intellectual revolution of the twentieth century.” He claims (just as Dennett does) that these insights will have a profound impact on our self-view, to such an extent that “we will have to start all over again to describe and understand ourselves, in terms alien to our intuitions” (Alexander 1987, 3). Richard Dawkins is equally optimistic, if not even more so, when it comes to what modern biology can deliver. He claims that we have “no longer ... to resort to superstition when faced with the deep problems: Is there a meaning to life? What are we for? What is man?” (Dawkins 1989, 1). In his view, science, and in particular biology, is capable of dealing successfully with all these questions.

In his essay, “The Limitless Power of Science,” Peter Atkins advocates the “omnicompetence of science” and believes that “science, with its currently successful pursuit of universal competence ... should be acknowledged king” (Atkins 1995, 132). Finally, Patricia Churchland writes: “In the idealized long run, the completed science is a true description of reality, there is no other Truth and no other Reality” (Churchland 1986, 249).

For a philosopher of religion, the view of science as a “universal acid,” eating through just about everything, as a complete explanation, as an answer to our existential questions, or even as the king of all, is very fascinating. These ideas are fascinating because here the traditional borderline between science and religion is now erased. The scientific project becomes a religious or a world-view project. The claim is that what can help humanity solve its besetting problems and sorrows is science. Let us put our trust in science because it can save us from evil.

But what, more precisely, is scientism? Though it is not at all easy to define, we might say that someone is a proponent of scientism if he or she believes that *everything (or at least as much as possible) could and should be understood in terms of science*. Be aware here that I am citing the notion of science in the restricted way that is common in English usage, though not in the German or Swedish tradition. Thus, the term covers only the natural sciences and those areas of the social sciences that are highly similar in methodology to the natural sciences. In scientism, it is assumed that there is something problematic, inferior or even irrational about any activities or enterprises that could not be

understood in such a way. In a demon-haunted world, science is the candle in the dark. To spread the light of science to the “unenlightened” is therefore a part of the mission of the scientific faith. Another concept that could be invoked in this context is “scientific expansionism,” and this explains quite well what the project is all about. Namely this: the proponents believe that the boundaries of science (that is, of the natural sciences) can and should be expanded in such a way that what has not previously been understood as amenable to scientific methodology can now be brought within the scope of science. Science can answer many more questions than we have previously thought possible.

In its most ambitious form, scientism can be defined as the view that science has no real boundaries; that is to say, eventually it will answer all empirical, theoretical, practical, moral and existential questions. Science will in due time solve all genuine problems that humankind encounters. How, exactly, the boundaries of science should be expanded and what, more precisely, it is that is to be included within science, are issues on which there is disagreement. Some proponents of scientism are more ambitious than others in their extension of the boundaries of science. That is to say, they are all scientific expansionists, but in different ways and to different extents.

I sometimes refer to advocates of scientism as “science believers.” The reason for this is not that I want to make a contrast between what we believe and what we know, indicating that these people only believe these things, and they do not really know them. Rather, my reason is that I want to highlight the “believe in” rather than the “believe that” aspect of belief. The point is that these advocates put their faith in science; they put their trust in science; they rely on science. Science is, in Paul Tillich’s terminology, their “ultimate concern” (Tillich 1951, 11-12). Some of the proponents of scientism even explicitly claim that science could and should replace traditional religions. I have called this form of scientism existential scientism or, sometimes, “scientific faith.”

Perhaps the best-known advocate of this view is Edward O. Wilson. According to Wilson, traditional religions are so full of falsehoods and superstition that they have to go, *but* the mental processes of religious belief represent programmed predispositions whose components have been incorporated into the neural apparatus of the brain through thousands of generations of genetic evolution. As such, they are

powerful, ineradicable, and at the centre of human social life. Therefore we have to find a substitute for religion. Wilson writes:

We are obliged by the deepest drives of the human spirit to make ourselves more than animated dust, and we must have a story to tell about where we came from, and why we are here. Could Holy Writ be just the first literate attempt to explain the universe and make ourselves significant within it? Perhaps science is a continuation on new and better-tested ground to attain the same end. If so, then in that sense science is religion liberated and writ large.

(Wilson 1999, 6)

One problem is that science lacks the primal source of power that religion, for genetic reasons, is hooked into. This is partly because the evolutionary epic denies immortality to the individual and divine privilege to society. Moreover, scientific naturalism (which is what Wilson calls the alternative to traditional religions) will “never enjoy the hot pleasures of spiritual conversion and self-surrender; scientists cannot in all honesty serve as priests” (Wilson 1978, 193). But, nevertheless, Wilson believes that a way exists to divert the power of religion into the service of science, even if it will be for the future to tell us how, exactly, this might be done. He believes that the evolutionary epic is probably the best myth (in the religious or “noble” sense as he calls it) that we shall ever have.

Existential scientism is a very interesting form of scientism, but my focus will be on another form, *epistemic scientism*. However, advocates of existential scientism (or scientific faith) typically also accept epistemic scientism and further use it as an argument for why we should accept existential scientism. So the two are interconnected.

Perhaps the most well-known form of scientism, epistemic scientism expresses a particular idea about the boundaries of knowledge,

saying that *the only genuine knowledge about reality is to be found through science and science alone*. The only kind of knowledge we can have is scientific knowledge. Everything outside of science is taken as a matter of mere belief and subjective opinion. Consequently, the agenda is to strive to incorporate as many other areas of human life as possible within the sciences, so that rational consideration and acquisition of knowledge can be made possible in these fields as well. If one holds this epistemological view, then it is of course not difficult to understand that one would believe that everything (or at least as much as possible) could and should be understood in terms of science—because what we cannot understand and explain in terms of science is something that we cannot know anything about at all. This is not the view that (a) science is the paradigm example of knowledge or rationality, but the view that (b) the only genuine knowledge about reality is to be found through science and science alone.

Churchland, as we have already noted, maintains that “In the idealized long run, the completed science is a true description of reality, there is no other Truth and no other Reality” (Churchland 1986, 249). A more classic statement of epistemic scientism comes from Bertrand Russell: “Whatever knowledge is attainable must be attained by scientific methods; and what science cannot discover, mankind cannot know” (Russell 1978, 243). Other examples of statements of this view are these:

Science is the only way to understand the real world. (Dawkins 2000)

Yet for many people, including many religious believers, science is arguably the only form of intellectual endeavour which can produce something worthy of the term “knowledge”, even if it is not guaranteed to do so. (Baxter 2007, 3)

We take science to be the only good way to arrive at reasonable beliefs about what is true, at least in the realm of the purely factual. Hence, we defer to science. (Boghossian 2006, 4)

Lastly, Atkins, in his argument for the limitless power of science, claims that:

There is no reason to suppose that science cannot deal with every aspect of existence. Only the religious—among whom I include not

merely the prejudiced but also the underinformed—hope that there is a dark corner of the physical Universe, or of the universe of experience, that science can never hope to illuminate. (Atkins 1995, 125)

The Traditional Theory of Knowledge

Before assessing these claims, let me break for a while and ask: what is knowledge? Though there are a number of different theories of knowledge in contemporary epistemology, I shall take as my starting point the traditional understanding of knowledge: the *justified true belief* account of knowledge (the “JTB account”):

Someone *S* *knows* something *p* (“Dinosaurs once roamed the earth”) if and only if

- (1) This person *S* believes *p*
- (2) This person *S* is justified in believing *p*
- (3) *p* is true. (It is a fact that “Dinosaurs once roamed the earth”.)

If these three conditions are satisfied then this person knows that dinosaurs once roamed the earth.

Our early ancestors *believed* that the earth was flat (thereby satisfying condition 1). They also thought they knew that the earth was flat. But even if their belief about the earth had been *justified* (that is, it satisfied condition 2), it was false. Now, if a belief is to count as knowledge it must not only be justified, it must also be *true* (that is, it must satisfy condition 3). And it was not a fact in the past, any more than it is today, that the earth was flat. So, our ancestors’ belief in this regard did not constitute knowledge. On the other hand, nor is it sufficient merely to *believe* that the earth is round, even though this is the factual case; something more is needed. Imagine one of our early ancestors saying to the others seated around the fire that he believes that the earth is round. When the others ask why he believes this, he answers: “I just

believe this—for no particular reason.” Out of sheer luck he happens to have stumbled upon the truth. But, according to the JTB account, he did not *know* that the earth was round, because condition 2 was not satisfied in his case.

What, more exactly, does it mean to be “justified” in believing *p*? According to *evidentialism*, a belief is *justified* only when there are good reasons or sufficient evidence to think that it is true. Perhaps W. K. Clifford’s claim that “it is wrong always, everywhere, and for anyone, to believe anything upon insufficient evidence,” is the best-known statement of evidentialism (Clifford 1877/1947, 77). On this account, “justified belief” simply means, “belief for which one has good reasons.” According to evidentialists, the second condition should be explicated as follows:

(2′) This person *S* is justified in believing *p*, that is, he or she has sufficient evidence or good reasons to believe *p*.

Some people do not make a distinction between knowledge and rationality. Perhaps they think that it is rational to believe only what one knows to be true. However, there appear to be many things that we do not know, but which we are still perfectly rational in believing. I believe that my wife is home right now because she told me that she would be there. But maybe she has changed her mind and gone to visit some friends instead. Would I not in these circumstances be rational in believing that she is home, although this turns out to be wrong? Or, consider our early ancestors again. They believed that the earth was flat. I would say that, although they were wrong, they were rational in believing what they did believe.

The evidentialist theory of rationality takes this into account by simply dropping the third condition and then saying:

Someone *S* is *rational* in believing something *p* if and only if

- (1) This person *S* believes *p*
- (2) This person *S* is justified in believing *p*.

Truth (“ p being true”) is then not a necessary condition for rationality; it is only a necessary condition for knowledge. So one could be rational in believing something which is, or turns out to be, false.

If we explicate epistemic scientism in terms of the JTB account of knowledge, we arrive at:

Someone S *knows* something p if and only if

- (1) This person S believes p
- (2') This person S is *scientifically* justified in believing p
- (3) p is true.

Science provides the only path to knowledge. One could similarly hold a scientific view when it comes to rationality. I have called this view *rationalistic scientism*. To adopt this view is to maintain that one is only being rational if one holds only beliefs that are scientifically justified. It is irrational for anyone to hold any belief that cannot be supported by good scientific evidence.

Problematic Implications of Scientism

Let us focus on epistemic scientism and discuss some of the problems it faces. First, what is seriously problematic about the epistemological form of scientism is that it is self-refuting (that is, it undermines itself) or is self-referentially incoherent (that is, when it is applied to itself it generates a contradiction).

Epistemic scientism states that all genuine knowledge is scientific knowledge. But what is the status of this proposed claim about knowledge? In fact, it follows from this claim itself that we cannot *know* that scientific knowledge is the only mode of knowledge *unless* we are able to determine that this is so by scientific means. This is the case because, according to this epistemology, science is the only source of knowledge that we have. The belief that “all genuine knowledge is scientific knowledge” is, according to the theory itself, a justifiably true belief if and only if it is scientifically verifiable. Hence, in accord with the JTB theory, these conditions must be satisfied:

- (4) Someone *S* believes *p*, namely that all genuine knowledge is scientific knowledge
- (5) This person *S* is *scientifically* justified in believing *p*, namely that all genuine knowledge is scientific knowledge
- (6) *p* is true.

But what scientific methods, for instance in biology or physics, are suitable for the task, demanded by the condition (2''), of providing scientific justification for the belief that the only genuine kind of knowledge is scientific knowledge? Well, hardly those methods that make it possible for scientists to discover and explain electrons, protons, genes, survival mechanisms and natural selection. The reason is not that the content of this belief is too small, too distant or too far in the past for science to determine its truth-value (or probability), rather, it is that beliefs of this sort are not subject to scientific investigation.

The belief that only science can give us knowledge about reality is a view in the theory of knowledge and is, therefore, an issue for philosophy and not a matter for science. But further, epistemic scientism is self-refuting, undermining itself. This is so because, if the belief that only science can give us knowledge about reality is a philosophical standpoint, then it follows that we can never know that it is true because the belief itself says that the only kind of knowledge we can have is scientific knowledge! If all this is correct, it is absolutely devastating for epistemic scientism. However, the only people who seem to pursue this line of thought are philosophers or, to be more precise, only analytical philosophers. But this is as bad as it could get, because it entails that what one believes cannot even possibly be established as the truth: it is necessarily false. It is just as problematic as it would be for someone to be taller than he is, to become a father of his own parents, or to be a married bachelor.

The only way around this problem is to try to reformulate the scientific stance. But is this possible? The answer is yes, and I think Atkins proposes such a form of scientism. He writes that the "attitude that I advocate is that the omniscience of science, and in particular the simplicity its reductionist insight reveals, should be accepted as a working hypothesis until, if ever, it is proved inadequate" (Atkins, 1995,

132). But why should we accept this as our working hypothesis? The answer that Atkins hints at is that science has been tremendously successful; it has given us insights about nature that could only have been dreamt of a couple of centuries ago. It is the success story of science that justifies the *scientistic attitude*: that the working hypothesis should be that everything could and should be understood in terms of science.

Even though we cannot prove that all genuine knowledge is scientific knowledge, we can and should take this as our working hypothesis because of the successes of science. Other kinds of knowledge might therefore exist. This “softcore scientism,” as I shall call it, does not, in contrast to the previous “hardcore scientism,” deny that other kinds of knowledge might exist. Rather, it wants to place the burden of proof on to those who claim that there do exist other kinds of knowledge than scientific knowledge. The advocates of soft-core scientism merely maintain that we should be suspicious of all human knowledge claims that are not scientific and which apparently cannot be reduced to scientific knowledge. This form of scientism appears not to be self-refuting. It does not entail that we know that all genuine knowledge is scientific knowledge and thus face the impossible task of explaining how this knowledge could be obtained by scientific means. Its advocates would, rather, maintain that this is a rational belief or a justified working hypothesis; it is rational or justified because of the success story of science. Hence the idea is that it is rational to believe (or to accept as a working hypothesis) that the only kind of knowledge we have is scientific knowledge, as long as there are no good reasons to believe otherwise.

A second problem that scientism faces is that science did not develop until around the seventeenth century. It is hard to say when exactly it began to emerge in its modern form, but science is certainly a newcomer in human history. So then, what about the people who lived before the development of the scientific method and the knowledge that this method (or rather cluster of methods) has generated since the seventeenth century? Did they not know anything at all? Scientism seems to entail that there would not have been any knowledge available before the dawn of science. Not until the discovery of the scientific method can human beings have known anything about themselves or the world around them. But is this standpoint a reasonable one?

I would maintain, to the contrary, that people living say 10 000 years ago did know quite a lot about many things. Imagine a group of people sitting around the fire all those years ago in what we today call Africa. They knew that they had to eat to survive, that John (or whatever his name) was in love with Maria, that John's parents were dead and that there were, in the bushes nearby, dangerous animals that they should be careful to avoid. John knew that he was thinking about Bill, his brother, who was out hunting. They knew that you could trust some people but not others. They surely knew a lot of other things as well. It is true that, since the development of science, we know *more* than these earlier people did about the physical world, but my point is this: before the development of science there was human knowledge available, and that therefore there is no good reason to believe that only science can give us knowledge. It also follows that, even if the scientific project had never got underway, we would still know many things.

Yet a third problem is that an acceptance of epistemic scientism entails that we have no knowledge in the field of humanities, because the disciplines within the humanities are not part of the sciences. But, do we not know many things, within the humanities, about art, language, literature, and human history?

Inferential and Non-Inferential Knowledge

So far I have pointed out three problematic consequences that follow from the adoption of scientism. My next point is that there are many things that we must know *before* we are able to conduct any science or are able to derive any scientific knowledge. This is because scientific knowledge depends upon other sources of knowledge.

Let us start with things that look most obviously like scientific beliefs, for example the beliefs that there is a tree outside my window and that people are walking down the street. These are just two examples of the kind of *observational* or *perceptual knowledge* we acquire every day, and my claim is that we must have this kind of knowledge before we can obtain scientific knowledge. A possible objection might be that observational knowledge *is* scientific knowledge. However, one difficulty with classifying observational knowledge as scientific

knowledge is that it would mean that we all are scientists and, further, that “science” has existed long before the development of science, as we now understand it. We all (or almost all of us, since some people are blind) would be scientists, since we all have the means of acquiring these beliefs without seeking expert advice or undertaking scientific experimentation, that is, we must all be scientists because, by perception alone we can come to know that “There is a tree outside my window” and that “People are walking down the street.”

Compare these beliefs with what I would readily classify as scientific beliefs, such as “Genes are segments of chromosomes,” “Chromosomes are composed of DNA,” “Nuclear fusion causes the sun’s energy,” or “All particles of light travel with a velocity of 300 000 km/sec.” These beliefs, in contrast to observational beliefs, are obtained by means of scientific inquiry and experimentation. Scientific knowledge presupposes the development of methods and empirical techniques; and we are *not* all scientists, since most of us do not master such methods and techniques. Thus, science aims to give us knowledge about what the physical world is like in the realms that are too small, too distant or too far in the past to be directly experienced. This is done by developing theories about, for instance, the transmission of diseases, the motions of planets and stars, the succession of fossils and the similarities among organisms.

This also means that scientific knowledge is a different species of knowledge from observational or perceptual knowledge. Scientific knowledge is typically an *inferential* form of knowledge, whereas perceptual knowledge is a *non-inferential* form of knowledge. Let me try to explain, by means of an example, the difference between these two forms of knowledge. Some years ago, I received a letter from Professor Lewis Wolpert and I had previously seen one of the books he had written. On the basis of this evidence I knew that he existed, but my justified true belief in his existence was a form of inferential knowledge. In April 2008, I met him at a conference in Sigtuna and we both took part in a panel discussion about the limits of scientific knowledge. From that day on, I had non-inferential knowledge about the existence of Lewis Wolpert. That is to say, I no longer had to believe in the truth of his existence on the basis of other things that I know and which constitutes evidence for his existence. I now know that he exists because I have seen

and talked to him personally. These days, my knowledge of him is a species of non-inferential knowledge.

Inferential knowledge is, then, knowledge that we have which is based on (inferred from) other things we know that constitute evidence for it. For instance, there are footsteps in the snow outside my window, and I therefore know, inferentially, that a person has passed by outside my window. *Non-inferential knowledge* is, in contrast, knowledge that is not reliant on other things, which we know and need to take as evidence. If, instead, I had actually seen a person passing by outside my window in the snow, my knowledge of this would be an example of non-inferential knowledge.

Phrased differently, in the first case the assumption that a person has passed by my window provides the best explanation of the evidence, that is, of the footprints. In the second case, however, I simply see a person passing by. I neither need to see something else (the footprints) from which I infer this person, nor need I offer a best explanation of what is seen. This also explains why we find it inappropriate or puzzling to talk about theories or hypotheses when dealing with perceptual beliefs or observations that we have made. But it is, of course, neither inappropriate nor puzzling to talk about theories or hypotheses in science. This is so, simply because scientific knowledge is characteristically a species of inferential knowledge. Thus, perceptual knowledge is not scientific knowledge. Observational beliefs and knowledge are, rather, things that science typically takes for granted. Science starts from these things. Consequently, if scientific knowledge is the only sort of knowledge we can have, as scientism would have it, then science itself seems to be based on blind faith or superstition.

What about *memorial knowledge*, does not science depend on this kind of knowledge too? Beliefs of memory are those beliefs that are about things we have previously experienced or thought about. For instance, I remember that I am married to Anna and fell in love with her in 1986, and that I have been writing about scientism today. Furthermore, I do not merely believe these things I also reckon that I *know* these things.

But I do not think that the beliefs of memory can be scientifically established. Rather, to be able to develop and test a scientific hypothesis against a certain range of data, scientists have to be able to remember, for

instance, the content of the hypothesis, the previous test results and, more fundamentally, they are scientists and where their laboratories are located. Their knowledge presupposes memory. The truth is that, unless we could trust our memories (and obtain knowledge), we could never reason at all or do any science whatsoever, because in any inference we must remember our premises on our way to the conclusion. All activities we are engaged in therefore presuppose memory knowledge. Accordingly, science does not merely take observational knowledge and self-reflective knowledge for granted, it also presupposes the possibility and reliability of knowledge based upon memory. But if scientific knowledge is the only sort of knowledge we can have, then we cannot know that we know this, because such knowledge requires memorial knowledge.

Notice that memorial knowledge could be either non-inferential or inferential knowledge. I know, for instance, that I had breakfast this morning. This knowledge is non-inferential: it is not based on other things that constitute evidence for it and from which my belief is inferred. But consider instead the question: "Mikael, do you know whether you had dinner with your grandparents on Saturday, 10th May?" To this question my answer would go something like: "Well, let's see. They came back from Spain on Wednesday. Jacob played a game of football on Saturday, so we arrived back later than we had expected that evening. Because of this, they had eaten before we got back from the game. No, I did not have dinner with them that night; I know that." In this case, unlike in the former example, my memorial knowledge uses a species of inferential knowledge.

The fact that we have non-inferential knowledge does, apparently, undermine the JTB account of knowledge, at least when it is explicated in terms of evidentialism, as it typically is. But this will have to be a topic for another essay. If this is the case, then the JTB account could perhaps be a good approximation of scientific knowledge, but not of *all* forms of knowledge.

Introspective, Linguistic and Intentional Knowledge

Let us move on. Let us ask, what about my claims that, “I know that I am now thinking about scientism,” “I know that there is a slight pain in my stomach” and “I know that I am in love.” Are these scientifically knowable? And if they are not, cannot I (or people who have experienced similar things) have knowledge about these things?

To be honest, I cannot see how any of these beliefs could constitute scientific knowledge. By using scientific methods (say by measuring my brainwaves), scientists can perhaps determine whether or not I am thinking, but they cannot discover what I am thinking *about*, the *content* of my thoughts. In my view at least, introspective knowledge is necessary for us to be able to do science, or, at least, good science. To be successful, I think, scientists must be able to reflect about their own ideas and to know that they have these ideas, to be able to develop sound theories and to test them in a satisfactory way.

I also know that I am impatient and that I am not as careful as I should be. Knowledge about one’s own character and temperament is also important if one is to be a successful scientist. It is a form of knowledge that science cannot give us, but which good science depends on.

Now, to ask it crudely, can science read books or, for simplicity, the two sentences “The only kind of knowledge we can have is scientific knowledge” and “Drink Coca-Cola,” and thus obtain *linguistic knowledge*? More precisely, the question is whether, for example, the biologist *qua* biologist or the physicist *qua* physicist can read these texts? Can they as scientists discover (or come to know) the meaning of these sentences by applying solely the methods of biology or physics? Well, scientists can, of course, analyze the chemical laws that allow ink to bond with paper and the other things that make it possible to write these sentences. But can scientists, using such empirical methods, come to know the information contained in these sentences? I must admit that I cannot even imagine what such experimentation would look like. The crux of the matter is that it is not even possible to become a scientist without first being a “hermeneutic creature,” that is, a being who can understand and interpret meaningful phenomena (that is, things which

express a meaning), such as languages. Again, people could read before the development of science, and science depends on linguistic knowledge to be able to produce scientific knowledge.

We are not only able to know the meaning of the sentence “Drink Coca-Cola” written on a lighted billboard, but we are also able to know that someone put it there with the *intention* of persuading us to buy this particular product. There is a reason for its being there and we can know this. Thus, we have not merely linguistic knowledge but also *intentional knowledge* (that is, knowledge about people’s intentions or purposes), or so it seems.

A scientist can, of course, explain the lighted billboard in terms of the strength of the steel posts that support the sign, the current of electricity that causes the lights to glow, and so forth. But meaningful phenomena such as intentions are clearly nothing that scientist can obtain knowledge about by merely applying the methods and instruments of physics or biology, or any other natural science for that matter. The advocates of scientism are therefore forced to deny that there are such things as intentions or purposes and, consequently, must maintain that our purported knowledge about them is merely an illusion. In this particular case, they have to deny that the billboard contains a dimension of reality that is undetectable by their scientific methods, namely, that the sign expresses an intention to persuade us to buy a particular product and, furthermore, that we can obtain reliable knowledge about this.

But is it really reasonable to deny that intentions exist and that we can have intentional knowledge and, more importantly, can they *as scientists* deny this? Can we even understand science if we deny the possibility of intentional knowledge and thus intentional or teleological explanations? If, in trying to explain why Darwin developed the theory of evolution, for instance, we were merely to refer to the molecular movements in his brain or the propagation of DNA, would we have fully understood his behaviour? The answer, it seems, must be no. No satisfactory account of Darwin’s behaviour can avoid referring to Darwin’s *intention* to explain the diversity of living things and trace the patterns in that diversity, and his *belief* that his theory would offer the best explanation of these phenomena. Darwin’s intention to explain the diversity of living things is obviously not the same event as some nerve impulse firing in the brain. More importantly, the content of his thoughts

(including his intentions) cannot be discovered by scientifically examining some neurone firing in his brain. Nor, for that matter, can the content of the theory of evolution be discovered in such a way.

Knowledge about Social Reality

I shall further argue that knowledge about social reality is something that science cannot give us, and it is a kind of knowledge few of us would on reflection deny that we have.

Let me give you an example of what I mean by knowledge of the social world. I am not talking about the social sciences, but merely about commonsense knowledge or everyday life knowledge. Suppose I go into a café in Stockholm and sit down on a chair at a table. The waiter comes and I utter a fragment of a sentence in Swedish. I say, "Kan jag få en öl, tack?" (Can I have a beer please?) The waiter brings the beer and I drink it. I read a book and notice a Coca-Cola sign on the wall and cars outside the window. I leave some money on the table and leave. This sounds simple, but as John Searle and others have pointed out, its metaphysical complexity is truly staggering (Searle 1995). Moreover, its significant features fall outside the scope of science. Notice that we cannot capture the features of the description I have just given in the language of physics and chemistry or any other of the natural sciences.

There is no physical-chemical description adequate to define "café," "waiter," "sentence in Swedish," "money," or even "chair" and "table," even though cafés, waiters, money, chairs and tables are physical phenomena. Since no physical-chemical description can be given of these social phenomena, no scientific knowledge of the social world exists. But we do know these things; a large chunk of our knowledge is of the social world we inhabit! Where science only can see masses of metal in linear trajectories, we can see cars being driven along the road. Where science only can see cellulose fibres with green and grey stains, we can see dollar bills.

Therefore, and contrary to what Atkins thinks, we have every reason to believe that (a) the world is bigger than the world of the natural sciences and that (b) we can obtain knowledge about this bigger world that cannot be reduced to scientific knowledge.

The Privileged View of Science

There is, however, a fall-back position that many people accept, even if they are not advocates of scientism. Let me therefore end by highlighting this view. Some people would say not that science alone can provide us with knowledge, but that science is the paradigm example of knowledge and rationality. *Science provides us with the most reliable path to knowledge and rational belief.* Every other intellectual or cognitive activity is in this sense inferior to science. Harold I. Brown, for instance, maintains “science provides our best example of a rational endeavour” (Brown 1988, vii). Roland Uhrberg, claims that the “best method for obtaining new knowledge is the scientific method, but that does not mean that one could obtain knowledge of all the mysteries of reality” (Uhrberg 2008, 87, my translation). Science is the best way of understanding the world.

But this cannot be true if science is dependent on other forms of knowledge. Scientific knowledge can then be no stronger than these other forms of knowledge on which the science depends. But I would go further than this and claim that some of my non-scientific knowledge is *more* reliable than my scientific knowledge, and I am inclined to think that the same applies even for those who are themselves natural scientists. Take my belief that “I know that I am now thinking about scientism.” It makes no sense to question my belief that I am now thinking about scientism by asking, “Mikael, are you certain about this? Is it not rather the case that you are thinking about dinner?” (This is so, unless, of course, you are questioning my truthfulness, thinking that I am trying to fool you.) But for any scientific theory developed one could reasonably ask of the scientists: “Are you certain about this, is it not rather that something else is the case?” Or think about this claim:

I know that I had breakfast this morning. This knowledge claim of mine is better justified than any scientific belief or theory. I am more certain about it, and rightly so, than that the evolutionary theory is true, or that any other scientific theory is true. My view would be that science provides us with a good and important way of obtaining knowledge about the world, but it is not the only way and not necessarily the best way of

knowing the world. If you want to know what love is, it might be better to read novels than to take science classes.⁸

Bibliography

- Alexander, R. D. 1987. *The Biology of Moral Systems*, Aldine De Gruyter.
- Atkins, P. 1995. "The Limitless Power of Science", in Cornwell, J. (ed.), *Nature's Imagination. The Frontiers of Scientific Vision*, Oxford University Press.
- Baxter, B. 2007. *A Darwinian Worldview*, Ashgate.
- Boghossian, P. 2006. *Fear of Knowledge*, Oxford University Press.
- Brown, H. I. 1988. *Rationality*, Routledge.
- Churchland, P. 1986. *Neurophilosophy*, MIT Press.
- Clifford, W. K. 1947. "The Ethics of Belief", in Stephen, L. and Pollock, F. (eds.), *The Ethics of Belief and Other Essays*, Watts & Co.
- Comte, A. 1988. *Introduction to Positive Philosophy [Cours de philosophie positive]*, Hackett.
- Dawkins, R. 1989. *The Selfish Gene*, Oxford University Press.
- Dawkins, R. 2000. "Thoughts for the Millennium", in Microsoft Encarta Encyclopaedia.
- Dennett, D. C. 1995. *Darwin's Dangerous Idea*, Penguin Books.
- Hakfoort, C. 1992. "Science Deified: Wilhelm Ostwald's Energeticist World-View and the History of Scientism", *Annals of Science*, 49, 525-544.
- Ostwald, W. 1912. "Die Wissenschaft", in Blossfeldt, W. (ed.), *Der Erste Internationale Monisten-Kongress in Hamburg vom 8.-11. September 1911*, Leipzig.
- Russell, B. 1978. *Religion and Science*, Oxford University Press.
- Searle, J. R. 1995. *The Construction of Social Reality*, The Free Press.
- Stenmark, M. 2001. *Scientism: Science, Ethics and Religion*, Ashgate.
- Tillich, P. 1951. *Systematic Theology, Vol. One*, The University of Chicago Press.
- Uhrberg, R. 2008. *Vetenskap-religion*, Uppsala: Vulkan.

⁸ See Stenmark (2001) for a more extensive discussion of different forms of scientism.

- Wilson, E. O. 1978. *On Human Nature*, Harvard University Press.
- Wilson, E. O. 1999. *Consilience*, Alfred A. Knopf.

We need to find God, and he cannot be found in noise and restlessness. God is the friend of silence. See how nature - trees, flowers, grass- grows in silence; see the stars, the moon and the sun, how they move in silence... We need silence to be able to touch souls.

Mother Teresa

Preferential Scientism: A Useful Fiction

Niels Henrik Gregersen

Introduction

Over the years I have admired Mikael Stenmark's work on the interface between science and religion. Not only has Stenmark offered helpful typologies of intellectual options, but his analytical approach invites his readers to think along with him. How, in the dialogue between the sciences and the religions, can we avoid argumentative shortcuts, and how can we combine positions that are otherwise viewed as contrastive? In asking these kinds of questions, Stenmark consistently writes from a philosophical vantage point which is informed both by disciplined rational standards and by common sense judgments that remain close to the real-world situations, in which the practices of science and religion meet.

Stenmark has used his philosophical acumen also on the curious phenomenon of scientism. He has helpfully mapped and discussed varieties of scientism in several of his publications, not only in his book *Scientism: Science, Ethics, and Religion* (Stenmark 2001), but also in his article "What is scientism?" (Stenmark 1997), and in his entry to the *Encyclopedia of Science and Religion* (Stenmark 2003). I find Stenmark's typologies convincing and do not feel a need to add new varieties of scientism to his analysis. However, I would like to highlight a distinction between scientism as a *worldview* about what is ultimately real and as a *precept* for applying methods from the natural sciences to areas that are usually approached only from the perspective of the human sciences, or from the viewpoint of phenomenology. In what follows I argue that what may be redeemable about scientism is its often criticized expansionism, in particular if this scientific expansionism does not (as is usually the case) inflate into an exclusivism on the part of science. I take this idea of scientism as a precept as a friendly amendment to Stenmark's penetrating analyses, in so far as he himself has given examples of a "preferential scientism", as I am going to call it.

Why Scientism is not a Tenable Philosophical Position

Stenmark has given ample reasons why standard forms of scientism are philosophically untenable. Put bluntly, it is silly to think that the sciences can solve all genuine problems that humankind ever has and will encounter – existential questions as well as ethical and aesthetic questions. Who could imagine a science for young people’s identity formation, a science for choosing new governments, or a natural science for writing novels and painting pictures? Scientific background information may be important, but neither lives nor novels can be purely science-based. It also seems weird to subscribe to an epistemic scientism, according to which those kinds of knowledge, which already are or can be justified by science, are taken to be the only reliable kinds of knowledge at our disposal. What about the pre-theoretical knowledge, by which human beings for millennia have lived, thrived and survived? As pointed out by Stenmark and others, the ontological, epistemic and existential forms of scientism are not only unconvincing, but logically self-refuting, in so far as “scientism” is not itself a scientific position, but a metascientific position, that is, a philosophical position “about” the relation between scientific knowledge and all other forms of knowledge. Hence, even if scientism happened to be the one and only true position amongst worldview contenders, it could not be so by being scientific.

Moreover, the ontological and epistemological forms of scientism that seem to be the prevailing forms of scientism (rhetorically promoted by ardent proponents of the science-alone view), leave out, as a matter of fact, many forms of knowledge that are basic to the pragmatics of human life – and likewise to the pursuit of science itself. Stenmark points to forms of knowledge such as *perceptual (non-inferential) knowledge*. Can anyone do science without perceiving colours and identifying organisms, thereby using pre-scientific modes of human understanding? Or *knowledge by memory* – can anyone do science without remembering earlier steps in an experimental set-up? Or think of *introspective knowledge* – how can it be argued that a pain does not “really” exist, when patients report to the doctor about their pain (even in the extreme case of “phantom pains” where the pain is felt in limbs that have been amputated by surgery). Or *intentional knowledge* – how could any

scientist know more than I do about what I momentarily desire or do not desire? Or *semantic knowledge* - which neuroscientist can identify the specific contents that I have in mind during a brain scan, for example a cat lying on the mat, to re-use an old argument of Hilary Putnam (1995)? Or think of *knowledge of socially defined facts* – does a scientist understand the meaning of a \$ 1000 note better than a user within a fiscal system, say a beggar who unexpectedly receives a little green greasy piece of paper (1,2 grams, 5 x 10 cm) into his empty hands?

Using the Principle of Charity *On the Commitments of Scientism*

Due to the exaggerated claims raised by contemporary protagonists of scientism, most forms of scientism are not only unwarranted, but also utterly implausible. However, might there be something to rescue from scientism, not as a philosophy of life, but simply as an academic attitude, hence as an impetus for pursuing science? Let me here try to play the role, not of the devil's advocate, but of an angelic advocacy for a more modest scientism. I hereby make use of the well-known hermeneutic principle of charity that is, taking up a viewpoint in its best possible meaning, despite the untenable arguments and aggressive tone of scientific protagonists.

Let us imagine a more modest contender of scientism who is prepared to admit that scientism is an unviable proposition if taken in the assertive mode (“all genuine knowledge is scientific in nature”), but who insists that scientism is quite a strong view if used as a methodological prescript for any practising scientist: “Always look to science in order to uncover what is genuinely real”. Hereby scientism is treated as a sort of a regulative principle. Let us furthermore imagine that our modest contender of scientism were to argue along the following lines:

“Well, it is indeed correct that the ontological and epistemic versions of scientism, as usually expounded, are not only unwarranted but also *prima facie* implausible. However, the natural sciences still provide the best possible framework for obtaining reliable, long-term knowledge about the way the world is. Remember that the sciences have so far, in just 300 years of inquiry, offered the best prospects that we

have concerning our understanding of reality. Therefore I feel, as a practising scientist, a sort of professional obligation to follow scientism as involving the following three precepts: (1) Always look to the best available and established sciences – and don't try to find interpretative loopholes to suit your extra-scientific interests, for example your religious outlook. (2) Always expand the scientific methodology to other territories of knowledge, even where your colleagues within the human sciences (not to mention theology!) claim their own territory. And finally (3) always think that scientific explanations of things exist, even where we have not yet reached such knowledge. For after all, the natural sciences offer us better and more reliable guidance to what is really true than any other form of knowledge that people have been used to taking for granted, as, for example, non-inferential perception, memory, introspection, and so on. Often enough, common sense views have proven to be wrong”

Let me call this attitude a *preferential scientism*. This variety comes close to what Stenmark in his earlier work has called an “academic-internal scientism”. Stenmark’s preliminary definition of this “methodological scientism” was as follows:

“The attempt to extend the use of the methods of natural science to other academic disciplines” (Stenmark 1997, 17; cf. 2001, 2).

I take this position to be sensible, and even defensible as an expression of a strategic preference for scientific images over against the manifest images of common sense and everyday language. Stenmark, however, thinks that such a view should not legitimately be called “scientistic”. This may indeed be the case, given the more widespread use of ontologically stronger and more exclusivist claims among protagonists of scientism. Stenmark therefore proposes the following definition:

“Methodological scientism is the attempt to extend the use of the methods of natural science to other academic disciplines in such way that they exclude (or marginalize) previously used methods considered central to those disciplines” (Stenmark 1997, 18; cf. 2001, 3).

The point in this second rendering of methodological scientism is its more expansionist vision, and its more aggressive bite. This inner-academic scientistic position is not only about applying approaches from the natural sciences to the human sciences, but about doing so in the

expectation that the natural sciences are able to offer such self-sufficient explanations that explanations from first-hand experience or from the human sciences will be superseded, either by exclusion or by marginalization.

It seems to me that such an expansionist version of methodological scientism is not at all rare among practising scientists. However, while very few would argue that all other explanations can be excluded, more would hold the view that the human sciences could be swiftly marginalized due to future research. For example, religious studies may provide information about the concrete forms of religious life over the centuries, whereas cognitive science explains the general trends of religious evolution, or similar strategies (Gregersen 2010).

Preferential Scientism Within the Sciences

The Quest for Minimalism

A preferential scientism usually involves a preference for minimalism, that is, for an explanation in terms of general features within which the particular features can be subsumed. Such preferences are actually at work within the sciences. Most physicists really wish to make biochemistry obsolete or marginalized by explaining the chemistry of living organisms in terms of general physics and chemistry. Likewise some biochemists, working within the domain of microbiology, claim to be able (at least in principle) to explain in a fully satisfactory manner the macrobiology of evolutionary history and ecology. Methodological scientism is thus at work also within the natural sciences - as a constant precept, as a kind of inner-disciplinary regulative principle.

Of course, neither the physicists nor the microbiologists have yet succeeded in their endeavours. Therefore biochemists argue that they are able to identify new causally relevant factors (e.g., genes) that require a fundamentally new vocabulary, as, for example, coded *information* in addition to flows of *energy* and physical *stuff*. Hence biology can be claimed to be an autonomous science by being an information science, as recently stated by John Maynard Smith (2010). Likewise evolutionary biology and ecology argue that these disciplines, while presupposing the general explanations provided by physics and biochemistry, need to

introduce new vocabularies (for example, epigenetic networks) and are able to identify new causally relevant channels (for example, geographical niches, historical coincidences, and prey-predator cycles), channels that are not fully explainable by reference to the coding capacities of genes. Taken together, it seems that in so far as the sciences are driven by the search for theoretical unification, a scientific methodological minimalism is a *useful* fiction, situated at the heart of the grand scale research programmes of physics and chemistry. However, in so far as this methodological minimalism is not workable, the quest for unification remains a useful *fiction*.

Something similar, I think, goes on between the natural and the human sciences. Built into the scientific project are varieties of a preferential scientism, as defined above. However, scientism remains a fiction, even a *science fiction*, in so far as our imagined spokesperson for a more modest variety of a methodological scientism resorts to future successes of future sciences, that is, to a utopian science. Proponents of scientism are thus repeatedly driven to hypothetical arguments. In the 1970's and 1980's the utopia was about a future genetics, putatively capable of explaining human existence and coexistence by reference to genes. These were the heydays of sociobiology, as epitomized in the work of E.O. Wilson. Since the 1990's – the “decade of the brain” – the new utopian science was neuroscience that would supposedly be capable of explaining human cognition, our emotional life, our economic exchange of goods and symbolic actions, so that the human sciences are predicted to become gradually superfluous, or at least marginalized as progress in the neurosciences continues.

Conclusions

The discussion today is not whether scientism has offered what it promised; it has not. But neither is the discussion today whether the natural sciences (especially evolutionary theory and the neurosciences) are explanatorily relevant for understanding the human person and the social behaviour of human beings; they indeed have proven themselves relevant. What, then, are the real questions today? As I see it, the real question is to what extent scientific explanation can explain human

behaviour, and how the explanatory models from the natural sciences can be used in tandem with the understanding of human beings as perceptual and symbolic beings within the human sciences. It seems that new causal capacities are released when human communities are formed, in which words, gestures and self-reflection play a seminal role, a role not known in animal societies. It seems indeed hard to deny that the world has been changed by religious communities for millennia and by scientific communities for centuries.

To sum up, science is not the only game in town when it comes to reliable knowledge about the world in which human beings live and thrive. Hence the standard varieties of ontological and epistemological scientism are anything but convincing. However, a preferential scientism may still be fertile as a precept for future research. As I have argued above, however, the basic problem is that even such a modest plea for scientism is bound to use hypothetical arguments by referring to scientific explanations that are not available. Thus also a preferential scientism relies on science fiction. Fictions, however, may still be useful in guiding scientific practice. Scientism, seen as a precept or a regulative idea, may (sometimes) be a useful fiction.

Bibliography

- Gregersen, Niels Henrik. 2010. "Religious Evolution from the Perspective of Complexity Sciences". In *Advanced Methodologies in the Scientific Study of Religious and Spiritual Phenomena*, ed. William Grassie, Philadelphia, PA: Metanexus Publishing.
- Putnam, Hilary. 1995. "Why Functionalism Didn't Work" [1992], In *Words and Life*. Cambridge, MA: Harvard University Press, 441-459.
- Smith, John Maynard. 2010. "The Concept of Information in Biology". In *Information and the Nature of Reality: From Physics to Metaphysics*, eds. Paul Davies and Niels Henrik Gregersen, Cambridge: Cambridge University Press 2010, 103-121.
- Stenmark, Mikael. 1997. "What is Scientism", *Religious Studies* 33, 15-32.
- Stenmark, Mikael. 2001. *Scientism: Science, Ethics, and Religion*. Aldershot, UK: Ashgate 2001.

Stenmark, Mikael. 2003. "Scientism", *Encyclopedia of Science and Religion*, New York: Macmillan Reference, vol 2, 783-785.

Stories, Myths, and Human Identity in Cognitive Neuroscience and Religion

John A. Teske

Abstract

Scientific understanding is generally thought to be paradigmatic, a synchronic understanding via logical proof, empirical observation, and causal explanation. Religion is more characteristically thought to be narrative, involving a diachronic understanding via storied accounts of the “vicissitudes of human intentions” organized in time, explanations not being causal, but in terms of believable narratives of actors striving to do things over time. Nevertheless, in the historical sciences generally, in explaining the behavior of complex adaptive systems, and in the human sciences in particular, stories may well constitute the best scientific explanations. These are explanations in which causal relationships may be embedded within and expressions of higher-order constraints provided by complex system dynamics, best understood via the temporal organization of intentionalities which constitute narrative. Without narrative, personality traits and human actions are incomprehensible. Understanding that causality does not exhaust meaning suggests a relationship between religion and science, particularly human science, in which the logic of explanation involves an interpretive circle that runs between parts and wholes at different levels of explanation.

I will therefore sketch a synthetic integration of several levels of explanation in addressing how myths, narratives, and stories engage human beings, produce their sense of identity and self-understanding, and shape their intellectual, emotional, and embodied lives. I will try to suggest how a multi-leveled understanding of evolutionary biology, history, neuroscience, psychology, narrative, and mythology might actually form a coherent picture of the human spirit. Neuropsychological functions involved in constructing and responding to the narratives by which we form our identities and build meaningful lives include memory, attention, emotional marking, and temporal sequencing. It is the neural substrate, the emotional shaping, and the narrative structuring of higher

cognitive function that provide the *sine qua non* for the construction of meaning, relationship, morality, and purpose that extend beyond our personal boundaries, both spatial and temporal. This includes a neural affect system shaped by our developmental dependency, the dynamic narratives of self formed in the development of identity, and reconstructed over the life-span, and the religious and mythological metanarratives within which individual stories make sense, and without which they cannot. There is a difference between narrative and historical truth, but we are also constituted by what we imagine ourselves to be, and the incompleteness of our stories, until they are no longer ours to tell.

Keywords: causality, complex adaptive systems, context-sensitive constraint, development, embodiment, emotion, explanation, hermeneutic, history, intentionality, identity, meaning, memory, myth, narrative, neuropsychology, religious naturalism, social construction, spirituality.

Neuromythology: Narratives and Meaning *In Science and Religion*

One of the ways to distinguish between understanding in science and in religion is provided by Jerome Bruner's (1986, 1990) distinction between *paradigmatic* and *narrative* modes of understanding. The paradigmatic mode involves synchronic understanding via logical proof, empirical observation, and causal explanation, putatively more characteristic of science. The narrative mode involves diachronic understanding via storied accounts of the "vicissitudes of human intentions" organized in time, explanations not being causal, but in terms of believable narratives of actors striving to do things over time. The latter mode would be more characteristic of novelists or poets than of scientists or logicians, and arguably more characteristic of religion. That religion is about propositional beliefs is a canard regularly put forth by anti-religious polemicists attempting to cast religion as paradigmatically defective, such as Richard Dawkins (2006), Daniel Dennett (2006), Sam Harris (2004), and Christopher Hitchens (2007).

That religion is not centrally about paradigmatic claims is an idea supported by theologians and religious scholars at least from Rudolf

Bultmann (1958) and Reinhold Niebuhr (1949), including more popular recent accounts like that of Karen Armstrong (1993), but certainly even to contemporary Muslim scholars like Reza Aslan (2006). The latter argues that factual questions are irrelevant, that no evangelist would have been at all concerned with recording objective observations of historical events. While it may be true that there are also principles, propositions about religious concepts, it is a mistake to pretend that religion provides an alternative explanatory account of the natural phenomena with which science concerns itself. The questions that matter are about what the stories of a religion mean. The meaning for human lives, even of the paradigmatic accounts of science itself, also require a wider framework of narrative meaning, in which those accounts can be said to have any meaning or sense for our lives.

While science is necessarily inclusive of the paradigmatic, since attention to reasoned analyses and empirical observations are important to establishing causal explanations, the paradigmatic mode is ultimately insufficient for many explanatory scientific accounts to be rendered comprehensible even on scientific grounds. This is likely to be true in the historical sciences generally (which include evolutionary biology), in explaining the behavior of complex adaptive systems, and in the human sciences in particular, in which stories may well constitute the best scientific explanations. These are explanations in which causal relationships may be embedded within and expressions of higher-order systemic constraints provided by complex system dynamics, best understood via the temporal organization of intentionalities which constitute narrative.

In the case of specifically human actions, our intentions, consciousness, and meaning are manifested by the brain's self-organizing dynamics, which initiate, control, and constrain the causalities of organismic behavior. Alicia Juarrero (1999: 8) provides an account of intentionality in which the brain's distributed dynamics "originate, regulate, and constrain skeleto-muscular processes, such that the resulting behavior 'satisfies the meaningful content' embodied in the complex dynamics from which it was issued...[providing] continuous, ongoing control and direction by modifying in real time the probability distributions of lower level neurological processes". Covering law models are inadequate, since the precise pathways which will be taken by

complex adaptive systems will be ineradicably unpredictable. Such complex adaptive systems, out of which intentions emerge, have behavioral trajectories which are in principle unique, contingent, and nondeterministic even in stable states, and unpredictable across the bifurcations which can eventuate in phase transitions, or more catastrophic transformations (e.g. conversions, or other life-changing events). Given such unpredictability, the only explanation can be a historical, interpretive story which retrospectively retraces the actual changes in dynamics, including their embedding in an historical and structured environment (including external symbolic technologies, cf. Clark 2003, Donald 2002). In open systems, embedded by feedback in context and history, their distinctive character and behavior will embody the sedimentation of the contingencies and idiosyncrasies experienced over history and development. There is, of course, a difference between the story one might tell *about* the changes in dynamics of a complex adaptive system and the stories that human beings also, and of necessity, tell about *themselves*, which may play an integral role in the very constitution of meaningful lives through time. So we also must tell a story about the storytelling itself.

According to Juarrero (1999), without narrative, personality traits and human actions are incomprehensible, so it becomes necessary to explain human actions using a hermeneutic, narrative model, much as is the case with other interpretive understandings. For example, the overall meaning of a text is constructed out of the interrelations between individual passages, as, in turn, the meaning of individual passages depends upon the larger text in which they are embedded. A nomological-deductive, covering law model may only be adequate for atemporal, acontextual, isolated, linear phenomena. For complex, dynamic phenomena, context-dependent constraints progressively individuate and mark them as historical, embodying within their structure the conditions under which they were created and by which they have been transformed. For such systems, sensitive to initial constraints, irregularities and fluctuations, and capable of dramatic divergences, interpretation is always required, and the meaning of events can be fully understood only in the context of the higher-level constraints that govern them. We can only understand human motoric behavior in the context of the intentions which they serve (or fail to serve). For phenomena that are

essentially contextual and historical, the logic of explanation must be hermeneutic rather than deductive, involving an interpretive circle that runs from parts to wholes and back again, not a reduction of purposive acts to nonpurposive elements, of reasons to the causes which they constrain. Causality does not exhaust meaning. Neither are narratives an alternative opposed to scientific naturalism, but the context within which such accounts must be understood if they are, finally, to make any sense, to have any meaning at all.

What are the implications of this logic of explanation for the relationship between religion, ideology, mythology and science, particularly human science? We also ask larger questions of meaning in terms of broader agencies, be they human communities, or what we take to be sacred or divine. In some sense this *is* what we mean by *meaning*. This is not an account that is *alternative* or *opposed* to physicality or design, but is an *additional* requirement for comprehensibility, for meaningfulness. None of this is to say that our physicality, our evolution, our history, or our individual development does not help us to understand how it is that we come to be able to undertake intentional, meaningful action, but it does not exhaust *that* or *how* we do it.

Neuromythology: An Overview

What I want to do here, is to sketch a more comprehensive overview of how personal narratives, particularly the broader mythic and religious content of human stories, so deeply engage human beings. It is a fuller narrative of our lives, our own life story, which produces our sense of identity and self, our personal history, our wounds received and inflicted, our attempts to shape and be shaped by others spiritually, intellectually, and emotionally, down to our deeply embodied physical existence. I believe that the functions involved in constructing and in responding to stories: memory, attention, emotional marking, and temporal sequencing, and the neurological events that support them, the product of an evolutionary hypertrophy of the prefrontal cortex, are integrated and made coherent by the cultural invention of myth and story. The narrative structuring of higher cognitive functioning enables the construction of meaning, relationship, morality and a cognizance of the purposes which

extend beyond individual boundaries. This shapes our neural affect system, and the dynamic narratives by which we construct selves and relationships (two sides of the same coin). Of necessity, and by socialization, the particular narrative forms and themes are drawn from culturally available myths and stories, our experience colored by the larger stories within which we try to interpret and make sense out of our lives. For Charles Taylor (1989), narrative constitutes our movement in a moral space, our striving after valued goals and ends, and the vicissitudes of the conflicts and struggles that we meet, and create, along the way.

How might we form a more integrated sense of how a multi-leveled understanding of evolutionary biology, history, neuroscience, psychology, narrative, and mythology might actually form a coherent picture of the human spirit? Neuropsychological functions involved in constructing and responding to the narratives by which we form our identities and build meaningful lives include memory, attention, emotional marking, and temporal sequencing. It is the neural substrate, the emotional shaping, and the narrative structuring of higher cognitive function that provide the *sine qua non* for the construction of meaning, relationship, morality, and purpose that extend beyond our personal boundaries, both spatial and temporal. These provide a contingent solution to disunities of mind, the construction of self and identity, and the alienation and fragmentation of personhood, relationship, and community, but a solution that is likely only accomplished with widely varying degrees of success, and may include a range of fictionalization and self-deception in all of us.

We will look at the basic emotional components of our nervous systems, and how they might be shaped via socialization into complex human emotional and relational patterns. This includes the emergence of self and identity via these socialized emotional patterns, and the shaping of consciousness, memory, and identity by developing capacities for autobiographical narrative. Then we will be ready to consider the symbioses of hybrid human minds with the historically and culturally available corpus of mythological forms, by looking at some of the themes of these mythological forms, and their impact on the processes by which we grasp the human experience, both our own and that of others, and the relationships and institutions with which we are interdependent, including the therapeutic, the moral, and the religious. Given time, we

can conclude with some remarks about the relationship between narrative and historical truth.

The Neural Substrate of Narrative Selves

The contributions of neural components to our building representations of who we are and what we are up to, the stories we tell ourselves about ourselves, should be readily apparent. The input, the content of such stories and the reactivation, the simulation of experience that they provide, include: sensory-motor activity, our memories and images of perceptions and actions, our memories and anticipations of both internal and external events. They include the subcortical mediation of motivational and emotional experience which give the stories we tell ourselves and others their felt significance, that move us. They include the multitasking made possible by the dorsolateral components of working memory that allow us to hold some things in mind while operating on other contents. They include the ventromedial connections between high-level executive function and the emotional systems by which we prioritize, evaluate, and mark somatic significance. They include the orbital prefrontal error-detection of mismatches with expectation that are essential to taking corrective action (and may signify the “trouble” so central to narrative plots), and the mediation of self-consciousness and internal focus via the cingulate gyrus. These provide the raw materials from which narrative is fashioned, and which narrative may provide the understood and experienced integration into meaningful, coherent, and comprehensible structures. However, not only must such narrative self-representations be selected, and therefore be a limited sample; abstracted, and therefore be separated from the experienced particulars; but also constructed, and therefore perspectival, egocentric, and always in some sense fabricated (and potentially self-deceptive, even in motivated ways) (Teske 1996).

Events certainly occur in our interactions with the world, and also with experiences generated from our interiors, and, while we certainly hear and recount these events in storied form (and in some sense need to), they do not occur, nor are they likely to be processed, at least in their early stages, in storied form; nor do these stories have any clear direct

causal impact on governing our own subsequent behavior. Nevertheless, given the relationship between limbic system emotional mediation and arousal, and especially hippocampally generated “replay” of sequenced events, our formulation of events into narrative form may be an important part of not only our declarative memory for them, but any ability we might have of synthesizing them into more coherent diachronic representations, of self, of others, and of their relationships and interactions. While these pieces of a broader neuromythological account are of needs speculative, there is empirical evidence for (1) the construction of temporal orderings (cf. Dennett 1991 and Flanagan 1992 for overviews), for (2) the reconstructive character of memory e.g. Loftus 1979, Neisser 1981), for (3) the dissociation of inner speech from the executive functions of the prefrontal cortex (Baddeley 1993), and for (4) the constructed character of our experience of free-will, of the self-in control (Wegner 2002).

This produces what Dennett (1991) calls a “multiple drafts” model of consciousness, in which we constitute our sense of ourselves through time via a regularly revised set of “drafts,” organized from the more fragmentary information provided by simpler neural components. Nevertheless, it is this capacity to organize memory (and anticipation) into a serially ordered hierarchy of actions extending backward and forward in time, that also makes it possible to tell stories, organize more coherent and meaningful lives, connect our pasts with our futures, and, in all likelihood, draw on or integrate our own stories with the broader, perhaps more archetypal, ideological, and mythical narratives and metanarratives provided by our culture, our history, and our literature.

It is also the case that the neural processes by which we constitute “what I meant,” or “what I intended” are the processes which provide the material support for the constitution of any meaning at all. The narrative selves of our conscious experience may be better understood as emergents with higher order effects and with indirect rather than direct determination of actions. It remains the case that the structuring of our lives into meaningful experience, its ordering in time, and its connection to other people’s stories and to culturally available narratives, is also likely to be learned and internalized from other human beings with whom we have close physical and emotional interdependency, whose lives have in turn been structured and ordered by particular historical and cultural

practices and institutions. This will be especially true, even foundational, to the emotional forms which shape our personal myths of self, in the ontogenesis of these structuring capacities in the first place. Our consciousness and representations of ourselves are likely to depend heavily on the “somatic marking” (to use Damasio’s 1995 apt phrase) of our self-representations (cf. also Metzinger’s more sophisticated “self-model theory of subjectivity” 2003) which emotionally prioritizes particular events and outcomes, itself scaffolded by our early life experiences with particular socializing agents (by whatever rearing practices, social rituals, or life-changing events). Our sense of both the meaning and moral significance of events depends on such neurally mediated emotional and narrative structuring. As Charles Taylor (1989) has indicated, connections between events, how they cohere and show continuity, and the integrity or disintegration of our lives through time, are constituted in narrative. Understanding oneself requires both an account of how one got here, and of where one is going, which provides a location in a “moral space.” These accounts are, as we have seen, causally dependent on the neural structures and functions by which they are produced, the unpacking of which may not only give us a better understanding of that production, but of the dissociations between those accounts and our actions.

The Development of Emotions, Scripts, and Life Stories

While the emergence of storytelling and narrative form in human evolution and prehistory is beyond our present scope (cf. Deacon 1997, Donald 2002), the shaping of narrative content over the course of development is central to constructing a viable neuromythology, sufficient to account for our emotional engagement in narrative, our own development of a narrative self, and the embedding of human meaning and identity in broader narratives, and mythologies. Storytelling is learned early, and even children are aware that stories are about people (or people-like characters) trying to do things over time; that they have a beginning, a middle, and an end (a “how its going to turn out”); and that what makes it a story is some kind of narrative tension, a protagonist who could be defeated, or a conflict needing resolution.

It is this narrative tension which I believe to be central to a narrative self, the understanding of which is likely to be crucial for a fully developed neuromythology. While the “story grammar” components are necessary (e.g. Mandler 1984), it is the tension/climax/denouement that makes a story compelling. (Why some childrens’ movies tend to be unsatisfying for older children and adults is because, in the interest of protecting small children, narrative tension is sacrificed.) We all know moviemakers, and storytellers, that are good at setting up and maintaining suspense, curiosity, and tension, and those who do not do so well. Given phenomena like infantile amnesia (the difficulty of accessing pre-linguistic memory), the difficulty of remembering dreams that are not put into storied form, and the ease with which students remember a good illustrative story, I have a suspicion that we encode events into a story form in order to remember them. Indeed, given the evidence (1) of the role of long-term potentiation in the hippocampus and the reactivation of hippocampal ensembled memories during sleep (McNaughton, et al 1994), (2) the relationship of arousal to memory (Dudai 1989), as well as (3) common experiences of rehearsals and retellings of stories over time (cf. Loftus 1981), it may well be that there are crucial dependencies of human memory (at least episodic memory) upon narrative form, particularly the arousal-producing qualities of narrative tension. Events in the world do not occur in storied form, and the same set of events can be put together into quite different stories, but it may be that the storied form not only provides a structure which aids memory, but the emotional activation that results in longer potentiation and deeper encoding. The difficulty of remembering dreams, unattended disjoint events, and even traumatic event sequences, may be that they have not been put in meaningful narrative structures, particularly structures that have plot sequences including tension, climax, and denouement, that involve end states, resolutions, the goals, meaning, and purposes around which our intentional lives are constructed. The relevance of these structures to the narratives of identity formation, including the identity “crisis” of conflict and choice (Marcia 1980), should be obvious.

Out of what do we build the emotional sequences which are requisite to the dramatics of narrative? A neural affect system is shaped into emotional patterns by the social scripts laid down during our lengthy period of developmental dependency, including second-order emotions,

the development of independence, autonomy, and relations of intimacy and power. Personal identity is made possible by the evolution of a human neuropsychology that requires social interdependency for its development. Our neuroplasticity requires shaping over a lifetime, socially scaffolding our neuroregulation, including emotional attachments and dynamics. The evolutionary hypertrophy of our prefrontal cortex leads to a colonization of brain function, making possible the social construction of virtual realities, novel forms of socially constituted experience, and the transforming effects of mythic, ideological, and religious systems (Teske 2001a).

There are about ten primary human affects, rooted in biology and evolution, each of which are linked to particular facial expressions which are species-wide, and recognizable across quite disparate cultures (Ekman 1972, Izard 1977). Silvan Tomkins (1979) has elaborated a "Script Theory," further extended and elaborated by Donald Nathanson (1992) into a fuller theory of how the self emerges from the storied structure of affect and emotion. According to Tomkins, the role of primary affects is to provide the amplification that gives our basic biological drives their motivating power, their urgency. These are innate, biologically differentiated and specialized; each feels different by virtue of the varied biological systems involved, including their neural pathways, and by virtue of links to specific facial responses which provide both sensory feedback, as well as social information to others. Shame, guilt, and pride are generally thought to be emotions *about* other emotions, and involve experienced contractions and expansions of self-boundaries respectively (e.g. "swelling with pride"). The basic affects are strictly biological equipment. These are organized by specific programming that can move from mild to intense levels (e.g., surprise-startle, interest-excitement, shame-humiliation), the affect system producing urgency, a particular profile of response (e.g. the quickness of startle responses, the arousal of anger), but which provide no information about the environmental source (e.g. sobbing provides no clue as to whether it is produced by hunger or loneliness), and the affect can also produce alterations in other sensory reception (e.g. tumescent genitals expose more receptive surface). While the affect systems are strictly biological, feeling states involve an affect plus awareness of it, and

emotions involve the combination of affect and feeling with remembered experiences which can trigger additional affect.

It is the production of regular patterns of emotion, and their recall, which produce the organizing scenes and scripts that are the basis of our personal dramas. These patterns will not only be heavily dependent upon the domestic or family dynamics of a particular moment in history and culture, but are likely to shape, and necessarily so, our extremely plastic and immature nervous systems during the course of development, in ways that may often be irrevocable, or difficult to counter-condition (e.g. in the case of experiential preferences, basic amygdalic fear responses, or foundational emotional and relational scenarios upon which all subsequent ones will be built). A *scene* is the combination of at least one affect and one object, which may include persons, places, times, actions, or feelings. These are learned, formed from repeated experience, as affects themselves can come to be connected to variant objects and situations, depending on the patterns available, particularly in the early environment, given the long period of social dependency in human growth to adulthood.

Scripts involve a learned set of rules for interpreting, creating, enhancing or defending against a family or grouping of particular scenes. The short term importance of a particular scene will depend on the biological organization provided by the affect system, but its long-term importance in a life drama or narrative will be a function of the psychological magnification produced by the similarities and differences between a scripted pattern of scenes and those which this pattern activates in memory. Similarities produce a magnification by analog, as a kind of "here we go again." Variations around a stable core tend to produce the magnification of novelty (curiosity, enjoyment, interest), with differences being magnified as "special."

Tomkins (1979) begins with a distinction between two basic types of scripts: (1) A "commitment" script, resembling romantic or comedic narrative forms, includes a program or goal that anticipates positive affect, and a long-term investment in improvement. (2) A "nuclear" script, resembling tragic or ironic narrative forms, is marked by confusion or ambivalence about goals, the magnification by analogy to positive scenes that turned into negative affect. No claim is made that these forms *cause* a particular sequence of events to occur, only that

these scripts and their accumulated magnifications have the effects of organizing scenes into coherent and meaningful stories. No doubt the formulation of such accounts can have self-fulfilling effects, but they can also produce motivational magnifications.

Drawing on Erik Erikson's work on the modern western "identity crisis," Dan McAdams (1988) suggests that identity itself can be understood as a life story, initially composed in late adolescence and early adulthood, which connects remembered events, current circumstances, and future anticipations into an internalized, integrated personal myth. It may be that becoming an adult at this particular point of culture and history simply means being able to present ones accumulated actions according to certain "criteria of intelligibility" (Slugoski & Ginsburg 1989), that is, that they be accounted for in term of *reasons* rather than merely *causes* or simply in terms of their sequence or their outcomes. This means that the stories we tell ourselves (and others) about our lives are going to be told in terms of intents (and usually *conscious* ones, rather than the reasons and intents about which we can say "I didn't know it at the time, but here's what I was up to," although these would not be ruled out); this is part of what makes such accounts, and our actions, *intelligible*, regardless of when the intents were actually formulated, and irrespective of what role any consciousness of intents might actually have played in bringing about the relevant actions and decisions. What I would like to suggest is the possibility that the dynamics of narrative plotting, and our capacity to encode our experiences in memorable terms, also requires that events be *framed as* conflicts, crises, and climaxes in order for them be remembered at all (at least with any facility, or without extensive situational or mnemonic support). Thus some sort of storied or narrative form, regardless of its constructed character, would be a *sine qua non* of the memorability of events, imagined or otherwise.

The life-story model of identity developed by Dan McAdams (1988) provides a detailed account of the origins of such stories, which a full neuromythology would both link to brain development and function, and to the broader mythological corpus available in any culture. In his model, narrative tone is tied to basic attachments of infancy, producing basic variations in security/insecurity. McAdams' model suggests that early childhood might include a stockpile of emotionally charged images from

entertainment media, fairy tales, and even mythical and religious stories and iconography. The era of formal schooling may include the development of basic story thematics, goal oriented sequences modeled by socializing agents, composed of imagery as well as recurring motivational dispositions. McAdams elaborates basic thematic dimensions of agency (separation from and mastery of the environment) and communion (connections and intimacies in relationships and larger social projects) as central to narrative content. Basic life stories are likely to vary in complexity, but a central feature of identity for the adolescent includes the development of foundational beliefs and values, which are likely to be necessary prior to the construction of life narratives (though one can see potential plot crisis events in how these are established), and are not likely to change much after young adulthood. McAdams suggests that a life story is constructed out of crucial scenes, concrete events that either affirm central truths or represent episodes of change.

I find McAdams' life-story model of identity to be an important contribution to linking several levels of explanation, as we move from the neuropsychology of emotion, to broader accounts of personality and life-story, especially in his understanding central conflicts in terms of conflicting and interacting *imagoes*, the organizing of a multiplicity of roles into a manageable cast of characters. Certainly the conflicts, crises, and climaxes necessary for the emotional anchoring of narrative which provides its memorability, and hence a narrative self, can be understood in terms of these kinds of interactions. What this will require is a focus on real transactions with the nexus of events and persons of which we are interdependent parts. I think the power of our stories have to do with the dramatics of these transactions. To put it in the terms of Kenneth Burke's (1945) *Grammar of Motives*, it is the action, not the agent or the patient, that provides the dramatics. As such, it might be necessary to develop a vocabulary of dramatic transaction to understand more fully how our identities are not only constituted by stories, but also within the larger stories of our history and culture, the only way by which our relationality can be more fully integrated into a broader context of human understanding.

Transactional Dramatics, Healing, and Myth

A broad theory of the effects of story and narrative is beyond our scope here. Nevertheless we need to at least provide some examples of the transactional dynamics that provide the engaging emotional power of stories, both in the formation of our identities and in the identifications with the available narratives of folk traditions, of literature, of history, and of mythology. In addition to a potential cast of imagoes which can be drawn from culturally available narratives, motivational themes of agency and communion, and broad plot classes such as those provided by scripts of commitment and nucleation, we can also point to a broad vocabulary of transactional dramatics. While as yet speculative and hypothetical, it is possible that we can best account for the engaging emotional power of narratives in terms of such dramatics. What remains to be done here is to suggest some broad examples of historically emergent and developmentally internalized transactional dramatics, and summarize some of the empirical research bearing on the primary psychological functions of integration and healing which stories can provide

Joseph Campbell's (cf. Campbell 1988) classic work on mythology, *The Hero with a Thousand Faces*, captures at least one of the central dramatics of agency, that of the *heroic*. Myths and stories provide models of the accomplishment of valuable goals under duress and in the face of obstacles, and the heroic form both provides identifiable heroes, and provides a broad catalog of the form of their accomplishments, and the dynamics of their overcoming of obstacles can be used to metaphorically read our own actions in their emotional terms. There may be ways of taxonomizing such variations as those involving defeat and victory, contamination and redemption, exile and homecoming, which trace these variations all the way to the emotional substrate and neural events out of which our engagement is constructed, though that engagement be narratively constituted.

A second crucial dramatic is certainly that of the *romantic*. Stephen Mitchell (2002) asserts that the account of our romantic life is central to the stories we tell to maintain a sense of ourselves, but that no romantic narrative is without pain, hurt, and loss (hence the popularity of the Blues

as a musical genre). Mitchell points out that there are few better ways to determine one's identity, represent one's uniqueness, than to provide an account of our scars, old wounds, and damage we have sustained. He argues that such accounts fall along an axis of self-pity and guilt, of damage inflicted ("she done me wrong"), and of damage which one has brought upon oneself and others ("I was a fool"), and that it is this emotional content that organizes stories of past as well as present relationships. As with the heroic, so too there are romantic emotional variations in alienation and reunion, betrayal and forgiveness, or sacrifice and bliss, traceable to their neuropsychological components, although meaning still resides in the narrative context.

On the individual level, the level of engagement with human neuropsychology that is central to a neuromythology, there is both clinical and empirical research evidence about the healing effects of narrative approaches to traumatic events. "Stories may bring our lives together when we feel shattered, mend us when we are broken, heal us when we are sick, help us cope with stress, and even move us toward psychological fulfillment and maturity" (McAdams 2001: 780). Jonathan Shay's (1994) *Achilles in Vietnam* suggests that it is only in the telling of stories of trauma to a receptive audience, the meaningful integrating of scattered, dissociated, painful, and uncontrolled images and emotional responses into a coherent story, that there can be any real healing of post-traumatic stress in Vietnam veterans. Even in college students, James Pennebaker (1989, 1997) has shown that the narrative disclosure of trauma, where it combines facts and feeling, produces measurable improvements in physical health (down to the level of immunological functioning), which depend upon both the degree of emotion expressed and the extent to which it is a well-formed story.

An understanding of Joan Didion's (1979) claim that "We tell stories in order to live," can be obtained by looking carefully at the dynamic narratives of self developed in the formation of identity, seeing how they are rooted in our neuropsychology, and how they draw from the available cultural corpus. There are cultural, social, and personal functions of myths, their role in understanding human crisis and transformation, in love, heroism, family life, and even the demonic. Our construction of ourselves via such mythic and storied forms, whether comedic, romantic, tragic, or even ironic, enables our participation in the

historical moment, in epistemically objective, socioculturally constituted realities, our contribution to human history, and our attempts to apprehend the timeless and eternal. Finally, not only does narrative constitute our movement in moral space (Taylor 1989), but it may have the potential both for healing and for disruption, for us as individuals and as a species.

Meaning, Narrative Truth, and Historical Truth

Let us be clear. To the extent that religions try to make paradigmatic claims, they are either not likely to be testable, or, where they oppose naturalistic accounts provided by science, are likely to be wrong. In any case, it is the narrative, diachronic framework for such claims in which they have sense or meaning. To the extent that science provides us with a paradigmatic, synchronic description of objects or events, it does not provide meaning. It is the framework into which such descriptions are placed that does, frameworks which science itself does not provide, including the scientific faith that the world can be understood and made sense of at all. In the case of human beings (and other complex adaptive systems), the standard paradigmatic account may be insufficient even on a scientific basis, since a full understanding of such beings requires a diachronic, narrative account. These are not *alternative* to naturalistic accounts, but the narrative in which such accounts make sense. We can certainly study human beings, and even religions, as natural phenomena, but that will not exhaust what they are. This is not to posit some additional supernatural components, but only argues that standard paradigmatic, causal accounts of events do not exhaust their meaning.

In living beings, narrative accounts are likely to be prospective as well as retrospective. While repeatable events enable predictive prospection, unrepeatable, novel, creative, “emergent” events do not; one of the limitations of the “human sciences,” is that, as MacIntyre (1984) pointed out, they can finally only be about the past, one of the reasons they are notoriously poor at predicting novel historical events, from the fall of the Soviet Communism to the emergence of the World Wide Web. Hence the need for the understandings of history, philosophy, mythology, and theology to provide the prospective futures into which human beings

can live. We must realize that our finitude, even as a species, always leaves us with unanswered mysteries, unpredictable futures, a natural world that is metaphysically ungrounded, and an inevitable horizon of subjectivity (cf. Rahner 1969) beyond which our understanding may only be apophatic or beatific. There may be unanswerable existential questions that need believable answers in order for us to live meaningful lives, and for there to be a human future at all. Hence, it may be that a broader theological and eschatological framework becomes necessary for stories that extend prospectively into a future that is other than a repeatable past. Despite my own deep disbelief in the dogmatics of most of my own faith tradition, I confess an incapacity to understand my life without concepts like sin, grace, redemption, resurrection, sacrifice, compassion, and the acceptance of bodily and emotional suffering.

To paraphrase MacIntyre (2006), it may only be in the light afforded by religious and theological doctrines concerning human nature and the human condition that we can really address the questions that ought to be central to us all, secular or not, not because of any particular answers that these doctrines provide, but in their way of addressing the questions. These are, finally, eschatological questions about the ultimate meaning and fate of our lives, only faith providing the assurance that such meaning exists at all.

Stories may play essential roles in memory, in consciousness, and in meaning, but they only really do so when we make them our own, or it is always someone else's meaning and not ours. As Antonio Damasio (1999) points out, consciousness may well begin with the power to tell a story with words, and taking the position of a narrator. That means identifying with characters, and taking our own unique perspectives as authors and sometimes agents in the stories that make up our lives. The complexities, the variations, the contingencies involved, to say nothing of the necessary substrate of our own feeling bodies, permit no other recourse. Religions require making stories our own, at greater "degrees of interiorization of the spiritual dynamics," as Wolfhart Pannenberg once put it (1982), the events of our lives making sense only within the moral landscape of stories within which the vicissitudes of our intentions play out. That they are from particular points of view is one of the central characteristics of story, and what is necessarily absent in nomological science. Nevertheless our own stories are understood by their place in

larger and more inclusive stories, narratives being constituted of movement in moral space, particularly in stories of healing and redemption (McAdams 2005). Religion and mythology are what provide the larger stories within which individual stories make sense, and without which they cannot.

I have already indicated that, to the extent that external, objective events do not occur in story form, narratives are, from a paradigmatic point of view, always fabrications and, to that extent, are always fictional. Stories may include actual events, of course, or fail to do so, and there is a facticity that constrains truth-telling in stories. But a story can be true to the facts and still fail to mean much, not be very memorable, and not in that sense, be true to meaning. Narrative theorists, clinical psychologists, and, for that matter, literary critics, share a view that stories are not a record of facts (though they may also record facts), that they are less about facts than about meaning, and that a past, from a particular point of view, is always constructed in the telling. As a result, we do not judge stories by their adherence to empirical fact, but by *narrative* criteria: e.g. coherence, openness, credibility, or integration. Donald Spence (1982) distinguishes between *narrative truth* and *historical truth*, where narrative truth is *not* the truth of logic, science, and empirical demonstration, but something more like *verisimilitude*. Despite the necessary attention to facticity of a good historian, if what I am saying is right, that the historical sciences (to say nothing of history itself) cannot make sense of the behavior of complex adaptive systems in general and of human action in particular without attention to *narrative*, then perhaps it would be safer to use the distinction made by the novelist Tim O'Brien, in a collection of stories about the war in Vietnam (1990), who distinguishes between *story truth* and *happening truth*.

O'Brien's (1990) largely first person accounts of a soldier coping with combat in Vietnam are moving, and effective, so much so that many veterans reading his stories find them to be "healing," as reported by a psychiatrist treating post-traumatic stress in Vietnam veterans (Shay 1994). But at the end of the book O'Brien confesses that while he was there, walking through the jungles, everything else is invented. One of the most fascinating stories is one called "The Man I Killed," and the story is full of guilt, obsessive reverie, adrenaline-induced time dilation, and the incoherence of fragmentary impressions as the narrator tries to

make sense out of a fresh corpse as he sits on the side of the trail. O'Brien tells the reader that he is inventing himself, and while he didn't actually kill the man, he was there, could form a vivid image of a face of a man with a jaw in his throat, and he also shared the guilt, because of his presence. Then he confesses that even *that* is invented. "I want you to feel what I felt. I want you to know why story truth is truer sometimes than happening truth," (p 203). The happening truth was that he was young, was in a world of many dead bodies with many faces, but he was afraid to look, and was left twenty years later with "faceless responsibility and faceless grief." His stories make things present, both for himself and for his readers, and allow him, and them, to look at things, to attach faces to "grief and love and pity and God," and be able to feel again. So when his daughter asks him if he ever killed anyone in the war he can say, honestly "of course not." Or, honestly, "Yes."

Story truth is not about providing external descriptions of the world to be judged by their veridicality. As Bruno Bettelheim says in his analysis of the psychological power of fairy tales (1977), they can help us deal with grief, loss, fear by giving us models of how to make sense of them. Robert Coles (1989), in his work on the moral imagination, highlights the *integrative* functions of stories, in healing what is sick or broken, bringing together what is shattered, helping us cope with stress, and moving us toward fulfillment and maturity, functions for which paradigmatic, *happening truth* is woefully inadequate. I think that mythology and religion can be far better understood by viewing them in terms of narrative truth, as products of the imagination, as symbolic (though we too easily forget this), as ways of organizing the cold hard facts of the world into meaningful and symbolic narratives, rather than operating as if the cold hard facts are all that existence is *about*. They can be *all there is* (though it is remarkably arrogant, even strange, given the history of science, to presume that there isn't still a lot we do not know about) without being *what they mean*. Nobody argues with the claim that not everything can be expressed scientifically. This is not to say that we cannot or should not provide scientific, causal accounts of art, music, poetry, literature, and religious experiences; they need not involve magical or mysterious powers. But what they express is not expressed scientifically. "The arts work our imaginations with all the playful tricks

of language, allegory, metaphor, and metonymy that science, for its purposes, doesn't much care for" (Flanagan 2001: 23).

Finally I think we are also, truly and really, as much constituted by what we imagine ourselves to be, whether prospective or fictional. I agree with Ted Laurenson that it is in their imaginative projections that the religions or mythological systems of the world, make it possible to address our "perceptions of separateness," and "the brute facts of individual desire, suffering and death" (Laurenson 2007: 813). "Why find an end in the narrative self if there is no point to the narrative?" (814). We cannot learn what ends to project merely by looking at the *happening truth* of science. Possibilities *are* constrained by facts, and the more we know about the facts, the more realistic our projection of possibilities might be, but it takes imagination, not science, to invent those possibilities. "Religion is part of our dream of possibilities; its study provides a lens for the observation of many aspects of what the human enterprise is and can be about, of explorations of what it might mean to have different notions of ourselves, and why it might matter if we did" (814). As long as we are alive, our stories are not complete, their meanings always and necessarily other peoples stories, as they are ours, all parts of a larger story in prospective; when we shuffle off this mortal coil, they are finally no longer ours to tell, but parts of which, as only faith teaches us, our lives will have meant something, which is finally not ours to determine.

Bibliography

- Armstrong, Karen. 1993. *A History of God*. New York: Ballantine
- Aslan, Reza. 2005. *No god but God*. New York: Random House.
- Baars, Bernard. 1997. *In the Theater of Consciousness*. NY: Oxford University Press.
- Baddeley, Alan D. 1993. "Verbal and Visual Subsystems of Working Memory." *Current Biology*, 3(6), 563-565.
- Barbour, Ian G. *Religion and Science: Historical and Contemporary Issues*. New York: HarperCollins, 1997.
- Bettleheim, Bruno. 1977. *The Uses of Enchantment: The Meaning and Importance of Fairy Tales*. New York: Vintage Books.

- Bickle, John. 2003. "Empirical Evidence for a Narrative Concept of Self." In Fireman, Gary D., McVay, Ted E. Jr, Flanagan, Owen J. (Eds.). *Narrative and Consciousness: Literature, Psychology, and the Brain*. NY: Oxford University Press.
- Bruner, Jerome S. 1986. *Actual Minds, Possible Worlds*. Cambridge, MA: Harvard University Press.
- Bruner, Jerome S. 1990. *Acts of Meaning*. Cambridge, MA: Harvard University Press.
- Bultmann, Rudolf. 1958. *Jesus Christ and Mythology*. New York: Scribner's.
- Burke, Kenneth. 1945. *The Grammar of Motives*. NY: Prentice-Hall.
- Campbell, Joseph. 1988. *The Power of Myth*. NY: Doubleday.
- Carter, Rita. *Mapping the Mind*. Berkeley: University of California Press, 1998.
- Chodorow, Nancy. 1978. *The Reproduction of Mothering*. Berkeley, CA: University of California Press.
- Churchland, Paul M. 1995. *The Engine of Reason, the Seat of the Soul*. Cambridge, MA: MIT Press.
- Churchland, Paul M. *A Neurocomputational Perspective*. Cambridge, MA: MIT Press, 1989.
- Clark, Andy. 2003. *Natural-Born Cyborgs*. New York: Oxford University Press.
- Coles, Robert. 1989. *The Call of Stories: Teaching and the Moral Imagination*. Boston: Houghton Mifflin.
- Damasio, Antonio. 1999. *The Feeling of What Happens*. Orlando, FL: Harcourt.
- Damasio, Antonio. 1995. *Descartes' Error: Emotion, Reason, and the Human Brain*. New York: Avon Books.
- Dawkins, Richard. 2006. *The God Delusion*. New York: Houghton Mifflin.
- Deacon, Terrence W. 1997. *The Symbolic Species*. New York: Norton.
- Deacon, Terrence W. *The Symbolic Species*. New York: W. W. Norton, 1997.
- Dennett, Daniel C. & Marcel Kinsbourne. 1992. "Time and the Observer: The When and Where of Consciousness in the Brain." *Behavioral and Brain Sciences* 15: 183-247.

- Dennett, Daniel C. 1991. *Consciousness Explained*. Boston: Little, Brown.
- Dennett, Daniel. 2006. *Breaking the Spell*. New York: Viking.
- Donald, Merlin. 2002. *A Mind So Rare*. NY: Norton.
- Drees, Willem B. *Religion, Science, and Naturalism*. New York: Cambridge University Press, 1996.
- Dudai, Yadin. 1989. *The Neurobiology of Memory: Concepts, Findings, Trends*. NY: Oxford University Press.
- Edelman, Gerald M. 1989. *The Remembered Present: A Biological Theory of Consciousness*. NY: Basic Books.
- Ekman, Paul. 1972. "Universals and Cultural Differences in Facial Expressions of Emotion. In J.Cole (ed.), *Nebraska Symposium on Motivation 1971*. Lincoln, NE: University of Nebraska Press.
- Flanagan, Owen J. Jr. 1992. *Consciousness Reconsidered*. Cambridge, MA: MIT Press.
- Flanagan, Owen. 2007. *The Really Hard Problem*. Cambridge, MA: MIT Press.
- Flanagan, Owen J. Jr.. 1996. *Self-Expressions: Mind, Morals, and the Meaning of Life*. NY: Oxford University Press.
- Gazzaniga, Michael S., Richard B. Ivry, and George R, Mangum. *Cognitive Neuroscience*. New York: W. W. Norton, 1998.
- Giddens, Anthony. 1991. *Modernity and Self-Identity*. Stanford, CA: Stanford University Press.
- Gilligan, Carol A. 1982. In *A Different Voice*. Cambridge, MA: Harvard University Press.
- Gregersen, Neils, Willem Drees, and Ulf Gorman (eds.). 2000. *The Human Person in Science and Theology*. Grand Rapids. MI: Eerdmans.
- Harris, Sam. 2004. *The End of Faith*. New York: Norton.
- Hefner, Philip. *The Human Factor: Evolution, Culture, and Religion*. Minneapolis: Fortress Press, 1993.
- Hitchens, Christopher. 2007. *God Is Not Great*. New York: Twelve.
- Huchingson, James. 2004. Review of Gregersen, Drees, and Gorman's *The Human Person in Science and Religion*. *Zygon: Journal of Religion and Science*. 39 (September): 724-726.
- Humphrey, Nicholas. 1984. *Consciousness Regained*. New York: Oxford University Press.
- Izard, Carroll E. 1977. *Human Emotions*. NY: Plenum Press.

- Juarrero, Alicia. 1999. *Dynamics in Action*. Cambridge, MA: MIT Press.
- Laurenson, Edwin C. 2007. "Persons and Dreams of Possibility in Religion and Science." *Zygon: Journal of Religion and Science* 42 (December): 813-15.
- Loftus, Elizabeth F. 1979. *Eyewitness Testimony*. Cambridge, MA: Harvard University Press.
- MacIntyre, Alasdair. 1984. *After Virtue*. Notre Dame, IN: Notre Dame University Press.
- MacIntyre, Alisdair. 2006. "The End of Education: The Fragmentation of the American University." *Commonweal*.
- Mandler, Jerome M. 1984. *Stories, Scripts, and Scenes*. Hillsdale, NJ: Erlbaum.
- Marcia, James E. 1980. "Identity in Adolescence." In J. Adelson (ed.), *Handbook of Adolescent Psychology*. NY: Wiley, pp. 159-187.
- McAdams, Dan P. 2005. *The Redemptive Self*. New York: Oxford University Press.
- McAdams, Dan P. 2001. *The Person* (3rd Ed.). Orlando, FL: Harcourt College Publishers
- McAdams, Dan P. 1993. *The Stories We Live By*. New York: William Morrow.
- McAdams, Dan P. 1988. *Power, Intimacy, and the Life Story*. NY: Guilford.
- McAdams, Dan P. 1985. *Power, Intimacy, and the Life Story*. New York: Guilford.
- McNaughton, N, et al. 1994. "Reactivation of Hippocampal Ensembled Memories During Sleep." *Science* (July 19): 676-679.
- Metzinger, Thomas. 2003. *Being No One: The Self-Model Theory of Subjectivity*. Cambridge, MA: MIT Press.
- Mitchell, Stephen A. 2002. *Can Love Last? The Fate of Romance over time*. NY: Norton.
- Nathanson, Donald L. 1992. *Shame and Pride: Affect, Sex, and the Birth of Self*. NY: Norton.
- Neisser, Ulrich. 1981. "John Dean's Memory: A Case Study." *Cognition* 9: 1-22
- Niebuhr, Reinhold. 1949. *Faith and History*. New York: Scribner's.
- O'Brien, Tim. 1990. *The Things They Carried*. New York: Viking Penguin.

- Oates, Joyce Carol. 1999. "The Calendar's New Clothes." *New York Times* (Op. Ed.), December 30, Final, Section A, Page 27, Column 1.
- Pannenberg, Wolfhart. 1982. "Spirit and Mind." In *Mind and Nature: Gustavus Adolphus College Novbel Conference XVII*, 134-157. San Francisco: Harper and Row. Reprinted in *Toward a Theology of Nature: Essays on Science and Faith*, ed. Ted Peters. Louisville, KY: Westminster/John Knox Press, 1993.
- Pannenberg, Wolfhart. *Toward a Theology of Nature: Essays on Science and Faith*, ed. Ted Peters. Louisville, KY: Westminster/John Knox Press, 1993.
- Peacocke, Arthur. *Theology for a Scientific Age: Being and Becoming – Natural Divine, and Human* (2nd ed.). Minneapolis: Fortress Press, 1993.
- Pennebaker, James W. 1989. "Confession, Inhibition, and Disease." In L. Berkowitz (ed.) *Advances in Experimental Social Psychology*, Vol. 22. NY: Academic Press, pp. 211-244.
- Pennebaker, James W. 1997. "Writing about Emotional Experiences as a Therapeutic Process." *Psychological Science*, 8, 162-166.
- Rahner, Karl. 1969. *Hearers of the Word*. (Michael Richards, trans.) New York: Herder & Herder.
- Roser, M. and Gazzaniga, Michael S. 2004. "Automatic Brains – Interpretive minds." *Current Directions in Psychological Science*, 13, 56-59.
- Sartre, Jean-Paul. 1965. *Essays in Existentialism*. Seacaucus, NJ: Citadel.
- Searle, John. 1969. *Speech Acts: An Essay in the Philosophy of Language*. New York: Cambridge University Press.
- Shay, Jonathan. 1994. *Achilles in Vietnam*. New York: Simon & Schuster.
- Slugoski, B. R., and Ginsburg, G. P. 1989. "Ego Identity and Explanatory Speech." In J. Shotter and K. J. Gergen (eds) *Texts of Identity*. Newbury Park, CA: Sage, pp 36-55.
- Steiner, George. 1989. *Real Presences*. Chicago: University of Chicago Press.
- Taylor, Charles. 1989. *Sources of the Self: The Making of Modern Identity*. Carbondale, IL: Southern Illinois University Press.
- Teske, John A. 1999. "The Haunting of the Human Spirit." *Zygon: Journal of Religion and Science* 34 (June): 317-322.

- Teske, John A. (2005). "Boundaries and Spirit: Subject/object, Self/other, and Internal/external in Science, Religion, and Culture." *Studies in Science and Theology* Vol. 10, eds. H. Meisinger, W.B. Drees, and Z. Liana. Lund, Sweden: Lund University, pp 59-73
- Teske, John A. 1996. "The Spiritual Limits of Neuropsychological Life." *Zygon: Journal of Religion and Science* 31 (June): 209-234.
- Teske, John A. 2000. "The Social Construction of the Human Spirit," In Gregersen, Drees, and Gorman, 2000.
- Teske, John A. 2001a. "The Genesis of Mind and Spirit." *Zygon: Journal of Religion and Science* 36 (March): 93-104.
- Teske, John A. 2001b. "Cognitive Neuroscience, Temporal Ordering, and the Human Spirit." *Zygon: Journal of Religion and Science* 36 (December): 667-678.
- Teske, John A. 2002. "Cyberpsychology, Human Relationships, and Our Virtual Interiors." *Zygon: Journal of Religion and Science* 37 (September): 677-700.
- Tomkins, Silvan. 1979. "Script Theory: Differential Magnification of Affects. In H. E. Howe and R. A. Dienstbier (eds.), *Nebraska Symposium on Motivation*, vol. 26, 201-236.
- Wegner, Daniel M. 2002. *The Illusion of Conscious Will*. Cambridge, MA: MIT Press

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The Inexpressible Meaning in Narratives

René Rosfort

Introduction

For more than a decade John Teske has worked hard and patiently ‘to help reduce the tension between scientific, philosophical, and religious understanding of human nature and spirit by demonstrating how the latter may be generated by, nested within, or supervenient to the former’ (Teske 2006, 170). I deeply admire his careful attempt to integrate different, often antagonistic, academic disciplines into an ecumenical synthesis that enhances dialogue and cooperation instead of rejection and hermetically closed doors among the different academic disciplines. Furthermore, I share his suspicion with regard to the use of evolutionary or neuroscientific research to substantiate or even verify theological claims, as is commonly the procedure in the interdisciplinary research programme termed *neurotheology*. Teske’s alternative label *neuromythology* avoids the problematic scientific aspirations of neurotheology by downplaying the obsessive crusade for empirical verification of ontological questions that remain empirically unanswerable. Neuromythology is concerned with the value of religious symbols in our quest for meaning in a natural world, and thus ‘allows us to direct our attention explicitly to the investment of these symbols with passion and authority, which is what our deepest meanings are about’ (Teske 2006, 171). Despite his warranted mistrust about the scientific colonization of theology and religious phenomena, Teske’s project retains an interdisciplinary verve in the attempt to combine scientific, philosophical, and religious understanding into a coherent picture of the human spirit. The frustration with such attempts to build broad systems has always been that the critics try hard to find a basic flaw in the construction to poke until the whole system crumbles down. I will not do that. It is irrelevant and often counterproductive to criticise the whole by isolating one of the parts and using that for a *pars pro toto* argument. On

the contrary, I will comment on some of the individual arguments and ideas without questioning the admirable attempt to integrate science, philosophy and religion. My response will mainly be a philosophical one concerning the use of narratives with regard to science and the question of meaning in human existence.

So without further ado, I shall go straight to my comments. I have singled out three interrelated issues that I find problematic: 1) Meaning and Objectivity, 2) Identity and Selfhood in the Light of Narratives, 3) Narratives and Inexpressible Meaning.

Meaning and Objectivity

Implicit and Explicit Narratives

One of Teske's central theses appears to be that the paradigmatic method of science cannot provide the multifarious meanings that we as humans seek in our lives. I fully agree with this, and I would venture that so do most serious empirical scientists.

Uncompromising scientific attempts to explain what makes life interesting and important to us in our existence often seem far-fetched and artificial. To reduce love, tenderness, jealousy, resentment, hate, and other human feelings and concerns to causal operations such as synaptic interactions, evolutionary development and 'selfish genes' is so counterintuitive that it prompts more questions than it answers. I believe that most people are neither appeased nor alarmed by learning that our care for and interest in our children and friends is only an unconscious part of a larger scheme to preserve our genes or promote the welfare of our species. The distance between our personal stance and our scientific endeavours seems unbridgeable. Our everyday words and deeds are imbued with personal meanings that are incompatible with scientific practice. The meanings we, as humans, live by are drastically different from the meanings we use to scientifically explain human life.

Nevertheless, we cannot simply ignore the growing bulk of scientific insight and theoretical clarification of human life. We need scientific methods in order to ratify and sober up some of the meanings that we live by. Contrary to earlier ages, western culture today (and an increasing number of non-western cultures) has a strong faith in science

to tell us when we go astray in our opinions and the values we attach to things and persons around us. This is an indisputable development of our understanding of objectivity. What is more interesting, though, is how we relate this impersonal and objective stance to the personal or subjective attitudes we live by in our everyday lives.

Teske's approach to this difficult problem, as I see it, takes the objective paradigmatic stance to be insufficient, even incomprehensible, without 'a wider framework of narrative meaning, in which those accounts can be said to have any meaning or sense for our lives' (Teske 2010, 3). Here I disagree with the emphasis on 'any meaning or sense'. The meaning produced by scientific research in general, and neuroscience in particular, is not at all detached from our personal attitudes. Science springs from our personal engagement with life. We want to know more about ourselves and the world that we live in, and in order to attain such knowledge we must turn away from the subjective colouring of experience and action and adopt another, more detached look on the world and ourselves. This impersonal and objective inquiry yields a meaning relevant to personal existence without being *explicitly* put into a storied form, a narrative.

In this context, it is crucial to distinguish between *implicit* and *explicit* when we employ the concept of a narrative. If a neuroscientist wants to understand the interaction between the primary motor cortex and the subcortical working of the amygdala or the hippocampus, she focuses on the local causal relations between clusters of synaptic activation and inhibition in accordance with the experimental data that we know in regard to the physiology and anatomy of the brain. The meaning that she obtains from her research is always embedded in an implicit narrative, or as Wittgenstein calls it, a specific language-game with specific rules and connected by family resemblance. In short, it is meaningful in terms of cause and effect. When I jump back from a hissing sound before I cognitively affirm that there is a snake, neurophysiology can ascertain that my instinctive reaction is due to 'the quick and dirty' impulses which the amygdala activates without first interacting with the frontal cortex (Ledoux 1996, 157-169). But this kind of narrative is drastically different from the explicit kind of narrative that Teske argues for. The explicit narrative is a cognitive effort to put the

paradigmatic claim about cause and effect into the wider context of human existence.

I believe that Teske is both right and wrong when he writes that ‘external, objective events do not occur in story form’ (Teske 2010, 22; 11). They do not occur in the form of explicit stories, since these are expressions of our personal processing of something that is often largely impersonal. However, objective events always tell an implicit story about something in the sense that the paradigmatic disclosure of the physical universe is always meaningful within the conditions established by the advancement of the science itself. And these conditions always originate in our interest in the meaning of our human life in an often cruelly disinterested environment. A famous and deeply influential example of how the natural sciences make use of implicit narratives in their explanation of natural phenomena is the Darwinian revolution in biology in the second half of the nineteenth century. As Philip Kitcher has convincingly shown (Kitcher 1993, 11-56), a major part of Darwin’s success was due to the ability of his theory to provide our explanations of the origin and reproduction of species with a general narrative framework. In the first half of the nineteenth century, before the triumphant emergence of the Darwinian solution, several biological explanations of the history of the earth and of life existed simultaneously.

British natural theologians sought for evidence to confirm the existence of the Creator as an *engineer extraordinaire* who had made all species fit perfectly to their given environment, whereas the German *Naturphilosophen*, inspired by Goethe’s morphology, tried to identify various original archetypes from which the diversity of the species could be derived. Comparative biology did not look for the origin of organic structures or the relation of their intrinsic evolution to the well-being of their bearers, but concentrated on finding underlying similarities of structures in various species. In other words, natural theology and *Naturphilosophie* could exist in relative peace alongside one another, because the origin and evolution of structures were secondary to the actual structures that could be verified empirically in the species living at the time. Without a plausible history about how the anatomical structures had developed there was no way of verifying one and simultaneously rejecting the other. Darwin’s famous book changed this way of doing biology. In fact, Darwin did not bring anything essentially new to

biology, but he provided several histories that could explain and organise the variegated results of contemporary theories. As Kitcher points out, a Darwinian history works:

as a narrative which traces the successive modifications of a lineage of organisms from generation to generation in terms of various factors, most notably that of natural selection. The main claim of the *Origin* is that we can understand numerous biological phenomena in terms of the Darwinian histories of the organisms involved [...] Darwinian histories provide the *bases* for acts of explanation' (Kitcher 1993, 20-21)

I bring in Kitcher's account of the Darwinian revolution in biology in order to show that the relationship between objectivity and meaning is more complex than the picture drawn by Teske. According to Teske, the meaning of scientific results for human existence must be produced by an *explicit* narrative that conforms the otherwise, humanly speaking, meaningless scientific results to what is explicitly relevant to human significance and interest. By insisting on such a sharp distinction between scientific endeavour and explanation on the one hand and human meaning and interest on the other, Teske thrusts an unwarranted barrier in between the scientific meaning (objectivity) and the human meaning (subjectivity) that does not do justice to the actual nature of both approaches to the world. As John Hedley Brooke writes:

To affirm a clear separation between science and values may represent a philosophical ideal, but it flies in the face of a history of science sensitive to the manifold ways in which scientific knowledge has been value-laden (Brooke 1991, 338)

What we can learn from the example of Darwinian histories is that the objective explanations of natural science are also tightly bound to the quintessentially human need for explanatory narratives, although these narratives may lose their human flavour and end up as ossified and hidebound scientific paradigms. The meaning disclosed in scientific paradigms is an implicit narrative about what is not explicitly *human* in our being humans. In other words, scientific explanations of human life might just reveal that what we understand as human meaning in our explicit narratives about human life is dubious or even plain wrong when measured by the objective standards of science. On the other hand, given the narrative structure and value-laden nature of scientific explanations, our explicitly human or personal narratives might point to imperialistic tendencies and other weaknesses in many contemporary scientific agendas. There are more meanings in and around human existence than are revealed in both the implicit narratives of scientific paradigms and the explicit narrative form of personal explanations. However, an appreciation of meanings disclosed by both kinds of approach to human life may bring us closer to a picture of the human spirit which is more in accordance with the human and nonhuman aspects of being a human person. The issue of human personhood, which I see as one of the main concerns of Teske's approach, brings me to the next point in my response, namely about identity and selfhood in the light of narratives.

Identity and Selfhood in the Light of Narratives

In the present article, and in more detail in his seminal work over the last decade (e.g. Teske 1999, 2000, 2006), Teske has contributed to the widespread thesis of a narrative (and basically social) construction of the human self. He argues that by telling stories we infuse meaning and purpose into our lives, and furthermore, he joins the conglomerate of narrative theories in the conjecture that 'consciousness may well begin with the power to tell a story with words, and taking the position of a narrator' (Teske 2010, 21-22; see also Teske 2000, 201-203). This is a very strong cognitive stance on human consciousness, which I do not agree with. I believe that there are several phenomenological and

psychopathological arguments against this thesis. Our sense of ownership and self-awareness (that it is *my* experience, *my* thought, *my* action) with regard to conscious experience and action is present on a pre-reflective and pre-linguistic level. I am a self before I am able to articulate and explain this self in an explicit 'storied form' (Teske 2010, 11). When, for example, I notice a car turning fast around the corner and, instinctively, jump back onto the pavement, I apprehend this as something that means something to *me* before I am able to cognitively understand what is actually going on. In other words, I sense a potential danger that I do not understand. The experiential dimension of phenomena involves an intentionality that reveals both an object and a subject in the structure of experience before any reflective or linguistic articulation. In fact, the linguistic articulation is only possible because of this duality in the structure of experience. *Something* is experienced by *someone*, and this someone, this me, is inherent to the experiential structure of every phenomenon in consciousness. I always experience myself in an experience of something. Phenomenologists call this the first-personal givenness of the experiential phenomena, minimal self-awareness or core self:

On the phenomenological view, the experiential core self is not a product of our narrative practices. It is an integral part of the structure of phenomenal consciousness and must be regarded as a pre-linguistic presupposition for any narrative practices [...] We should recognize the existence of a primitive, pre-conceptual self(-experience) from early ontogenesis. Furthermore, experiences and actions must already be given as mine if I am to worry about how they hang together or make up a coherent life story. Only a being with a first-person perspective could consider her own aims, ideals, and aspirations *as* her own and tell a story about them (Gallagher and Zahavi 2008, 205; see also Zahavi 2005, 146)

The difference between this primordial minimal self-awareness and a narrative (i.e. cognitive) reconstruction of selfhood is perhaps most manifest in emotional experience.

When I experience something, this thing, person or event always *touches* me in a certain way. The feeling aspect of an experience clearly involves a sense of self that is sometimes cognitively impenetrable. Why do I feel so embarrassed and at odds with myself when in the company of a certain person? I might try to explain this to myself in terms of all kinds of stories about my history of interactions with this person. But I can only do this after having had the feeling, or rather, the feeling prompts a need to explain why *I* feel so in the first place. However, the affective experience is there before the cognitive explanation in the form of narratives. I insist on this primordial sense of self because it is crucial to the way we understand personal identity.

As Teske emphasises, the narrative concept of identity always runs the risk of admitting unwarranted fabrications or even confabulations about ourselves and the meaning of our lives. And I believe that this is a problem not only from the stance of a paradigmatic view of meaning as we find it in the natural sciences, but also in relation to the multifarious meanings that saturate our personal life. If narratives are to function as a way to ingrain our lives with meaning and purpose, we need a concept of the self that is not itself contingent with respect to the stories that we tell about ourselves, or others tell about us. Fact and truth are not only essential concepts in paradigmatic sciences. They are just as essential to the way we cope with the fragility of personal identity in everyday life. We can tell wrong stories about ourselves or be victims of wrong stories told about us (Dennett 1991, 418-430). The question *who am I?* surely involves narratives in order to be satisfactorily answered. However, these narratives work around *what* I actually am in terms of physical constitution, social background and context, character, habits, inclinations, dreams, desires, and so on. This *what* is part of my selfhood, and as such it determines and shapes my pre-linguistic experience of the world, other people, and myself. When I articulate an understanding of myself, this understanding must always relate itself to the part of my identity that I cannot change no matter which stories I tell about myself, namely the implicit self-knowledge expressed in the way I pre-

linguistically cope with my existence. I can choose to tell an arbitrary story about myself, but not without facing the implicit, and often diffuse, self-knowledge expressed in my bodily movements, feelings, memories, desires, habits, inclinations, and unconscious actions.

Simply put, one can say that my existence as a whole tells a story about my personal identity *despite* myself. This is not to say that I cannot change or improve myself. I can indeed become a better person, find my orientation in the 'moral space' of involvement with other people, but this *how I can be* can only be realised in relation to *what* I already am.

One of the heralded champions of narrative theories, Paul Ricoeur, emphasises the importance of staying aware of such non-narrative aspects of personal identity. The stories that I tell about myself and my life are always anchored in my embodied existence as a physical body with a certain history and as a person in the eyes of other people. In other words, my stories are necessarily bound to my specific body, which imbues my life with meanings that often I cannot make any sense of, and they are furthermore interconnected with the existence of other people who have a voice in my personal tales. Thus, my bodily existence and my life with other people reveal an *otherness* that transcends my own stories about myself. With respect to my body, the otherness is expressed in the sedimentation of my life in my character with all the involuntary impulses, feelings, desires, thoughts and dreams that make up a significant part of a human life. My body is mine in the sense that I can control and to a certain degree shape my body, but at the same time my body is out of my hands, so to speak, since it is part of the anonymous workings of nature that know nothing of my concerns and interests. Ricoeur formulates this fundamental ambivalence in the following way:

To the extent that the body as my own body constitutes one of the components of mineness, the most radical confrontation must place face-to-face two perspectives on the body – the body as mine, and the body as one body among others (Ricoeur 1992, 132)

My existence with other people discloses another, but by no means less significant, kind of otherness. Other people respond to my stories about myself. The meanings that I make of the events of my life are often

different from, and sometimes even conflicting with, the meanings other people make of them. For example, what for me is a road to fulfilment and happiness, can for others be seen as an uncompromising, selfish pursuit of a career with no regard to the well-being and happiness of those around me. Or what I understand as a meaningless and odious waste of time, e.g. my daughter's countless hours in front of the TV or senseless dedication to pedicure, may be meaningful and valuable to another person's sense of self. In Ricoeur's own words: 'The story of a life includes interaction with others [...] in the test of confronting others, whether an individual or a collective, narrative identity reveals its fragility' (Ricoeur 2005, 103-104).

The fragility of our narrative reconstructions of meaning is rooted in the inherent otherness of personal identity. We are not a person on our own account, neither is our identity something that we ourselves bestow on our life. Of course, we have something to say about ourselves in the story of our life, but our voice must always find its tune in orchestration with the voices of other people and the inarticulate workings of an anonymous physical nature. The meanings of human life spring both from personal freedom to enhance or impede humanity and from the involuntary facticity of being part of a natural, non-human world. Hence, the fragility of personal identity lies, for a substantial part, in the tension between how I can be reconstructed in my own and other people's stories about myself and what I actually am. This brings me to my final comment, namely the problem about inexpressible meaning in narratives.

Narratives and Inexpressible Meaning

In general, I have two interrelated concerns with regard to narrative reconstructions of selfhood and personal identity.

The first one is eloquently expressed in the book of Ecclesiastes, where the author, in chapter eight, sternly asks: 'Who *is* the wise man? And who knows the interpretation of a thing? A man's wisdom makes his face shine, and the boldness of his face shall be changed' (Eccl. 8,1). If we build our understanding of personhood on the stories told by the person herself or those told by others or even those embedded in and transmitted through the social and cultural body of human interaction, we

risk violating the nature of human personhood. Who is able to decide when a narrative construction of a person is correct, and when it is not? Who should we trust when we are in doubt about a person - the person herself, the sociocultural conventions and habits that make up that person, or the physical constitution of the person?

Human personhood is fragile, and being a person is difficult, exactly because there are no easy solutions to such questions. Some narrative constructions are easy to verify or dismiss as deceptive or miserable fabrications. If I tell my wife that I live in a happy marriage, and she starts to laugh and walks out of the door, perhaps I should reconsider my idea of a happy marriage. Or if I tell my lifelong friend that I have always enjoyed working in the bank, and he notices that I have been complaining about my job for over ten years now, it does not help that I try to convince him that it was just something I said at that time. Perhaps I have to accept that in some respects he knows me better than I do. The same goes for many other aspects of my identity and sense of self. In this sense, there is an imperceptible and yet distinct line between what I want to be, and thus sometimes tell myself, and what I am. I would love to be taller than I am, to have read more books, to know more about palaeontology, to stop cheating on my wife, to spend more time with my children, and so on. But my stories about myself are conditioned and, to some extent, dependent on my physical constitution and the people with whom I live my life. In other words, the mythological aspects of my narratives are always balanced against the solid facts that I am embodied and thus bound to my biological constitution, that I am embedded in a certain sociocultural context, and that I spend my days with people who know my life intimately, or at least have an opinion about the person I am. This grounding of my narratives in the (f)actual world poses a problem for Teske's distinction between 'story truth' and 'happening truth', where the former is what constitutes our narratives and thus our construction of a personal identity, and the latter is concerned with the factual veridicality of the 'objective' world (Teske 2010, 23-24). Teske concludes that 'I think we are also, truly and really, as much constituted by what we imagine ourselves to be, whether prospective or fictional' (Teske 2010, 25), and although he is perfectly aware that '[p]ossibilities *are* constrained by facts, and the more we know about the facts, the more realistic our projection of possibilities might be' (ibid), his emphasis on

our reflective construction of selfhood and personal identity misses the problematic relation between fact and possibility at the heart of the human self. The philosopher Arne Grøn poignantly explains the complex relationship between identity and narrative constructions:

[O]ur identity is not simply what comes out of the narratives we tell about ourselves. Identity is also how we relate to our narratives or to ourselves in telling these narratives [...] the identity of the self depends on how one understands oneself: how one takes oneself in taking what happens to oneself. Thus, how one relates bodily – in movements, gestures, seeing – to others is also to place oneself in a position to others. But this is not an identity that is developed in a narrative, but rather what narratives would relate to. In trying to understand what I experience by “constructing” some sort of narrative, I relate to myself as the one having experienced what I try to understand. Self-relation is not first to be established in a reflection or in a narrative, but is implicit in relating to others and a shared world (Grøn 2004, 147)

When a person relates to herself, to what she is or what she wants to become, this self-relation is not effectuated merely in the form of conscious narratives. Narratives are only a part of how a person understands the world and her role in it, other people, and herself. Narratives can be considered as reflective attempts to cope with fundamental aspects of what it means to be a human person, but as such, narratives are constructed ‘after the fact’, so to say. And like every human construction, they come wrapped in all the flaws of human nature, i.e., in every shade of ambition, envy, jealousy, self-deception, anger, greed, and so on. And to complicate the picture even more, the narratives

of different persons (of political parties and even of different societies) very often clash because of their different points of view. The possibility of narrative reconstructions of self and personal identity is muddled by the difficult balance of individuality and coexistence of those with different and, sometimes, opposing characters. And hence the question of Ecclesiastes, 'Who *is* the wise man?' In other words, who can we rely on in the interpretation of our life? Rather than being a solution to the perplexities of human personhood, narratives (the personal ones as well as those we find in novels) are important exactly because they make evident the difficulty of being a human person. Thus, in one sense I fully agree with Teske that narratives are essential to our understanding of human life. Without narratives, human sorrow and despair would linger cruelly barren deep in our hearts, and our cry for meaning in a seemingly inhuman universe would remain inarticulate. However, narratives do not create meaning and understanding *ex nihilo*, and neither do they necessarily solve our perplexities about life. They may help us to cope with life and promote our search for meaning, but only in so far as we understand how they originate in and work on a pre-reflective, and often inexpressible, sense of being a person in coexistence with other persons. This brings me to my second concern, and conclusive remark, about narrative reconstructions of selfhood and personal identity.

If we let the meaning of being a self originate, develop and be completed in the cognitive elaboration of narratives, then we neglect the cognitively impenetrable aspects of being human, mostly expressed in our feelings. Our capacity for language is indeed one of the essential characteristics that separate us humans from other animals. However, the strange thing about being human is that often what we care for most, our most intimate concerns, our love and our sorrows, cannot be expressed by language or put into an intelligible narrative. We somehow know that someone or something means literally everything to us, but we cannot articulate why or how they do so. Narratives are surely an invaluable help in sorting out the complexities of meaning in human existence, but, just like the natural sciences, they can never exhaust the meaning of human existence. The human heart or our inmost self only seldom finds its way past our lips, or as Cordelia says when her father, the elderly King Lear, asks her how much she cares about him: 'Unhappy that I am, I cannot heave my heart into my mouth' (Act 1, sc. 1). Moments before in the

same scene, when she hears the flowery proclamations of filial love and endless praise from her two calculating sisters, she asks herself, 'What shall Cordelia do? Love and be silent'. Her question is not an expression of despair or perplexity about finding the right words to grease her father's goodwill towards her. On the contrary, she is certain of the love she feels for her father, and she will not taint this love with poor approximations in the shape of swollen words. Her confidence does not rely on the understanding of others, her father, her two sisters, and the rest of the court, but rests on the certainty of her love itself: 'Then poor Cordelia! And yet not so; since I am sure my love's more richer than my tongue'.

Cordelia's feelings for her father disclose an important aspect of human life and existence, namely that our lives are saturated with feelings and emotions that we cannot articulate or understand, but which nevertheless affect our actions and self-understanding. Feelings and emotions are, perhaps, the most embodied phenomena of our mind (de Sousa 1987, 46-51). As such, some of our feelings tend to remain inexplicable to ourselves. And other people often do not fare well when they attempt to explain our own feelings to us. Attempts to explain and evaluate the emotional life of another person have often led to strained or broken relationships, whether of lovers, friends, or even parent and child. To have another person telling you what you should or should not feel is not a very pleasant experience, even if the other person is actually right. Who is another person to tell me what I should or should not feel? Most people would agree that whereas we may judge and even correct a person with regard to how he or she should behave, things become more complicated and require a more subtle approach when it comes to another person's emotional life. And this is due, among other things, to the fact that a person often does not understand his or her own emotional life.

A person may be a victim of his emotions in the sense that the autonomy of human existence becomes very fragile when it comes to feelings. Why do I keep on loving her despite the fact that I do not want to love her anymore? Why do I envy her, even though I do not like or even recognise myself in my envy? One reason for the inexplicable nature of many human feelings is the biological nature of human affectivity. Whereas our reflective thoughts are capable of abstracting from our biological constitution, our feelings are too immersed in the

anonymous and cognitively impenetrable workings of our mammalian bodily functions. I may be irritated or sad simply because of lack of sleep, food, or comfort. In this way, many of our feelings are out of our conscious control. Another reason is that our feelings often involve the existence of other people whom we do not know or fully understand. The character of my love (happy, unfulfilled, strained, disappointed, etc.) depends as much on the person that I love as it depends on me. Friendships are bound and shaped by mutual feelings, as is every other interpersonal relationship that is saturated with a plethora of feelings such as happiness, anger, care, sadness, joy, satisfaction, and so on.

Conclusion

These concluding remarks on the affective nature of human life are only to emphasise what I have been arguing for all along. Human meaning and personhood are not things that can be constructed as narratives by sheer will or disciplined effort. It may indeed include such human factors, but, to invert a saying by Teske (Teske 2010, 5), narratives do not exhaust human meaning. Personal and social narratives should not shroud the cold facts of natural science in a human form in order to make these facts meaningful to human life. On the contrary, narratives and natural science are two different ways of making sense of our human nature, and they must retain their own right to correct and refine the explanations of the other. Thus, the impersonal paradigmatic explanations of natural science may very well disclose features of human life and existence that despite their clinical expression and meaning help us better understand our human, and, at times, all too human, nature.

Bibliography

- Brooke, J. H. (1991). *Science and Religion: Some Historical Perspectives*. Cambridge: Cambridge University Press.
- Dennett, D. C. (1991). *Consciousness Explained*. Boston: Little, Brown.
- de Sousa, R. (1987). *The Rationality of Emotion*. Cambridge, MA: The MIT Press.

- Gallagher, S. and Zahavi, D (2008): *The Phenomenological Mind: An Introduction to Philosophy of Mind and Cognitive Science*. London: Routledge.
- Grøn, A. (2004b). "Self and Identity." In D. Zahavi, T.Grünbaum, J. Parnas, *The Structure and Development of Self-Consciousness. Interdisciplinary perspectives*, 123-156. Amsterdam/Philadelphia: John Benjamins Publishing Company.
- Kitcher, P. (1993). *The Advancement of Science: Science Without Legend, Objectivity Without Illusions*. Oxford: Oxford University Press.
- Ledoux, Joseph (1996). *The Emotional Brain: The Mysterious Underpinnings of Emotional Life*. New York: Simon and Schuster.
- Ricoeur, P. (1992). *Oneself as Another*. Trans. by K. Blamey. Chicago: Chicago University Press.
- Ricoeur, P. (2004). *The Course of Recognition*. Trans. D. Pellauer. Cambridge, MA: Harvard University Press.
- Teske, J. (1999). "The Haunting of the Human Spirit." *Zygon*, vol. 34: 307–322.
- Teske, J. (2000). "The Social Construction of the Human Spirit." In N.H. Gregersen, W.B. Drees and U. Görman (eds.): *The Human Person in Science and Theology*. Edinburgh: T&T Clark LTD.
- Teske, J. (2006). "Neuromythology: Brains and Stories". *Zygon*, vol. 41: 169–196.
- Zahavi, D. (2005). *Subjectivity and Selfhood: Investigating the First-Person Perspective*. Cambridge, MA: The MIT Press.

The Role of Understanding in Human Nature

Peter Gärdenfors

Introduction

Why is understanding so important in the life of humans? We can easily imagine a life where we follow a set of rules without understanding why these rules are there. However, achieving understanding is a strong motivational factor for many of our endeavours.

Understanding is a central concept in cognitive science since it concerns the coherence of a cognitive system and how the system evaluates its own coherence. Despite the enormous progress during the last centuries there are surprising lacunae in our scientific knowledge. The very concept of understanding has often been overlooked in educational, philosophical and psychological research. In the early stages of cognitive science the functioning of the brain was seen as similar to that of a computer. Bruner notes in his book *Acts of Meaning* (1990) that if thinking is seen as information processing, questions about meaning and understanding disappear. But a theory about human nature cannot be based on “information,” “processing” and “behaviour” only – it must contain some account of what it means to understand. Among other things, this involves putting the acts of humans in a social and cultural context.

Understanding is nothing mysterious, but very little is known about how understanding arises. Within the humanities one finds the hermeneutic tradition concerning “Verstehen”. However, this tradition focuses on the possibilities of interpreting cultural products – books, paintings, symphonies, etc. Research is still in its nascent stage as regards the role of quotidian insights, for example in ordinary students’ learning – what happens when you discover a connection you have not sensed before. A new insight is often connected with an aha-experience.

However, when it comes to describing what happens in our heads when we understand, science has little to say.

In this article I will focus on the role of understanding in culture, education and science, and more specifically, on how to use abstract theories to make sense of the world. However, first of all I must provide a general background to how I understand understanding. As a working hypothesis, I shall propose that *understanding consists in seeing a pattern* (Gärdenfors 2007, Gärdenfors and Lindström 2008). I shall begin by discussing how this idea, which derives from Gestalt psychology, is interpreted in modern cognitive science in terms of “hidden variables”. In particular I will show that the minds of humans are tuned to seeking causes and to reading the minds of others. As a first application of the ideas, I argue that what patterns are seen is to some extent dependent on the culture one lives in. The second application concerns education. It seems obvious that the goal of education should be that students understand the material they study. I propose that this is achieved by helping them to discover patterns that they cannot find on their own. I present some educational techniques such as visualizations, simulations and virtual agents that can be used to make students see the relevant patterns in a knowledge domain. Finally, I discuss the role of understanding in science. I argue that current proposals can be subsumed under the idea that understanding is seeing a pattern.

Understanding is seeing a pattern

We find more or less abstract patterns at all levels of thinking, from seeing the stripes on a cat, to identifying the musical structure of a fugue by Bach or understanding the role of microorganisms in diseases. Some of the patterns we perceive are given by our biological constitution, some are learned during our childhood and our continued education, some are given by the culture we live in and some are provided by science. As I shall argue, perception of patterns is one of the most central cognitive processes. However, while relying on patterns increases our capacity to solve new problems, it can also hamper our ability to approach situations with an open mind.

Above all, we perceive patterns visually. However, it should be noted that the idea of understanding by experiencing a pattern is viable in all sensory modalities. For example a sommelier can distinguish a fine wine by identifying acidity, sweetness, etc.; a bilingual child has learned fluently different phonemes from two languages; a perfume maker can create new scents by altering combinations of oils and flower extracts; and a sculptor can capture all the aspects of an ageing body with stiffened joints, muscles and wrinkled skin. All these are examples of experiencing a pattern that results in a better understanding of a knowledge domain. After attending a concert or visiting an art exhibition we say we are full of impressions. But it is a myth that our sensory experiences are “impressions”, in the sense that there is something that is pressed into our brains. Our brain is not a passive receiver of images and sounds from the surrounding world. It actively seeks patterns and it *interprets* what it receives. This continuously running process is the basis for all understanding. Our brain’s search for patterns, whether we are aware of it or not, takes place at a variety of levels. At the bottom of our understanding, there are biologically determined mechanisms that strongly control the way we perceive the surrounding world. At the top, one finds the cultural patterns that are required in order to interpret works of art, poetry, music, dance, etc. However, when we master the patterns, they also influence our perception of the cultural products. As a consequence, we don’t all see and hear the same things – there is no “objective” description of the world (Gärdenfors 2007). As Goethe writes: “Es hört doch jeder nur, was er versteht.” To illustrate that the search for patterns is ubiquitous, let us begin with an example of a biologically controlled mechanism from the visual modality

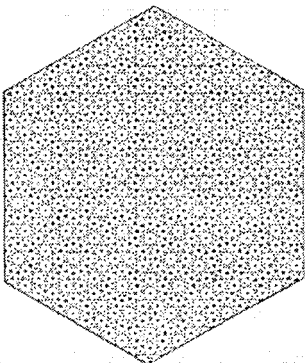


Figure 1: (From Marroquin 1976)

At an early stage of the visual process, the brain tries to find patterns among all the dots. We perceive circles of different sizes in the figure. An interesting aspect is that one circle is soon replaced by another that suppresses the first, etc. The figure “lives” even though not a single dot is moving. You may even discover Maltese crosses in the figure. If you do, the crosses will block the perception of the circles – and vice versa. The figure has no global meaning, but our visual system searches incessantly for patterns. There is therefore no unequivocal answer to how one “perceives” the figure.

The brain is full of mechanisms that *fill in* what falls on the retina, the eardrum or the other sensors. The experienced result is often a pattern in the form of a *Gestalt*. These processes were studied by the Gestalt psychologists in the first half of the twentieth century, but they have received a renewed interest since we are now beginning to understand the brain mechanisms behind this form of filling in. For example, consider Figure 2. We immediately perceive figure A as a circle and a rectangle, that is, we decompose it as in figure B, although there is no logical reason why it should not be decomposed as in figure C or D.

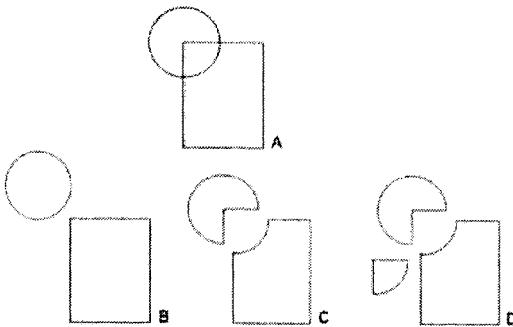


Figure 2: Perception of Gestalts

The mechanisms that fill in are important from an evolutionary perspective: Bad lighting conditions or occluding objects do not prevent us from discovering danger or food, which clearly increases our fitness. If one sees the tail of a tiger, one will surely understand that there is a whole tiger in the vicinity. Therefore, we will have a better chance of surviving in our environment. Our brains have constructed a large repertoire of patterns. We are often not aware of them, but they can be elicited by various tricks. For example, look at the two pictures in figure 3. What do they depict?

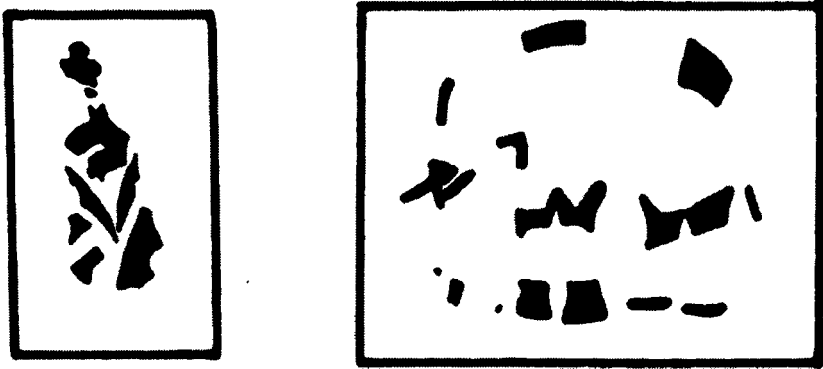


Figure 3: Incomplete depictions of objects.

It may not be difficult to see that the left is a picture of a violin, but for many observers a clue is needed for the picture to the right – a salient feature that deciphers the content. It is an *elephant* (with its head to the left). Suddenly the pieces fall into their places and one can interpret the picture – it becomes a Gestalt. The different parts become *meaningful*. For instance, one of the black blotches suddenly becomes the tip of the trunk. An interesting feature of such Gestalt experiences is that once you have seen the pattern, you cannot let it go away again.

For some category systems, the effects of a categorization are *amplified* by the perceptual systems so that distances within a category are perceived as being smaller and distances between categories are perceived as larger than they “really” are. This phenomenon is called *categorical perception* (see, for example, the articles in Harnad 1987). This finding implies that a reality where there are no sharp borders is

sorted into distinct slots by our cognitive mechanisms. The categories can be seen as a kind of pattern. They are normally a product of learning, most of which is implicit.

A simple but illustrative example of categorical perception is provided by figure 4:

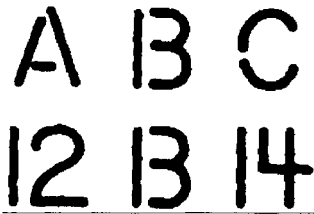


Figure 4: An example of categorical perception.

If you focus on the upper row, the sign in the middle is seen as a B, while if you focus on the lower row, the very same sign is seen as 13. The example illustrates that the *context* determines how we understand the information that our senses receive. This mechanism makes our processing more efficient, but it also locks us into certain interpretations.

The patterns above are culturally transferred since they form part of basic Western education that uses Latin letters and (adapted) Arabic numerals.

The mechanism of categorical perception has been found in many domains, but has been studied in particular for phonetic systems (see, for example, Petitot 1989). Understanding a language presumes that one can correctly categorize the sounds of the language and group them into units we call words. Even though a set of sounds may be produced by an articulatory parameter that varies continuously (output variable), the auditory system perceives this variable in a categorical way so that when the articulatory parameter is varied along its scale, the perceived sound (input variable) seems to remain constant for a large interval and then suddenly jumps to a new sound that is relatively stable too.

The Causal Drive

Humans have a more or less innate drive to seek patterns in their experiences. Above all, we have a strong tendency to seek causes in the happenings of the world. In a previous book (Gärdenfors 2006), I called this tendency our causal drive. There are good evolutionary reasons why we should look for casual connections since they help us understand how the world hangs together. By reasoning about causes and effects we become much better at predicting the future. And human beings are, more than any other animal, dependent on their prospective thinking (Gärdenfors 2003).

As a matter of fact, there is a very strong connection between seeing patterns and understanding causes. A causal variable is a kind of pattern that connects causes and effects. Conversely, seeing new patterns means that one sees new connections between phenomena in the world. A pattern thereby functions as a way of creating new causal explanations and offers new ways of solving problems. For example, if a parent discovers a connection between a grumpy child and that the child has not eaten for some hours, the parent can help the child by feeding it. If the parent then learns the variable "low blood sugar level" as a causal variable behind the whimpering and understands what kind of food quickly raises the blood sugar level of the child, the problem-solving capacity of the parent becomes even better.

Humans have a unique talent for extracting the *hidden variables* of the world. These variables often form the backbone of the patterns that we discover. Within philosophy of science they are called theoretical variables. A prime example is the *forces* we use to interpret and categorize the events and actions that are presented to us by our perception. On a more abstract level, various physical, social and other variables can help us understand a phenomenon that initially was a disconnected blur. The hidden variables that are used to perceive causal relations are fundamental examples of the patterns that humans are particularly apt at discovering.

In support of my notion of a causal drive, Leslie (1987) argues that infants not only can follow objects with their gaze, but they also have a special mechanism or module in the brain that calculates the forces

influencing an object. Such a system, if it exists, would be a paramount example of how the human brain can exploit the hidden variables that govern the world around us.

My interpretation of the difference between humans and other species is that our inner worlds are much more efficient in exploiting hidden variables to make predictions about the future. The causes are not given to us by our senses, but our brains fill them in. White (1995) even claims that that we literally perceive the forces, just as we perceive the contours of objects even if they are not contained in the visual information that reaches the eyes.

The great advantage of the causal drive is therefore that it improves our ability to forecast the future. But sometimes it becomes excessive. Even pure chance events, such as lottery prizes, are seen as a result of luck. But “luck” does not exist – it is a pure figment of our minds. The fact that we talk about luck is just a sign that our brains are obsessed with finding causes for everything that happens. If there is no cause, we must invent one. The causal drive is therefore a strong factor behind the creation of myths and magical thinking. Magical thinking is particularly strong in children’s thinking. Piaget (1930, 174) writes:

The child fills the world with spontaneous movements and living “forces”; the heavenly bodies may rest or move as they please, the clouds make wind of themselves, waves “raise” themselves, trees swing their branches spontaneously to make a breeze.

This idea can be extended to adult thinking: one can interpret magical or animistic thinking as just an application of psychological causality to physical phenomena – *agents* are seen everywhere as causes of events. Magical thinking does not only occur in children but is common, in different forms, at all stages of life and in all cultures. If you have once had an accident after seeing a black cat running across the road from left to right, you become worried next time you see a black cat. And you should not walk under ladders or open umbrellas indoors, and so on, ad nauseam.

I submit that the human understanding of physical forces has developed via animism and anthropomorphism. Presumably, we have long interpreted the physical events with the aid of social variables such as power and eventually understood how to think in terms of impersonal physical forces. This accords with Collingwood (1972), who writes:

“Causal propositions [...] are descriptions of relations between natural events in anthropomorphic terms.” It should be noted that it is only during the last few centuries that we have created a purely mechanistic description of the world.

Reading the Minds of Others

The causal drive of humans does not only concern the physical world but also the mental one. Apart from physical forces, we can perceive the *mental forces* that govern the behaviour of others. Perceiving these forces forms the basis for intersubjectivity. In this context, intersubjectivity means *the sharing and understanding of others' mentality*. The term “mentality” is taken here to involve not only beliefs and other proposition-like entities, but also all sorts of forms of consciousness such as emotions, desires, attentional foci and intentions. In the philosophical debate, intersubjectivity is commonly called having a “theory of mind” (Premack and Woodruff 1978, Mitchell 1997). (I avoid this term because it often presumes that one can understand the beliefs of others, something which, on the account presented here, is but one aspect of intersubjectivity.)

Along with becoming better at imagining the inner worlds of others, we have become more skilled at creating hidden variables that can explain the thoughts of others (and of ourselves). First of all we must understand the actions of others, since we generally derive the mental states of others from their behaviour (including their speech). This mechanism can be seen as a variant of the one that allows us to derive physical forces from the movements of objects. The *intentions* we ascribe to others are the hidden forces that make other agents behave as they do. Because we can imagine what others know and do not know, we become good at cooperation, something that has fostered the evolution of human language, culture and societies (Gärdenfors, to appear). A downside of this is that our knowledge about the knowledge of others also makes us more skilled at deception and counterdeception. If I can imagine what others know about what I know, it will be possible for me to foresee the potentially deceptive moves of others.

In previous works (Gärdenfors 2003, 2008), I have distinguished different *levels of intersubjectivity* in order to understand the cognitive capacities of animals and children at different ages.

- (1) Understanding the *emotions* of others. At this level one can, for example, understand that someone else is in pain. This is what is usually meant by *empathy*. Even though one can understand others' emotions, it does not mean that one understands what they believe or want.
- (2) Understanding the *desires* of others. This capacity involves understanding, for example, that others don't like the same things as you do.
- (3) Understanding the *attention* of others. This means that one can understand, for example, what someone else is looking at. However, this ability does not presuppose any conception of other parts of their inner world.
- (4) Understanding the *intentions* of others. This capacity means, above all, being able to understand the objective that may lie behind another individual's behaviour.
- (5) Understanding the *beliefs* and *knowledge* of others. This ability involves, among other things, understanding that others don't know the same things as you do.

A final step in the development of intersubjectivity is small but crucial for self-consciousness in its proper sense: I must realize that the inner world of my opponent does not only contain a representation of me as a bodily agent, but as *an agent with inner representations as well*. I believe that it is only after this insight that the agent can become self-conscious in the sense that it can form representations of its own representations. Some support for this point can also be obtained from results in developmental psychology (see e.g. Wimmer and Hartl 1991, Gopnik 1993, Carruthers, to appear). Along the same lines, Dilthey, one of the forerunners of the hermeneutic tradition, writes that to understand is to connect an expression with an experience to learn to know a *Geist*. According to him, all understanding involves a "rediscovery of the I in the Thou." Anticipating the modern debate he explains: "The understanding of self requires me to approach myself as others do, that is,

from the outside to the inside.” In other words, *self-consciousness* can develop as a shortcut in the representations involved in higher forms of intersubjectivity: in my inner world I can have a representation of my own inner world.

Understanding other Cultures

A culture is not just people in an environment, but, more importantly, a particular way of understanding the world. Each culture brings with it a different set of patterns of interpretation. One problem is that it may be difficult to perceive the patterns of other cultures. Since they do not fit with those of our own culture, we often experience them as “strange”, “odd” or simply foreign.

Musical scales are clear examples of how cultural patterns can actually influence perception itself. When Westerners listen to Arabic or Indian music, they perceive many of the tones as being out of tune. The reason is that the Western music scale is based on twelve tones, while in Arabic music the scale can contain seventeen tones and in the Indian scale twenty-one. Western ears fail to sort the tones from an Indian raga or an Arabic love song into the twelve slots given by the standard scale. They do not fit with the categorical pattern of Western music. An alternative pattern in the form of a different scale must be picked up before the music can be fully appreciated.

Cultural educational programs have a tendency to focus too much on teaching facts about other cultures and too little on understanding the basic patterns underlying cultural practices or belief systems. For this reason, education that strives to bridge cultures should focus on conveying the relevant patterns rather than facts about other cultures. In section 8, I shall discuss possible educational techniques to guide students in the recognition and comprehension of the relevant patterns of other cultures.

There are strong ties between the patterns we perceive and the language we use. Patterns give meaning to the concepts we use when structuring the world. Language then names the patterns, not the single sensory experiences. Linguistic differences in cultural patterns often create mismatched expectations. For example, “breakfast” is translated

into “prima colazione” in Italian. Yet the concept stands for radically different phenomena. I believe that an Italian seeing a full English (or American) breakfast for the first time will be as taken aback as an Englishman is disappointed when encountering the minuscule *prima colazione* at an Italian hotel. Examples like this are ubiquitous in translations between any two languages and they can even occur within a language when it is used in two culturally different regions.

Cultural patterns can be subtle. A striking example of hidden categorical perception comes from the way in which a pharmaceutical company attempted to sell headache medicine to a new market. This company wanted to globalize its business and launched an advertising campaign in North Africa. Because a large proportion of the inhabitants were illiterate, the message was presented in the form of a cartoon (see figure 5).

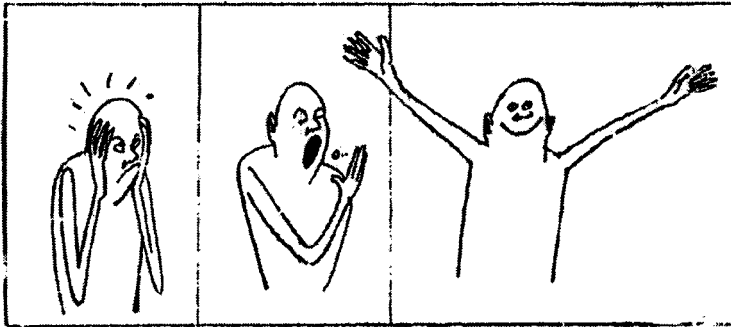


Figure 5. An advertisement for a headache medicine

The campaign was a failure. Those who could read, read Arabic, which is read from *right to left* and would only conclude that the medicine caused the headache. The intended meaning of the cartoon was thus interpreted in the opposite way. Those who could not read interpreted the cartoon as three separate figures and they could not understand the intended causal connection between the pictures. In Western cultures, people are so used to reading a cartoon from left to right and adding causal connections

between the pictures that it does not occur to them that this could be a culturally induced pattern.

The role of Understanding in Education

It is a miracle that curiosity survives formal education

(Albert Einstein).

Providing students with facts is a superficial form of education. Helping them create knowledge by teaching them how to interpret and evaluate the information is a much better form. However, human understanding goes beyond knowledge. The best form of education results in the students understanding the material they study. In our opinion, this is achieved by helping them to see patterns that they cannot discover on their own.

What kind of understanding is relevant in learning is of course dependent on the goals of education. In some contexts, learning practical procedures is in focus; in others, facts about the world; in still others, learning abstract theories. An encompassing goal of education would be to understand how theories make sense of the world and provide explanations for practical procedures.

Selz (1924/1981) proposed that insight occurs when a problem solver fills in a gap in the structural complex. For example, a child who realizes that the letters in a text correspond to separate speech sounds has cracked the reading code. The child has seen the pattern of language as formed by different phonemes and how they are connected to each other to make meaningful utterances. The rest is practice. Or a music student who suddenly understands how a Bach fugue is composed will be able to improve her performance by expressing more subtle variations.

Every student recognizes the joy of suddenly understanding a difficult problem or suddenly seeing a pattern in a complicated domain. An elementary example is to understand that a negative slope in a graph represents a decrease of a variable. An experienced teacher can easily perceive when a student has understood. The experience of *insight* is subjectively experienced as: "*Aha, now I get it!*" The emotional aha-

insight occurs when the pieces fall into place in the pattern, and the insight means that the student has achieved a more refined understanding of the domain.

From the cognitive neuroscience perspective one would also be interested in understanding what happens in the brain when, for example, a student experiences an aha-insight and what emotional and motivational responses correlate with such an insight. As a side remark, it can be noted that Land (1982) defined insight as “the sudden cessation of stupidity”. There are some recent exceptions (see for example Jung-Beeman et al. 2004), but, by and large, these processes have not been investigated. Although I lack the empirical data to support my position, I am convinced that the more often one experiences true understanding, the more *motivated* one will be to pursue one’s studies. In brief, I submit that understanding is a key motivational factor in education.

An aha-experience is a strong scaffold in the process of meaning making, as it provides the student with an affective receipt attesting to an understanding of the salient features of a pattern. This internal information is useful for the student as a success feedback to her learning. It may also be useful as external communication to a tutor who may draw attention to the factors that generate the student’s aha-insight. A skilled teacher can analyse the learning situation and pinpoint personal, environmental and emotional factors leading to the understanding of the pattern.

There is a saying that education is what is left when you have forgotten what you have learnt. This seems paradoxical because it is difficult to fathom how there can be any knowledge left when one has forgotten it. The paradox arises from the way we generally appreciate the concepts *information* and *knowledge*. My solution to the paradox is that *education consists of the patterns you have assimilated during your life*. To assimilate knowledge is to incorporate new knowledge in a form that is understandable to oneself. A pattern can remain even if the facts used to discover it are forgotten. The patterns are more important than facts since the former can be used for solving new problems that go beyond the training set. The deeper you understand, the more you can generalize your knowledge. And when you have understood, it is also much easier to explain your knowledge area to others. In other words, the one who understands can teach.

Understanding and Transfer

Achieving understanding within a knowledge domain leads to an increased ability to solve new problems and to answer new types of questions relating to the domain. This is essentially what is called “transfer” in educational research. In this section I will use the survey article by Bransford and Schwartz (1999) as a point of departure to describe the connections between understanding and transfer.

Bransford and Schwartz (1999) reconsider some of the traditional ideas about what constitutes a demonstration of transfer. Instead of focusing on the ability to answer new questions within a knowledge domain, they want to emphasize how the ability to *pose* relevant questions within the domain has developed. For example when fifth graders and college students were asked to provide a plan for protecting Bald Eagles from extinction, the proposed plans of both groups failed on several accounts. However, when considering the questions asked by the two groups, there were decisive differences. The fifth graders tended to focus on individual eagles (What do they eat?) while the college students focused more on interdependencies between the eagles and their habitats (What about the predators of eagles?) By this view of transfer, it seems that the college students had learned general biological principles that they could now transfer to generate more relevant questions. By exhibiting a greater repertoire of patterns they could apply to it, they demonstrated a better understanding of the problem. In brief, learning with understanding is important for enhancing performance on subsequent transfer tasks.

As an alternative, Bransford and Schwartz (1999) want to broaden the notion of transfer by focusing on the students’ “preparation for future learning” (PFL). They write:

So, rather than evaluate whether people can generate a finished product, the focus shifts to whether they are prepared to learn to solve new problems. For example, one determinant of the course of future learning is the questions people ask about a topic, be-

cause these questions shape their learning goals. [...] [T]he ideal assessment from a PFL perspective is to directly explore people's abilities to learn new information and relate their learning to previous experiences.

In my terminology, PFL involves extracting the relevant patterns so that the understanding they provide can be applied to future problem situations.

Bransford and Schwartz (1999) also argue that *contrasting cases* are important as guides to seeing patterns and thus to understanding. They describe an experiment as follows:

The goal of our studies was to explore ways to help college students understand memory concepts (e.g., a schema). [...] Our experiments compared the effects of reading about memory experiments and theories versus actively analyzing sets of contrasting cases relevant to memory. Students in the contrasting cases condition worked with simplified data sets from original experiments. [...] Their task was to "discover" the important patterns in the data. Students in the other condition wrote a multipage summary of a textbook chapter. [...] [W]e assumed that the use of contrasting cases would better prepare students to learn new information than would the activity of summarizing the text. As a means of examining this assumption, the new learning experience took the form of a lecture on memory theories and experiments. [...]. Students received a final prediction task that presented them with a new

memory experiment and asked them to make predictions about the likely outcomes. Students in the “summarize plus lecture” group did not do nearly as well as students in the “contrasting cases plus lecture” condition.

They also argue that the PFL perspective highlights the importance of learners actively interacting with their environments. When learners have opportunities to get involved with reality and receive feedback, their learning improves quite dramatically and the importance of their previous experiences is revealed. Furthermore, studies show that information presented in the context of solving problems is more likely to be spontaneously utilized than information presented in the form of simple facts.

Finally, Bransford and Schwartz point to the role of *intersubjectivity* in PFL: “An especially important aspect of active transfer involves people’s willingness to seek others’ ideas and perspectives. Helping people seek multiple viewpoints about issues may be one of the most important ways to prepare them for future learning.”

Educational Techniques for Understanding

I now turn to the challenge of how education should be organized in order to boost the students’ understanding by making them discover the relevant patterns within a knowledge domain. If we follow Piaget’s constructivist view on education, students should not be taught the patterns, but they should discover them themselves. They should only be scaffolded with the right kind of material for the process. However, practical educational experience shows that this method is far from optimal. An orthodox constructivist viewpoint puts too high demands on the students: They are supposed to discover the patterns that it has taken scientists and professionals centuries to uncover.

A teacher who introduces the theoretical structure within a knowledge domain will thereby present abstract patterns to the students. The pattern can, for example be a grammatical rule or a method of

composing music. The pattern is often constructed from theoretical variables that are not given by experience.

In education, merely introducing theories is not sufficient to achieve understanding. In high school and at college, scientific knowledge is presented via abstract theories, often in the form of equations or other symbolic notations. Yet, many students do not understand the theoretical elements beyond mechanically manipulating the formulas. For example, they pass their exams in physics by putting in the right numbers in the equations, without understanding the pattern expressed by the equation. In this way, students hardly achieve any deeper knowledge, let alone any understanding of the underlying patterns in physics.

I believe that certain educational information technology (IT) tools, in the hands of an experienced teacher/supervisor, can be effective in promoting understanding. In particular, I want to point to tools for *visualizing* abstract data and correlations, that is, visualizing the patterns, and to programs for *simulating* various processes relevant for grasping the patterns.

When a teacher wants to convey patterns in abstract theories, visualization is an excellent method for promoting understanding, because it can pinpoint salient features in the pattern. In mathematics a third-degree equation suddenly becomes comprehensible when drawn as a graph, the connection between demand and supply in economics becomes graspable when drawn as curves in a diagram, and the development of a historical battle is easier to remember if presented by blocks and arrows on a map. Presenting theoretical patterns visually makes it easier for the students to connect to their own experiences and thereby their understanding will be considerably enhanced.

If we consider the problem of conveying cultural patterns, I would point out that visualizations could be excellent tools in language education. In traditional dictionaries, words are explained by other words. But there are also “pictionaries” where some words are explained with the aid of pictures. For example the differences between the English “breakfast” and the Italian “prima colazione” could quite easily be expressed using pictures.

A *simulation* replaces a real course of events by a dynamic model where the most important variables are accounted for. Simulation programs can be said to be a form of visualizations – namely

visualizations of dynamic systems. In the computer game SimCity the player can construct a complex virtual city with water supply, electricity, streets, schools, industries, etc. The goal is not to conquer anything, but to keep the dynamic system representing the city in balance so that the city can develop in a harmonic manner. There must not be a shortage of electricity or too expensive streets. The simulations do not give you real experiences of city planning, but they provide *virtual experiences*. When it comes to understanding a process, such experiences are valuable substitutes. Because the student can *interactively control* a number of variables, she may acquire a rather rich experience of different causal connections in the system and thereby achieve a better understanding of it. When involved in a simulation, a student will be more likely to understand how different variables interact and affect other variables.

The virtual world of a simulator can complement the real one by providing situations that a student, for various reasons – ethical, economic, physical or temporal – cannot be allowed to experience directly, for example crisis management, stressful events such as a complicated surgical operation, and dangerous chemical experiments. Such virtual experiences become much more embodied and they stick to memory much more strongly than if the student just studies a text or abstract equations. On the other hand, the theories that are presented in textbooks can be supportive when interpreting the experiences. Understanding a knowledge domain builds on the interplay between theory and experience.

Different kinds of media can be exploited to bring out patterns. When I want to learn about a knowledge domain, I already rely on books, television, movies, recordings, etc. These media give us *substitute experiences*. *Role-playing* offers simulations of social interactions that can also provide students with valuable “virtual” experiences that they can later exploit in real life. If the students enact situations involving people from other cultures, the clashes between the cultures may become tangible without being embarrassing and without causing real problems. And then analyses of the clashes, together with a teacher or a supervisor, will be a very efficient method for understanding the underlying cultural patterns. If the teacher can act out the seemingly “odd” sides of the knowledge domain in a way that brings out a pattern, the students will be

assisted to see its rationale. Because role-playing involves *interactivity*, it is much more emotionally engaging than using traditional media.

Today, teachers are accustomed to use various IT tools as a complement to their teaching and for providing a richer learning environment for their students. *Intelligent tutoring systems* are computer programs that function as a virtual tutor, albeit in a rather limited form. By using such a system, a student can practice a task at their own pace, repeat it as often as they like, and at the same time be given support by the systems at various points in the task.

Along the same lines, *virtual pedagogical agents* can provide useful tools (Gulz 2004). A virtual pedagogical agent can be thought of as an embodied intelligent tutoring system or a visual representation of the system. Such agents can serve as a virtual tutor in a tutoring system. For example, suppose a student is working with social problems in society. By encountering virtual tutors representing different perspectives, the student can be made to see that a problem can be approached in different ways that partly contradict and partly complement each other.

Understanding in Science

As a final topic I shall compare the proposal that understanding is seeing a pattern with the debate concerning the role of understanding in science. This is currently a much discussed topic (e.g. Trout 2002, de Regt 2004, de Regt and Dieks 2005, Kvanvig to appear, Mulder no date, Kischenmann 2008; see also the review article by Keil 2006).

In contrast to the early accounts of explanation and understanding (e.g. Hempel 1965, von Wright 1971) it is now widely agreed that understanding and what counts as an explanation is relative to the epistemic situation of the scientist, not anything universal (van Fraassen 1980, Gärdenfors 1980, de Regt 2004, 103). This means that scientific understanding is pragmatic and context-dependent. For example, in the heyday of classical mechanics, Lord Kelvin is famous for having said that “the test of ‘Do I or not understand a particular subject in physics?’ is ‘Can I make a mechanical model of it?’”, but this ideal of understanding in physics has nowadays lost its appeal (de Regt and Dieks

2005, 138). It should also be remembered that for Newton's contemporary colleagues his notion of forces that operate at a distance was mysterious, while today hardly anybody with a scientific background will find it unintelligible.

One can divide the contemporary theories of understanding in science in two broad classes: causal and unificationist (de Regt and Dieks 2005). As an example of the causal theories, let us take Salmon's 1984 book *Scientific Explanation and the Causal Structure of the World*. According to Salmon, "underlying causal mechanisms hold the key to our understanding of the world" (Salmon 1984, 260) because "causal processes, causal interactions, and causal laws provide the mechanisms by which the world works; to understand why certain things happen, I need to see how they are produced by these mechanisms" (Salmon 1984, 132). In my view, this account of understanding does not conflict with the one presented here. On the contrary, as I argued in section 3, causal structures are special cases of patterns that can be discovered via the scientific process or via more mundane experiences.

The alternative approach to scientific understanding, the unificationist conception, has been defended by Friedman (1974) and further developed by Kitcher (1981, 1989) and others. Friedman writes that science unifies our knowledge since it "increases our understanding of the world by reducing the total number of independent phenomena that I have to accept as ultimate or given. A world with fewer independent phenomena is other things equal, more comprehensible than one with more" (Friedman 1974, 15). Later, Kitcher argued for the fundamental role of patterns in this unificatory process: "Understanding the phenomena is not simply a matter of reducing the 'fundamental incomprehensibilities' but of seeing connections, common patterns, in what initially appeared to be different situations. [...] Science advances our understanding of nature by showing us how to derive descriptions of many phenomena, using the same patterns of derivation again and again, and, in demonstrating this, it teaches us how to reduce the number of types of facts we have to accept as ultimate (or brute)" (Kitcher 1989, 482). Again, it should be clear that the unificationist approach to scientific understanding, in particular in Kitcher's version, could be subsumed under the idea that understanding is seeing patterns.

After reviewing the causal and unificationist approaches to understanding in science, de Regt and Dieks (2005, 151) propose their “Criterion for Intelligibility of Theories”: “A theory T is intelligible for scientists (in context C) if they can recognise qualitatively characteristic consequences of T without performing exact calculations.” De Regt and Dieks attribute the general idea behind this criterion to Heisenberg. As examples of intelligible theories they mention the molecular theory of gases, “potential vorticity” in meteorology and “field lines” in electrostatics with the aid of which scientists can make purely qualitative predictions. However, it is clear from their descriptions of the examples that scientists use the theories to *visualize* the qualitative properties (de Regt and Dieks (2005) emphasize this themselves on p. 155). In other words, the scientists can *see the patterns* that are relevant for making the predictions. Once again, I conclude that also their Criterion for Intelligibility of Theories falls under the general idea of understanding as seeing a pattern. It should be noted however, that their criteria make understanding relative to the scientist who see the patterns – there is no thing as an absolute understanding within a scientific theory (a similar point is made by Mulder no date).

Conclusion

In this article, I have focused on the role of understanding in human nature. The central hypothesis has been that understanding is experiencing a pattern. I have shown how this general idea can be applied when we look at understanding different cultures, understanding in education and understanding in science. However, there is a great need for research in order to obtain a deeper understanding of the cognitive and motivational processes involved in various forms of understanding. Among other things, there is a lack of psychological tests for *when* understanding occurs during a learning process. We also need to find out much more about how understanding generates motivation for further learning.

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Bibliography

- Bransford, J. D. and Schwartz, D. L. 1999. “Rethinking transfer: A simple proposal with multiple implications”, *Review of Research in Education* 24, 21–59.
- Bruner, J. 1990. *Acts of Meaning*. Cambridge, MA, Harvard University Press.
- Carruthers, J. to appear. “How we know our minds: the relationship between mindreading and metacognition”, *Behavioral and Brain Sciences*.
- Collingwood, R.J. 1972. *Essay on Metaphysics*. Chicago, IL, Gateway.
- De Regt, H. W (2004). “Making sense of understanding”, *Philosophy of Science* 71, 98-109.
- De Regt, H. W and Dieks, D. 2005. “A contextual approach to scientific understanding”, *Synthese* 144, 137-170.
- Dilthey, W. 1914–1936. *Gesammelte Schriften*. Leipzig, Teubner.
- Friedman, M. 1974. “Explanation and scientific understanding”, *Journal of Philosophy* 71, 5-19.
- Gärdenfors, P. 1980. A pragmatic theory of explanation, *Philosophy of Science* 47, 404–423.
- Gärdenfors, P. 2003. *How Homo Became Sapiens: On the Evolution of Thinking*. Oxford, Oxford University Press.
- Gärdenfors, P. 2006. *Den meningssökande människan*. Stockholm, Natur och Kultur.
- Gärdenfors, P. 2007a. “Understanding cultural patterns”, in M. M. Suarez-Orozco (ed.), *Learning in the Global Era: International Perspectives on Globalization and Education*, Berkeley, CA, University of California Press, 67–84.

- Gärdenfors, P. 2007b. "Evolutionary and developmental aspects of intersubjectivity", pp. 281–305 in *Consciousness Transitions: Phylogenetic, Ontogenetic and Physiological Aspects*, ed. by H Liljenström and P. Århem, Elsevier, Amsterdam.
- Gärdenfors, P. to appear. "The role of cooperation in the evolution of protolanguage and language", to appear in the proceedings of the conference *On The Evolution of Mind and Culture*, Pennsylvania State Museum, October 2007, ed by Gary Hatfield et al.
- Gärdenfors, P. and Lindström, P. 2008. "Understanding is experiencing a pattern", in *A Smorgasbord of Cognitive Science*, P. Gärdenfors and A. Wallin (eds.), Nora, Nya Doxa,. 149–164.
- Gopnik, A. 1993. "How we know our minds: the illusion of first-person knowledge of intentionality", *Behavioral and Brain Sciences* 16, 1–14.
- Gulz, A. 2004. "Benefits of virtual characters in computer based learning environments: Claims and evidences", *International Journal of Artificial Intelligence in Education* 14, 313–334.
- Harnad, S. (ed.) 1987. *Categorical Perception*, Cambridge, Cambridge University Press.
- Hempel, C. G. 1965. *Aspects of Scientific Explanation and Other Essays*, New York, NY, The Free Press.
- Jung-Beeman, M., Bowden, E. M., Haberman, J., Frymiare, J. L., Arambel-Liu, S., Greenblatt, R., Reber, P. J. and Kounios, J. 2004. "Neural activity when people solve verbal problems with insight", *PLoS Biology* 2(4), 500–510.
- Keil, F. C. 2006. *Explanation and Understanding*. *Annual Review of Psychology* 57, 227–254.
- Kirschenmann, P. P. 2008. "On several matters labeled 'understanding' regarding science and technology", paper presented at the ESSSAT 2008 conference, Sigtuna.
- Kitcher, P. 1981. "Explanatory unification", *Philosophy of Science* 48, 507–531.
- Kitcher, P. 1989. "Explanatory unification and the causal structure of the world", in P. Kitcher and W. Salmon (eds.), *Minnesota Studies in the Philosophy of Science*, Vol. 13, Minneapolis, University of Minnesota Press, 410–505.

- Kvanvig, J. to appear. "The value of understanding", In A. Haddock, A. Millar and D. H. Pritchard, eds. *Epistemic Value*, Oxford, Oxford University Press.
- Land, E. H. 1982. In G. I. Nierenberg, ed., *The Art of Creative Thinking*. New York: Simon & Schuster.
- Leslie, A. M. 1987. "Pretense and representation: the origins of 'theory of mind'", *Psychological Review* 94, 412–426.
- Lindström, P. and Holmqvist, K. in preparation. "More attention allocation on a critical area of interest in an insight problem", Manuscript.
- Marroquin J. L. 1976. *Human Visual Perception of Structure*, Master's degree thesis, MIT Dept. of Electrical Engineering and Computer Science.
- Mitchell, P. 1997. *Introduction to Theory of Mind: Children, Autism and Apes* (London: Arnold).
- Mulder, D. H. no date. "Explanation, understanding, and subjectivity", <http://www.bu.edu/wcp/Papers/TKno/TKnoMuld.htm>.
- Petitot, J. 1989. "Morphodynamics and the categorical perception of phonological units", *Theoretical Linguistics* 15, pp. 25–71.
- Piaget, J. 1930. *The Child's Conception of Physical Causality*, London, Routledge and Kegan Paul.
- Premack, D. and Woodruff, G. 1978. Does the chimpanzee have a theory of mind? *Behavioral and Brain Sciences*, 4, 515–526.
- Salmon, W. C. 1984. *Scientific Explanation and the Causal Structure of the World*. Princeton: Princeton University Press.
- Selz, O. 1924/1981. The laws of cognitive activity, productive and reproductive: A condensed version. In N. H. Frijda and A. D. de Groot (Eds.), *Otto Selz: His Contribution to Psychology*. The Hague: Mouton, 20–75.
- Trout, J. D. 2002. "Scientific explanation and the sense of understanding", *Philosophy of Science* 69, 212–233.
- Van Fraassen, B. 1980. *The Scientific Image*, Oxford: Clarendon Press.
- Von Wright 1971. *Explanation and Understanding*, London, Routledge and Kegan Paul.
- White, P. A. 1995. *The Understanding of Causation and the Production of Action*. Lawrence Erlbaum Associates, Hove.

Wimmer, H. and Hartl, M. 1991. "Against the Cartesian view of mind: Young children's difficulty with own false beliefs", *British Journal of Developmental Psychology* 9, 125–138.

Meaning of Patterns - Patterns of Meaning

Christine Tind Johannessen-Henry

Abstract

In this response to Peter Gärdenfors, I bring a theological perspective to Gärdenfors' cognitive scientific approach on the role of understanding. In relation to Gärdenfors' main point that understanding means seeing a pattern, I argue that the complexity in our perception of life patterns is open to theological interpretation of reality as a whole, which includes a scientific-philosophical approach to the human quest for meaning.

Keywords: pattern, religious belief, meaning, understanding, worldviews, view-of-life, experience.

Introduction

First of all I would like to thank Professor Peter Gärdenfors for his interesting paper on the role of understanding, in which he presents some reflections from his very elucidating book *The Meaning-Seeking Human* (Gärdenfors 2006). According to Gärdenfors, our perceptions can be strongly influenced by patterns built on earlier experience, a phenomenon also recognized in science. In a veiled reference to Bourdieu's concept of "habitus" (Bourdieu 1996, 112) Gärdenfors states that what we experience we interpret in the exact framework which we already know (Gärdenfors 2006, 53). I respond to Gärdenfors's lecture as a theologian in so far as my response implies some theological reflections on Gärdenfors' hypothesis that "understanding is seeing a pattern", an assertion which is almost self-evidently central to theological interpretation. In his paper Gärdenfors applies this idea to culture, education and science; here I will apply the idea to existential life views.

Building Bridges

Gärdenfors' interdisciplinary project is situated between the disciplines of cognitive science and philosophy with the purpose of building a bridge between biological and humanistic views on human beings. Gärdenfors' bridge building project is of paramount interest. It confronts the striking gap between the humanities on the one hand, which usually take meaning as given and do not take into consideration analysis of the emergence of this meaning, and the sciences of nature on the other hand, which actively avoid speaking of meaning, being incapable of explaining what meaning is (Gärdenfors 2006:44). This is the reason we should not let the single disciplines speak only for themselves: interdisciplinarity forces us to see the dependence of the context in understanding. Provided that scientific knowledge and academic research are not totally separated from our everyday life, it is necessary to connect the understanding from different disciplines on account of, and despite, the paradigmatic points of distinction which in practice are experienced as combined. An example drawn from the context of my own research area involving theology and health science is the medical treatment of life threatening diseases. In this live situation we are not able to understand the patient's situation from either a biological or a humanistic point of view alone; we are only capable of understanding the patient's situation and needs in the context of physical survival and the situations related to coping with the issue of significance (Pargament 1997, 21-67).

According to Gärdenfors, our brains are searching for patterns, as this is simply the way we are able to understand. We have the faculty for filling in empty holes so that the patterns make sense. Scientifically we know very little about how meaning emerges (Gärdenfors 2006, 44), that is, the emergence of a sense of coherence. Yet we are able to extract hidden causes, by which new patterns emerge; thus we understand things, which at first were unintelligible. By virtue of linking things with words and narratives we seek to understand what other people say. From this perspective of the quest for meaning in everyday life arise further reflections on the perspective of totality. Understanding and meaning aim to include the whole meaning of life. Our ability to understand through patterns is thus applied as metaphor or metonymy, that is to compare,

link or exchange an idea with another, on the whole meaning of reality. Through this application we enter the boundaries between philosophy and theology.

Gärdenfors' exploration of our understanding through patterns may raise the following concerns for theological reflection: How are we to understand Gärdenfors' approach to the meanings of patterns compared with religious quests for meaning? And how may our cognition of patterns be interpreted when reflecting on meaning in the interplay between order and disorder?

The Quest for a Fundamental Pattern

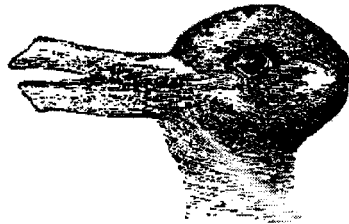
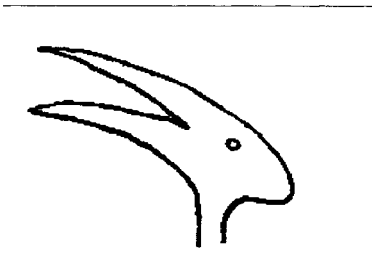
According to Gärdenfors, abstract patterns are found at every level of human thinking; we perceive patterns visually, and at the same time we interpret the patterns we see. Similarly the understanding of reality through patterns manifests itself in the question of meaning of life and metaphysical reflections. Let me here refer to a discussion about “fundamental patterns” between the Swedish theologian Anders Jeffner and his compatriot, philosopher Mats Furberg, on this matter. The discussion is part of a larger interest in Sweden in the area of “Empirical Research of Life Views” which has been a part of the Swedish debate on belief, philosophy and religion since the 1930's (Jeffner 1973, 8; Lindfelt 2003, 15). The more important question raised is whether it makes sense to apply the concept of a pattern to an interpretation of the whole of reality; in other words, do we perceive our experiences in life as based on certain “fundamental patterns” which reflect a total or comprehensive reality? Or is the idea of a fundamental pattern an illusion?

The concept of fundamental patterns as an idea of reality as a whole may be compared not only with patterns in cognitive science but also in genetics. In the latter a “fundamental pattern” of life is included in all living beings capable of growth and development. The principle lies in the ability of genes to copy, to transfer information, and to fulfil the manufacturing needs of the living organism. The fundamental pattern of genetics recurs in bacteria, vegetation, animals and humans, and ensures a large biological diversity (Bråkenhielm & Hansson 1995, 12). In this

manner it is biologically possible to trace fundamental patterns in living systems.

When Jeffner applies the concept of “fundamental pattern” in relation to terms like “worldviews” and “meaning of life”, it should not be understood literally, since the connection cannot be scientifically proven. Biological concepts of pattern-formation can be understood as analogous to certain religious texts, myths and narratives, in so far as they are grasping a certain perspective of life and existence. A description using fundamental patterns is thus an attempt to interpret an experience of totality by using inadequate images (Jeffner 1975, 79; 1966, 240-256).

To illustrate the idea of fundamental patterns and in order to maintain the integrity of the scientific and religious worldviews without reducing the one to the other, Jeffner, in his later writings, utilises a part of Furberg’s analysis on the influence of words and images on human perception (Jeffner 1975, 68-81. Anderson & Furberg 1972, 44-57). Furberg’s analysis is inspired by Wittgenstein’s (1953, 165e-185e) reflection of the term “see”, using Jastow’s duck-rabbit-head-drawing. This type of picture in cognitive therapy goes under the term "object recognition". (Eysenck & Keane 1998, 55)



The figure used by both Furberg and Jeffner shows at the same time the head of an antelope and that of a pelican. Hence, it is ambiguous. A person who knows of pelicans and not antelopes will spontaneously perceive the figure as the upper part of a pelican - but the empirical facts are the same. Despite the fact that we agree on all provable facts, we can disagree on the object as a whole regarding what really is – the truth of the object (Jeffner 1966, 243; 1975, 70).

Thereby Jeffner wants to illustrate that both non-religious and religious worldviews refer to the same reality even though we understand it differently. But through our perceptions of such different patterns we are able to explain why people who believe in God, without disagreeing with the non-believer about scientific facts, at the same time contradict statements which deny the existence of God. This cannot be exclusively explained as a contradiction in attitude, and yet it implies a contradiction of gestalt. A pattern of transcendence can keep religious experiences as something real and does not need to consider them as illusory (Jeffner 1975, 78).

Part of Furberg's objection to Jeffner's theory of a fundamental pattern and the drawing-illustration of it is as follows: The figure appears as if the pelican-head and the antelope-head are compatible – but they are *not* (Anderson & Furberg 1972, 48). They are irreconcilable - essentially different; heads and bodies are placed in different directions - horn and bill are in the same location. They push out and replace each other - there is no room for both gestalts. The shift happens when the eye changes from one aspect to the other. The pelican-antelope allows this change of aspect. However this is not the case in relation to the religious worldview and belief in God. The concept of God lies on another level. There is no change in aspect. To Furberg, the analogy between the pelican-antelope and Jeffner's notion of fundamental patterns is false.

If we are to visualize a fundamental pattern at all, the figurative drawing must be replaced by a non-figurative one, such as an ink spot (Furberg 1975, 38).



Furberg's replacement is to be understood as a hidden reference to the Rorschach-Test (Weiner & Greene 2008), where the purpose is to describe the whole personality of a person through a test of the person's perception of ink spots, identifying it as resembling, in this case, a pair of fly's eyes, or a rabbit with talons, etc. But in itself the ink spot represents nothing. It is neither unambiguous, nor ambiguous, and lacks any conventional interpretation. How we perceive it is all about the imagination of the perceiver - not about a given pattern. What Furberg is pointing out is that it is not possible to stay visual in this matter; the figure cannot literally be the totality containing every experience a person has had in his life. To the believer in God the concept of God is distinctive from anything that can be presented in drawings or sculptures, and can never be complete, empirically or visually. Considering these points, Furberg's stumbling block in this matter is the concept of "the whole" meaning. Through an empirical example and in the light of his own experience, Furberg indirectly asks: How can anyone claim the existence of a "total meaning" unless this person has had an extremely long life without suffering and grief and without experiencing or witnessing a serious disease, as in Furberg's example? (Furberg 1975, 33-34)

The discussion between Jeffner and Furberg illustrates the schism between a religious and a secular worldview and testifies to the meanings of different life views on the question of the meaning of the whole of reality; but the discussion also shows how many different levels of

patterns emerge, and the impossibility of including all variations of patterns in one human idea of totality. Thus our understanding of metaphysical patterns fossilizes our understanding if we remain only in the visual domain.

To attempt an explanation of what it means to understand and view a fundamental pattern, that is a religious view, I will draw a tentative parallel to Gärdenfors' notion with the cartoon made by western people for a campaign in North Africa, where people were not able to understand the intended causal connection between the pictures. The people who could read, read Arabic, which reads in the opposite direction from western writing, and people who could not read interpreted the pictures as separate. We may be able to express the outsiders' missing link as lacking a key of interpretation, comparable to the situation of the un-initiate in the interpretation of an emblem. An illustration of such religious image-interpretation is also to be found in the philosophy of the French theologian Jean-Luc Marion who rejects metaphysics, while iconographically naming the religious visual key of interpretation as seeing reality through a cross (Marion 1995, 70).

A Vague Element of Above and Beyond

If theology is to progress with interpretations of reality as a whole, it may have to include critical points such as those pointed out by Furberg. I see Gärdenfors as being predominantly in agreement with Furberg's argument (Gärdenfors 2006).

The German theologian Wolfhart Pannenberg gives the following theory of meaning of the whole of reality, a theory which to a certain extent counters the critics. In all realms of reality more complete forms of meaning appear. Contexts of meanings exist everywhere, even beyond the realm of the phenomena of organic and psychic life (Pannenberg 1990, 160). We have no specific consciousness of the whole of our own life in ordinary life, but in specific moments of experience the whole reality itself is present to us in feeling. On the other hand the whole of reality is not fully contained in our individual experience, but "there remains a vague element of above and beyond, which forms the framework in which the individual experience can first become what it

is.” (Pannenberg 1990, 161). The pattern in our life is drawn as we go on living, as it is poetically described by the Danish writer and storyteller Karen Blixen (Blixen 1937, 273-276). But whereas the whole pattern of the individual life is sceptically fulfilled in the story of Blixen (in the appearance of a stork!) the pattern is not fulfilled within an individual’s life according to the theory of Pannenberg. The point that the individual will never be able to understand the whole meaning - a completed pattern - becomes especially clear and obvious in the context of disease, as when a person dies prematurely from cancer. Rather, meaning emerges in a larger context than the individual person as an analogy of the universe, the whole meaning, that is, as infinite contexts of meaning. From this point of view, the “whole”, life-as-a-whole, is the history of the universe, which we cannot see as long as we are a part of it, as long as the history of the universe exists. The whole meaning, life-as-a-whole, is only given to us in glimpses.

Hidden Variables

A Human Created or Given Meaning

“Humans have a unique talent for extracting the *hidden variables* of the world,” Gärdenfors states, and argues that the patterns we see are to some extent dependent on the culture in which we live. But the question remains how we are to interpret the fact that altogether we have the capability of understanding and extracting meanings from the *hidden variables* and thus reading the minds of others with respect to emotions, desires, attention, intentions, beliefs and knowledge. One single word can mean widely different things. Depending on the context it is possible to speak of the particular “meaning” of a sentence within a discourse. According to Pannenberg, a human being does not create this meaning even though it is the human being speaking the sentences. Language itself represents a truth of reality, patterns, that is already given; otherwise it would not be possible to call some assertions “true”, or “approximately true”. Also the many layers of linguistic utterances indicate that there is always something “above and beyond” the meaning as cited. This shows itself in the way expressions can be expressed imprecisely. Furthermore meaning does not depend only on the writer,

speaker or interpreter. The point is that semantic structures in a speech or text appear to be an independent entity, in which the element of suitable interpretation must be judged in relation to it. It seems that our grasp of this semantic content is an activity, but is not an action of our own (Pannenberg 1990, 156-8). Hence when Gärdenfors claims “understanding is nothing mysterious”, I will add that to find meanings in this way is in itself a mystery.

These few theological reflections open up a greater question on understanding patterns in a larger perspective. Is the experience of meaning a matter of creating meaning, as in a secular interpretation, or is it a matter of an already given meaning re-enacted in specific situations, as in a religious interpretation? (Pannenberg 1990, 154)

Gärdenfors states that the purpose of science is not to reduce religion. The sciences of nature can explain by and large how the system of the eye functions, but the explanation does not take away the beauty in what we see (2006, 142). I would like to add that neither does the explanation take away the religious belief, that is, the religious experience of the pattern of reality.

Conclusion

I will conclude my response to Gärdenfors by commenting that even though a scientific understanding of patterns may seem to collide with a religious understanding due to crucial different points and conclusions, yet both views can be integrated into the concept of patterns.

Bibliography

- Anderson, J.; Furberg, M. 1972. Språkochohpåverkan. Om argumentationenssemantik, Lund: Berlinska.
- Blixen, K. 1965 (1935). Den afrikanske farm. København: Gyldendal.
- Bourdieu, P.; Wacquant, L. J. D. 1996. Refleksiv sociologi – mål og midler. København: Hans Reitzels Forlag.
- Bråkenhielm, R.C.; Hansson, M.G. 1995. Livets grundmönster och mångfald. En bok om genetik, etik och livsåskådning, Stockholm: Liber Utbildning.

- Eysenck, M.W.; Keane, M.T. 1998. *Cognitive Psychology, A student's Handbook*, 3rd edition, East Sussex: Taylor & Francis Ltd.
- Furberg, M. 1975. *Allting en trasa. En bok om livets mening*, Lund: Doxa.
- Gärdenfors 2006. *Den meningssökande människan*. Stockholm: Natur & Kultur.
- Jeffner, A. 1973. *Empirisk livsåskådningsforskning*, Uppsala Universitet.
- Jeffner, A. 1966. *Butler and Hume on Religion. A Comparative Analysis*, Stockholm: Diakonistyrelsen.
- Jeffner, A. 1975. *Filosofisk religionsdebatt*, Stockholm: Tryckmans.
- Lindfelt, M. 2003. *At förstå livsåskådningar – en metateoretisk analys av teologisk livsåskådningsforskning med anknytning til Anders Jeffners ansatser*. Uppsala: Acta Universitatis Upsaliensis.
- Marion, J. L. 1995. *God Without Being*. Chicago: University of Chicago Press.
- Pannenberg, W. 1990. "Meaning, Religion, and the Question of God", *Metaphysics and the Idea of God*, Michigan: Wm. B. Eerdmans.
- Pargament, K. I. 1997. *The Psychology of Religion and Coping. Theory, Research, Practice*. New York: The Guilford Press.
- Weiner, I. B.; Green, R.L. *Handbook of Personality Assessment*. New York: John Wiley & Sons.
- Wittgenstein, L. 2001. *Philosophical Investigations (1953)*, Oxford: Blackwell.
- Wittgenstein, L. 1967. *Wittgenstein's Lectures and Conversations on aesthetics, psychology and religious belief*, Eds. Cyril Barret, Berkeley: University of California Press.
- Wittgenstein, L. 2006. *Tractatus Logico-Philosophicus (1922)*, in A. Kenny (eds.), *The Wittgenstein Reader*, Oxford: Blackwell Publishing.

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We can't have full knowledge all at once. We must start by believing; then afterwards we may be led on to master the evidence for ourselves.

Saint Thomas Aquinas

