

Portraits of Human Nature: Reconciling Neuroscience and Christian Anthropology

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Caught in a Dilemma

Integrating and reconciling the truth claims made by Christian theology is always challenging. Perhaps most problematic is the challenge presented by modern neurobiology Christian anthropology. Given the presumption that 'truth cannot contradict truth', it seems to be increasingly difficult to hold a traditional Christian view of persons in a world of modern neurobiology and neuropsychology. One is caught in the middle of a dilemma or paradox represented by the following contradictory propositions:

Proposition 1: Humans are physical beings who also have non-material souls. It is through our souls that we experience and relate to God.

Proposition 2: Humans are neurobiological beings whose mind (also soul, religious experience, etc.) can, in theory, be exhaustively explained by neurochemistry and ultimately by physics.

The second proposition proposition is that of reductionalist materialism, characteristic of the philosophical view of many scientists but repugnant to Christians. While variations in this position exist, it is difficult to hold this position without mental life being presumed to be epiphenominal. Therefore, free will does not exist, and behaviour is determined by the laws of biology, chemistry, and physics.

The first view is the classic body/soul (or body/mind) dualism we get primarily from Plato, St. Augustine and Descartes, and which is pervasive in the modern Christian view of the person. Here mind are presumed to be non-material with a realm of agency separate, but interacting with, the physical body.

However, such body-soul dualism is faced with two critical problems: (1) the nature of the interaction between a non-material soul and a physical body and is unspecified; and (2) there is a decreasing residue of left-over higher human functions which have not yet been demonstrated to have neurocognitive correlates and therefore constitute evidence for a non-material soul.

Within dualism, to have a separate entity that is the soul in a manner that is more than trivial, the soul must have some realm (or realms) of agency within human mental and physical activity. It must account for something not represented in our neurocognitive systems, and must interact with our ongoing thinking and responding in some way. Otherwise, the concept of a soul is without compelling substance.

For example, if we were to create a list of critical attributes of human nature, and potentials for human experience, that have been presumed by scripture to reflect the activity of the soul, we might include the

following: free will, sin and the experience of guilt, acceptance of redemption, the experience of grace, righteousness and ethical behaviour, worship and an inner 'life in the spirit', the experience and expression of love, participation in community, ability to understand and respond to God's revelation, and existence after death.

The knotty problem raised by modern science is that so many of these properties and functions are now known to be strongly influenced or determined by the functions of various neurobiological systems. Although the research in most cases is incomplete, and thus leaves the question open, the strong influence of neurobiological processes on our personal, social, and even spiritual lives, at the very least forces us to consider the embodiment of soulish human functioning. For example: What is the meaning of experiences of nearness to God and intensely personal spiritual moments when these can be elicited by temporal lobe seizures? How do we think about love and interpersonal relationships when in Capgrass syndrome one strongly believes that one's family and close friends are impostors who only look like one's family and friends, suggesting an inability to couple recognition with the feeling of familiarity necessary for love? And what of the failure of moral restraint on behaviour in some cases of frontal lobe brain damage, or the dramatic infringement of Alzheimer's dementia on the spiritual and religious lives of some patients.

Thus, a neuroscience perspective strongly questions a separate, non-material agency for the soul by which certain domains of human experience can remain unaffected by changes in brain function. At the very least, we should be uncomfortable with simple answers regarding the nature of the human soul.

The Portraits of Human Nature Project

We recently joined with a number of colleagues in a 2-year book project, funded by the Templeton Foundation, in which we attempted to explore a more wholist (or monist) position, while striving to avoid the problems of a reductionist materialism. The book is entitled: *Whatever Became of the Soul? Scientific and Theological Portraits of Human Nature* (Brown, Murphy and Malony, 1998). The outcome of this project was presented at the combined meeting of the American Scientific Affiliation and Christians in Science at Churchill College, Cambridge University in August of 1998.

The goal of this scholarly endeavour was to establish a perspective on human nature that would allow for greater resonance between science and faith. We attempted to describe the nature of humans from the perspectives of disciplines ranging from biology to theology in a way that was reconcilable and congruent by taking a perspective that was both theist (Christian) and non-dualist.

In order to avoid confusion with reductionistic or materialistic forms of monism, which we did not wish to espouse, as well as to denote a particular form of monism, we chose the label 'non-reductive physicalism' to represent our common perspective. 'Physicalism' refers to the assumption that it is not necessary to postulate a second metaphysical entity, the soul or mind, to account for human capacities and distinctiveness. Soul (mind) is physiologically embodied. However a 'non-reductive' version of physicalism presumes that human behaviour cannot be exhaustively explained by analysis at lower levels (neurobiology). Higher level explanations supervene on lower levels.

Thus, the thesis of this project was that statements about the physical nature of human beings made from the perspective of biology or neuroscience are about exactly the same entity as statements made about the soulish or spiritual nature of persons from the point of view of theology or religious traditions. A similar view has at times in past discussions been labeled 'dual-aspect monism'. We would disavow the position that human science speaks about a physical being, while theology and religion speak about a non-material essence or soul. Perhaps a better way to state this is that when we talk of 'souls' we are talking about whole persons: body, mind and spirit. One might say, 'We are souls; we don't have souls.'

Non-reductive Human Science

One contribution of this project was a discussion, from a non-reductionist point of view, of the current state of the scientific portrait of human nature from several critical fields. The sciences of human nature generally have advanced by the demonstration that a higher-level, more complex capacity depends in some specifiable way upon simpler, more general physical (biological) processes. However, we have attempted to demonstrate that embodiment of a human ability or function within a biological, neurological or cognitive process does not imply that higher level explanations can be replaced entirely by accounts in terms of lower-level phenomena. For example, the dependence of human mental activity on underlying neurobiological processes does not imply that the processes of our thinking and deciding are epiphenomenal illusions without real causal efficacy. The important role in human behaviour of such phenomena as free will, conscious agency, and personal responsibility are not diminished or altered by recognition of the neurobiological substrates of consciousness and thought. A physicalist view of human nature does not lead inevitably to the conclusion that people are nothing but the product of organic chemistry and, ultimately, molecular physics.

Debate over reductionism is currently raging within science itself. (Easterbrook, 1997). Those in favour of reductionism point out how fruitful this form of research and thinking has been over the past several hundred years. Those who argue in favour of a non-reductionist point-of-view would contend that either or both of the following are true:

1. The fruitfulness of reductionism is limited since the human mind will not be able to grasp the ultimate physical/molecular explanation of any complex phenomenon, particularly those involving the human mind.

New principles of explanation emerge at higher, more complex levels of Organisation that are not evident in the laws governing more molecular phenomena.

For example, new principles emerge in neural networks that are not relevant to an understanding of single nerve cells. Complex learned motor behaviour, involving the interaction of large numbers of neural networks, demands explanatory concepts not available in an understanding of individual neural networks. Understanding human language and complex thought demands principles not apparent in an understanding of complex motor behaviour, and so on. Thus, a non-reductionist view of science such as we have taken in this book is not just a convenient position marketed by those who wish to defend a religious point of view in a scientific age, but increasingly seems to be demanded by science itself

Non-reductive physicalism is one of a range of possible monist formulations. Fraser Watts, the session discussant, provided a cautionary note with respect to non-reductive physicalism. Watts reminded the audience that 'there is still intense philosophical debate about whether non-reductive physicalism is an internally coherent position', suggesting that it may be premature to assume that non-reductive physicalism represents 'a safe neutral ground on which theology can co-exist with the human sciences.'

Evolution - Biology and Human Culture

The viewpoint of physicalism raises the issue of phylogenetic relationships and evolutionary processes in the creation of humankind. Francisco Ayala (who contributed to the book, but did not attend the conference) summarised the evolutionary process as it is currently understood, emphasising the fact that the development in modern humans of a large and complex brain allowed for a process of cultural evolution. However, cultural development can be considered to have transcended biological evolution in shaping human nature. Ayala argued that the capacity for ethics, for example, is dependent on development of brain systems sufficient to sustain an ability to anticipate the consequences of one's behaviour, the ability to make value judgements, and the ability to choose alternate behaviours. However, Ayala parts ways with much of sociobiology by maintaining that the norms of ethics and morality are not themselves a product of biology, but emerge in cultural development.

Here can be seen an example of a non-reductive theory of the origins of human traits within the science of evolutionary biology. A relatively small but critical change in physiology (i.e. the development of a large

and complex cerebral cortex) resulted in the emergence of rather massive differences in human behaviour that are evident in the development of culture (language, literature, art, science, technology, moral/ethical decision making, and religion). However, the processes of cultural development have so transcended the biological evolution that allowed them that it becomes impossible to imagine human culture to be nothing but genetically determined neurobiology. Human culture is subserved by the enhanced functions of the physical brain, but it cannot be reduced without remainder to the operation of these physical processes.

Genetics and Determinism

The role of genetic influences in the determination of the physical and psychological makeup of each person is an issue of current public concern. We regularly read in scholarly journals or hear in the news that another physical or mental trait or disorder has been 'linked to' a particular gene. In the realm of human behaviour, various forms of psychosis, a tendency for violent behaviour, alcoholism and addiction disorders, and sexual preference (to name but a few) have all been suggested to be genetically 'determined.' Elving Anderson discussed the implications of such statements. He pointed out that genes themselves are subject to regulatory processes and thus the pathway from gene to human trait is more complex and less predictable than has been assumed. Genes do not rigidly define a trait, but define a 'reaction range' of probabilities of traits or behaviours developing. In fact, the likelihood of a genetic influence on a behavioural trait is never an absolute one-to-one correspondence, but rather a somewhat greater-than-chance probability of the trait or behaviour occurring given the same (or similar) genetic makeup. There is always variability in outcome that is not entirely accounted for even by the combination of the same genetic endowment and the same environmental influences.

Therefore, genetics cannot be seen to provide much grist for the determinist/reductionist mill. Genetic inheritance endows each person with a range of probable physical or behavioural expressions. What is more, just like intelligence, personality, and behaviour, gene expression is subject to regulation and modulation by the environment and by the consequences of the events of personal history. Although genetics plays some role in human behaviour, and the events of personal choice are subserved by a neurobiological system, when focus is on behavioural outcome, reduction of explanations to the level of the genetic cannot be either adequate or entirely complete.

Brain Damage and the Mind

Over the past 150 or so years, evidence for the tight coupling between brain function and human behaviour has come from increasing knowledge regarding the behavioural outcomes of focal brain damage. The past decade has seen a dramatic acceleration of this knowledge based upon the new technology of functional imaging of brain processes during specific cognitive states or behavioural activities. Malcolm Jeeves reviewed this ever-tightening link that is being established between brain function and complex human thought and behaviour.

The unity of the body-mind-soul is clear in clinical neuropsychological phenomena such as the moral and religious breakdown in some individuals with Alzheimer's disease, or the hyper-religiosity of some individuals with temporal lobe epilepsy, or spiritual depression secondary to physical disorders. Thus the subjective experiences of soul and spirit rest deeply in the functions of the physical brain which abide by physical/biological laws.

Does this make our behaviour determined? Is our deciding, intending, willing and even religious believing merely an illusion? As with genetics, changes in brain function associated with neurological damage or disease can only be said to influence the range of potential behaviours available to the individual. While remembering may become more difficult, some memories survive. Although planning of behaviour may be deficient, behaviour is seldom totally chaotic. While brain damage or dysfunction may enhance or diminish the probability of various religious or moral behaviours, there remains a significant residual of the person's premorbid religious life influencing what is said and done. Though increasingly severe brain damage may progressively restrict the range of behavioural possibilities such as to make the person appear strongly

'determined,' only in the most severely brain damaged (i.e. nearly comatose) does one find a sense of inevitability in the patient's behaviour.

Human Intelligence and Relatedness

If the line between the physical and the spiritual is not drawn between humans and lower animals, but between humans and God, what has become of the soul? In what ways might a neurobiologically embodied centre of consciousness be considered spiritual? How do we understand the 'soul' language of scripture and Christian tradition? Warren Brown attempted to take the argument of nonreductive physicalism somewhat further by proposing that 'soul' is a capacity for a particular realm of experience rather than a non-physical essence inhabiting the body. Working backwards from the phenomena generally associated with soul, it was suggested that a critical element in human soulfulness is the capacity for, and experience of, personal relatedness. It was further argued that the capacity for deep and meaningful personal relatedness emerges from the operation of an interactive web of core cognitive abilities, each of which are present in lower primates, but markedly more developed in humans. Soul is the music made by an ensemble of players (the various lower-level cognitive abilities) who perform together to create the capacities for interpersonal dialogue as well as self-awareness and internal self-reflection (intrapersonal experiences). Played out in relationship to God who chooses to be in dialogue with his human creatures, the cognitive capacity for personal relatedness embodies spirituality.

The following capacities were suggested as those which are significantly superior to those of our closest non-human fellows and which are critical for personal relatedness: language (the capacity to communicate a potentially infinite number of propositions)-, a theory of mind (an ability to consider the most likely thoughts and feelings of another person); episodic memory (a conscious historical memory of events, persons, times and places (i.e., more than memory for actions and their consequences), conscious top-down agency (conscious mental control of behaviour), a future orientation (the ability to run mental scenarios of the future implications of behaviours and events); and emotional modulation by complex social and contextual cognition which serves to guide ongoing behaviour and decision making.

The particular cognitive abilities described were not meant to be exhaustive, but rather were chosen to suggest how areas of cognitive ability subserves relatedness and to indicate how these capacities compare between humans and our nearest primate relatives. Each of the cognitive abilities are not unique in humankind, but are nevertheless substantially enhanced in humans relative to apes. While the quantitative increase in level of each ability may or may not amount to a qualitative human uniqueness, certainly the richness of personal relatedness emerging as these abilities function in concert is unique to humans.

A view of the soul as emerging from the experience of personal relatedness is attractive in that it rescues the concept of soul from the individualism that is deeply ingrained in modern Western culture. Soul is not something that stands for our individuality, but something that links us to other individuals and to our community, and to God.

Fraser Watts, who served as discussant for the symposium, agreed that there are no absolutely unique human qualities, but that many of the important qualities related to mind are significantly enhanced in humans, and that it is the outcome of these enhanced qualities that go together to create what most people have in mind when they think about 'soul'. Watts therefore agreed that soul is something that has emerged. What is more, Watts advocated 'moving away from traditional formulations of humans as the "pinnacle" of creation, and seeing us rather as the "hinge" of creation, the point at which the natural world, that takes its origin from God, gives rise to the soul qualities that permit an explicit relationship to God.' In this view Watts distances himself from any suggestion about the 'perfection' or finality of human nature, but would allow that humans have reached a stage of development that gives rise to unique soul qualities.

Escape from Reductionism

Nancey Murphy dealt with some of the knotty philosophical problems raised by a physicalist approach to the brain-mind-soul problem. Is physicalism inherently reductionistic? Is an explanation at a lower, more biological level always more adequate and complete than an explanation at the level of human consciousness and will? Murphy argued that descriptions and explanations formulated at a higher level (e.g., human consciousness) can be seen as supervening on lower level explanations, even though they presume the necessity of the operation of processes at a lower level. This philosophical argument is consistent with two ideas that have currency in modern cognitive neuroscience. First is the concept of top-down causation, and second is the idea of emergence of new capacities at higher levels of complexity that cannot be predicted or adequately explained on the basis of the operation of lower-level processes. If higher-level explanations can be shown to supervene on explanations based on lower-level phenomena, then the concept of supervenience allows an escape from the seemingly inevitable tendency for physicalism to become reductionistic.

Important to Murphy's argument for supervenience was the idea that supervenient explanations of phenomena must be contextually specific. That is, particular higher-level explanations that may supervene over lower-level explanations often do so under one set of circumstances but not another. Thus, to fruitfully apply a higher-level explanation, one must represent contextual constraints within the explanation. Particular mental or spiritual explanations of behaviour would supervene on specific neurobiological explanations only as they represent and include contextual, circumstantial information, while similar behavioural or neurobiological phenomena might be given differing supervenient interpretations when occurring in other contexts.

Physicalist Theology

In order for the portrait of human nature suggested in these essays to be credible we need to have not only a non-reductive science of human nature, but a physicalist theology. By this we mean a Biblical and theological anthropology which can sustain a physicalist view of humans without loss or degradation of Biblical teachings, theological substance or critical Christian doctrines. Our goal in this project was to explore the 'look and feel' of Christian theology in the context of a portrait of human nature that is non-dualist, particularly in light of the embodiment of so many critical aspects of personhood suggested by modern neurobiology. Is any significant aspect of Christian faith lost or hidden when viewed from this perspective? Is it possible accurately to exegete critical Biblical passages, construct a reasonable systematic theology, or articulate a viable ethic from a physicalist viewpoint? Is there interdisciplinary coherence in this position? Are there aspects of a Biblical account of human nature that are better understood from a physicalist position than from a dualist one?

Biblical View of Soul

Joel Green dealt in depth with issues and problems of Biblical exegesis with respect to a Christian view of human nature. He suggests that while the Bible devotes little time to theoretical or speculative analysis of such issues, contemporary questions about the nature of humans are crucial to understanding scriptural accounts of salvation and the quality of human community before God. According to Green, 'The dominant view in Scripture is a monistic account of the human person that places a premium on human relatedness to God, to other humans, and to all of creation.'

In a paper which departed somewhat from his contribution to the book, Green proposed 10 theses regarding any attempt to come to grips with a Biblical view of human nature which are best quoted as they were presented:

Issues of Method:

1. Resolution of the dualism-monism debate requires the replacement of old fashioned word-study-oriented approaches with focused attention on language-in-use - that is, with discourse analysis.

2. The potential monism or dualism of the New Testament or some of its voices cannot be resolved with appeal to an alleged background in Greek as opposed to Hebrew thought.

3. Soteriology is a more fruitful departure than is eschatology for coming to terms with the nature of humanity in the New Testament materials.

4. When examining the relevance of the New Testament materials to the monism-dualism controversy, a distinction must be made between ontological and rhetorical dualisms.

Reading the New Testament

1. In their assumptions about human salvation, the Synoptic Gospels know nothing of bipartite or tripartite divisions.

2. For Paul, the idea of a disembodied soul is unthinkable.

3. The New Testament materials do not allow for human beings to be reduced to either their bodies or their souls.

4. Perhaps the most significant contribution the New Testament (and the Bible as a whole) has to make within the current discussion on the nature of the human person is grounded in its unrelenting witness to the necessary relatedness of humans with God on the one hand, and with both human and nonhuman creatures on the other.

Problem' Passages

1. Isolated texts do not 'the New Testament view' make.

2. Many passages have proven problematic because they are read outside of, or even against, narrative and other rhetorical interests.

Thus, while scriptural teachings regarding the image of God do not address directly the dualism-physicalism distinction, there is nothing in these teachings that would necessitate belief in an ontologically distinct soul. However, what is clear in scripture is that the image of God is relational, that is, it implies the capacity to enter into covenant relationships with God and with other humans. Humans are considered unique from the rest of God's creation primarily due to the capacity for covenantal relationships.

Discussant Fraser Watts replied that he agrees that the Bible is generally less dualist than the subsequent Christian tradition. Certainly, there is often an emphasis on the psychosomatic unity of human nature, but there are also many elements that don't easily square with a monist view. 'I am wary of exaggerating the convergence between the assumptions about human nature of the Christian tradition and contemporary science.' He therefore suggests a note of caution about whether Green may exaggerate how consistently monist the Bible is. Also, Watts suggested that there are numerous passages in the Bible that reflect assumptions about human nature radically different from those of contemporary scientists. 'Perhaps the differences are concealed by focusing too much on the monist/dualist distinction.'

Theology of Embodiment and Relatedness

In order to accept within Christian theology a physicalist account of human nature, one must 'touch all of the theological bases.' It must be possible to maintain this position consistently and systematically while answering basic theological questions in a way that is consistent with Scripture. Ray Anderson (who contributed to the project, but did not participate in the conference) considered a number of critical

theological questions: What is the soul? What is spirituality? What is the 'image of God'? What is sin? How are death, resurrection and immortality to be understood?

The concept of soul as the embodied capacities and experiences of personal relatedness (developed also by Brown) is central to the theological treatise of Anderson. The commandments to love God and love our neighbour, essential requirements of the Christian life, indicate the critical role of personal relatedness in Christian spirituality. To be spiritual is to be in relationship with God who is spirit. This then forms our understanding of the nature of the image of God. God's image is to be found in the capacity for covenantal relatedness, that is, in the capacity to love God and neighbour. Sin is therefore that which destroys or disrupts relatedness to God, as well as that which damages our relatedness to others.

Particularly problematic for a physicalist account of human nature is the Christian doctrine of life after death. If our self-identity and souliness are embodied in a physical and mortal body, how can these survive death? Resurrection of the body is the major Biblical emphasis and allows for the continuance of self-identity within a physicalist understanding of human nature. While continued self identity is guaranteed by scripture, it is always promised in the context of the activity of God's creative work. Immortality is not an endemic quality of humanity, but is granted by God in a new creative act in the context of our relatedness him. Continuance of self-identity after death is, thus, entirely a product of the activity of the sovereign and omnipotent God.

Christian Ethics without Dualism

Ideas regarding the nature of persons ultimately affect the way we treat one another. Our understanding of human nature inevitably impacts our ethics. Therefore, it is important to consider what might be the consequences of a physicalist view of human nature. Would such a view start us down a slippery slope of ethical decline?

Stephen Post suggested that dualism - the view that the distinctive attribute of human nature is the possession of a spiritual soul - has had both negative and positive influence on ethics in the past. Dualist views have sustained a sense of caution regarding what can be appropriately be done to the besouled body of another individual. If an immortal soul is present, does this not force one to continue to and love the seriously mentally deficient or the demented? But, does not this view also result in an irrational opposition to withdrawing or withholding medical treatments for an individual with no hope of sustaining life in anything but a vegetative state? Dualism has played a protective role within systems, at times to a fault.

But do Christian ethics necessarily require dualism, or are they more rightly as resting on other grounds? Post suggests that the fundamental not to be found in a dualist consideration of the soul other. Rather, it emerges from 'the ethos of bestowed love and from the narrative of Jesus among the most vulnerable.' 'A narrative of love and consideration to helpless, dying or deficient persons is sufficient motive, and perhaps a purely Biblical motive, than the consideration of a separate substantial soul.

Dualism has also tended to foster various forms of asceticism and gnosticism, anything that is associated with the physical is viewed as inherently evil, 'non-spiritual' and therefore not of value. While extremes of this view not difficult to find in the history of religious cult movements, more subtle encounter attitudes that denigrate sexual intimacy as basically non-spiritual, or view physical health as spiritually irrelevant ('Your sickness or psychological distress is not important as long as your soul is OK.'). The opposite has at times resulted from dualist thinking (i.e., 'It matters not what I do to or with my body, only my soul matters.')

Pastoral and Psychological Care

H. Newton Malony considered the implications of non-reductive physicalism for secular and religious counseling. The assumption that humans possess a spiritual soul that outlasts the body can be seen in much humanistic psychology and many religious rituals, particularly funeral rites. Thus, adopting a view of

humans as unitary body/soul entities is a point of view that may meet resistance from common religious traditions and practices. Malony believes 'soul' is a 'spiritual capacity' which can be experienced in behaviours which deals with such life problems as mystery, tragedy, and situational enigmas. He proposed a model for religious experience from the perspective of non-reductive physicalism, including suggestions for a manner of counselling that includes a spiritual dimension without implying a non-physical soul. According to Malony, conceiving of healing as a return to social functioning, as is typical of the short-term therapy mandated by many Health Maintenance Organisations in the United States, may well be a better approach, from a non-dualist perspective, than the forms of psychotherapy which emphasize gaining insight into oneself, with little attention to change in manifest behaviour.

Conclusion

We began with a dilemma: How do you resolve the discrepancy between the reductive physicalism which seems to be demanded by modern neurobiology and the more traditional Christian views of a substantive soul. If one adopts a physicalist framework, does this necessarily do violence to a Biblical view of human nature? The contributions to the project described in this session (and in *Whatever Happened to the Soul?*) suggest that there is a position which can be maintained with consistency from biology to human mental life, and ultimately through theology and human spirituality. The keys to this consistency in the various portraits of human nature can be summarised as the following: (1) an uncompromising inclusion of all that is known of the neurobiology of human nature; (2) a non-reductive view of the relationship between human subjective mental life and neurobiology which allows top-down causal influences, (3) a view of human souliness as embodied in the capacity for the deepest and richest forms of personal relatedness; and (4) recognition that it is God's sovereign choice to be in relationship to humankind that bestows ultimate and irreducible dignity to persons.

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References

Brown, W. S., Murphy, N. and Malony, H. N. (1998) *Whatever Happened to the Soul? Scientific and Theological Portraits of Human Nature*. (New York, Fortress Press).

Easterbrook, G. (1997) Science and God: A Warming Trend? *Science*. 277, 890-893.