

If the arrangement was as in (II), the substance would be different [it would be methoxymethane (dimethyl ether), a gas at room temperature].

4. The preceding example is a paradigm of DNA. In a DNA molecule the *order* of a large number of groups of atoms of four different types (A, C, G, and T) determines the particular proteins that can be synthesized on it.

5. Consider finally a metal crystal. Einstein attempted to reproduce the heat capacity of this by considering the vibrations of the individual atoms. His equation, however, fails at low temperatures. To get a better fit, Debye showed that it is necessary to consider the vibrations of the set of atoms *as a whole*.³

These examples show that the behavior of multi-component systems cannot be reduced *completely* to that of their components. Reduction is a useful tactic in science, but a false strategy. This does not mean that individual atoms can have supervenient properties as Clouser suggests. But *assemblies* of atoms can.

This conclusion has considerable bearing on creation, providence, and free will as I discuss elsewhere.⁴

Notes

¹Roy Clouser, "Prospects for Theistic Science," *Perspectives on Science and Christian Faith* 58, no. 1 (2006): 2–15.

²See, e.g., J. H. Jeans, *The Dynamical Theory of Gases*, 4th ed. (Cambridge University Press, 1925).

³P. Debye, *Annalen der Physik* 39 (1912): 789–839.

⁴P. G. Nelson, *Big Bang, Small Voice: Reconciling Genesis and Modern Science* (Latheronwheel, Caithness, Scotland: Whittles, 1999); *God's Control over the Universe: Providence and Judgment in Relation to Modern Science*, 2d ed. (Whittles, 2000); "Neuroscience, Free Will, and the Incarnation," *Perspectives on Science and Christian Faith* 58, no. 1 (2006): 86–7. I can supply copies of the books on request.

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Set Theoretic Analysis of the Whole of Reality

Roy Clouser¹ presents theistic science as a necessary synthesis between science and religious beliefs. Criticisms of this attempt are based on Clouser's definition of religious belief itself,² the very notion of the possibility of theistic science,³ and the shakiness of Clouser's philosophy of science vis-à-vis how scientific theories carry the "impact" of belief in God.⁴

A theistic science would have to represent the integration of all kinds of knowledge intent on explaining the whole of reality. These would include, at least, history, metaphysics, theology, formal logic, mathematics, and experimental sciences. However, what is the whole of reality that one wants to explain?

The notion of set theory is useful to depict the physical (P) and the nonphysical (NP) aspects of Nature (N).⁵ Nature is given by the union $N = P \cup NP$, where their non-zero intersection $P \cap NP \neq \emptyset$, where \emptyset is the empty set, represents elements of reality with both physical and non-

physical aspects. Therefore, the content of all that there is in Nature are elements that are either: (1) purely physical, (2) purely nonphysical, or (3) both, viz., physical/non-physical.⁵

The purely physical constitutes the subject matter of science⁶ whereas human consciousness and rationality, information, mental models and abstractions, etc., characterize the nonphysical aspect of Nature. Purely physical devices detect that which is purely physical. However, it is humans, and not physical devices, that "detect" self, mathematical and mental concepts, etc.⁷ Religious concepts and beliefs, which are "detected" by humans, are based on the notion of Divinity and so one must posit the existence of the supernatural (SN), which transcends Nature but may contain parts or the whole of Nature.⁸

One is supposing $NP \neq \emptyset$ and that the intersection of $P \cap NP \neq \emptyset$, which contains all living beings as elements. That is to say, certain aspects of living beings, say life itself, consciousness, rationality, etc., are not derivable from the purely physical otherwise $N = P$ and $NP = \emptyset$, which is the apex of reductionism. Clouser claims, "that divinity beliefs regulate an ontology, which in turn regulates scientific theories."⁹

Reductionism is understood as equating some sets or else supposing a set has no elements, viz. the set is empty.¹⁰ Note that $SN = \emptyset$ is the only form of reductionism that is theistically objectionable whereas all other forms of reductions are acceptable in science since science does not deal with ontological questions.¹¹ This notion of reductionism is consistent with Clouser's.

Is $N \cap SN \neq \emptyset$ indicating that there are elements or properties common to the Supernatural and to Nature or, instead, $N \cap SN = \emptyset$ with the two sets disjoint? The former allows for the existence of spiritual beings in Nature while the latter does not. Surely, the most general consideration of Clouser is that all elements of Nature are part of the supernatural and that the two sets are not equal. Otherwise one would be supposing some sort of pantheism $N = SN$, i.e., Nature is either identical with the supernatural or in some way a self-expression of its nature.

Our characterization of reality contains the whole gamut of what Clouser considers divine. From atheism with $SN = \emptyset$ to Christianity where SN consists of nested subsets whose elements are all sorts of creatures with the Supreme Being containing the whole of creation. This is the set-theoretic depiction of God as creator Who upholds all things.¹² This notion of God as infinite is reminiscent of Georg Cantor's concept¹³ of *Absolute Infinity*, the limiting transfinite number constructed from smaller numbers whose existence is in the mind of God and not man.

God created man as well as the physical aspect of Nature. It may be that mathematical descriptions of nature work because mathematics is a human creation.¹⁴ Mathematical theory underlying the laws of Nature, although directly containing no notion of human consciousness and rationality, carry the creative imprint of God through the creative power endowed in humans. Thus, the existence of self, which "detects" the spiritual, exemplifies the image of God in humans and points to theological and mathematical truths innate to humans. This answers the question raised by Eugene Wigner¹⁵ of the unreasonable effective-

ness of mathematics in the natural sciences and justifies Clouser's argument on how God "impacts" human development of scientific theories.

Notes

- ¹R. Clouser, "Prospects for Theistic Science," *PSCF* 58 (2006): 2-15.
- ²P. Le Morvan, "Is Clouser's Definition of Religious Belief Itself Religiously Neutral," *PSCF* 58 (2006): 16-7.
- ³H. Halvorson, "Comments on Clouser's Claims for Theistic Science," *PSCF* 58 (2006): 18-9.
- ⁴D. Ratzsch, "On Reducing Nearly Everything to Reductionism," *PSCF* 58 (2006): 20-2.
- ⁵M. Alexanian, "Physical and Nonphysical Aspects of Nature," *PSCF* 54 (2002): 287-8.
- ⁶*Ibid.*
- ⁷*Ibid.*
- ⁸It is important to remark that some religions consider parts of Nature as divine and so worship the creature rather than the Creator. Therefore, for such religions the set SN is not empty but contains those deified objects in Nature as elements of SN.
- ⁹Clouser ought to indicate that theology plays no role in science. However, metaphysics is indeed regulative of science, history, formal logic, and mathematics and constitutive of some aspects of theology.
- ¹⁰Nihilism is the more proper term when some forms of knowledge are eliminated.
- ¹¹The choice of Clouser of what constitutes "religious beliefs" obfuscates the issue properly raised by his detractors. The generic term "supernatural" allows one to consider existence that goes beyond Nature or what cannot be properly termed as natural.
- ¹²The finite number of creatures is described as elements of sets, whereas God is characterized by a set of infinite order that contains all sets, which together encompass the whole of his creation. Therefore, the existence of all that is depends on God's self-existence.
- ¹³B. A. Hedman, "Cantor's Concept of Infinity: Implications of Infinity for Contingence," *PSCF* 46 (1993): 8-16.
- ¹⁴Science does not deal with first causes. The scientist qua human being creates scientific theories that deal only with secondary causes. However, the human elements of consciousness and rationality are not an integral part of the laws and models themselves. Note that theoretical models of Nature and the predictions that follow from them are exactly like mathematical systems with axioms and theorems like Euclidean geometry. However, logical connections, which may or may not correspond to causal physical influences, propagate equally well in either direction. Therefore, the choice of what constitutes an axiom or a theorem is arbitrary.
- ¹⁵Eugene P. Wigner, "The Unreasonable Effectiveness of Mathematics in the Natural Sciences," *Communications on Pure and Applied Mathematics* 13, no. 1 (1960), 1-14.

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Reading God's Works in a Non-Christian Context

I wish to thank George Murphy for again stimulating my thinking about general revelation in his article "Reading God's Two Books" (*PSCF* 58, no. 1 [March 2006]: 64-7). His recommendation, which I agree with, is that people need to read the book of God's Word before reading the book of God's Works, for natural theology is dependent on revelation for its validity. While this approach is theologically sound, and appropriate for Christian theologians, it is practically inadequate in the normal experience of

people in the real world. I spend most of my time working with scientists and medical personnel who are not Christians and who have no knowledge of the Bible.

First, many people around the world are not interested in reading the Bible, which they perceive as being "owned" by Christians and is just for Christians. But these people will read and observe and marvel at nature, which they all equally enjoy (Matt. 5:45). Therefore, where we meet most unbelievers is at the interface of God's works and his Words, they having already read the former but not the latter. We do not have the luxury of organizing their order of reading these two books. Furthermore, I find many people's interest especially piqued when they see the way in which the Bible logically and systematically explains the origins and meaning of the natural world which they had only previously observed.

Second, few cultures that I am familiar with find the god behind nature to be "cruel and ruthless." They may find this god to be capricious, but not evil. *Attitudes to Nature* (Jean Holm, ed. [New York: Pinter Publishers, 1994]), which I reviewed in these pages several years ago, introduced the views to nature of the main world religions. Virtually all of the religions introduced reflected a sense of harmony and unity between humans and the created world. Therefore I do not share Murphy's concern that reading nature before reading God's Word will prejudice people toward erroneous or unchangeable views of God.

Within this context, how can we successfully lead people to do what Murphy is suggesting, to read God's Word, first and foremost? My challenge for scientists interested in engaging unbelievers in reading God's Word with interest, is to employ what Reinhold Niebuhr dubbed "middle level axioms," to wit, to use the jargon and concepts we have in common with these people to present the beliefs we hold as Christians. For example, one might use the word "environment" rather than "creation," and then pour into the word "environment" all that you know to be true about that creation from the Word of God. This way you will not be discredited by listeners who perceive you to blindly hold to your pet, Christian words. This approach is useful when talking with unbelievers from other cultural contexts, and I might add, it is increasingly necessary when talking with people in the US and other Western countries who have been raised in a post-Christian context. I have spent considerable time working out how this works in the Chinese context, where I live and work, and would be willing to share a manuscript I have on this topic with interested readers (email me).

I am pleased to see Murphy accepting, albeit reluctantly, the value of the classical view of building Christian theology on the foundation of natural theology. Even though it is not his preference, we must admit the common experience of the people in the world is to read God's two books backwards. Finally, I want to thank Dr. Murphy for helping me with my thoughts and writing on these issues currently and in the past.

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