

Sedgwick's understanding of natural law was opposed at the geological and scientific level by Lyell and Darwin, and at the moral level by the libertine John Stuart Mill. Sedgwick's understanding was defended by the old earth creationist William Whewell (1794–1866) of Trinity College, Cambridge University (Professor of Mineralogy, 1828–1832, Professor of Moral Philosophy, 1838–55) (*Ibid.*, Vol. 1, pp. 25, 95, 404–5; Whewell's *Of Induction*, p. 79).

Gavin McGrath
34 Mill Dr.
North Rocks, N.S.W., 2151
Sydney, Australia
gmcgrath@easyc.com.au

Correction: Values in Millimeters, Not Inches!

In my recent article on "Qualitative Hydrology of Noah's Flood" (*PSCF* 58, no. 2 [June 2006]: 120–9), I made a mistake on p. 122 concerning the average precipitation values for cities in the Iraq/Southern Turkey region. The values should be in *millimeters*, not inches. My thanks to Robert Rogland, who pointed out the correct values, and my apologies to all of those service men and women in Iraq who know better!

Carol A. Hill
ASA Fellow
17 El Arco Drive
Albuquerque, NM 87123
Carolannhill@aol.com

Titanic Deck Chairs and the "Real" Adam

John McIntyre's illustrious background in physics has probably conditioned him to believe that novel—or at least highly interesting—concepts win Nobel Prizes! However, in theology, ideas that have not been accepted by the church through the ages are more than likely to be dangerously wrong.

McIntyre proposes that Adam needed to sin to change from "an 'it' within the creation" to "an 'I' outside creation" who had "taken on the character of the Creator" (*PSCF* 58, no. 2 [June 2006]: 90–8). The idea is not new. It was articulated by Joseph Smith nearly 200 years ago.

This all follows, of course, from the premise that evolution and standard dating are indisputable facts. Adam then becomes a hominid, with perhaps only a dim awareness of God, chosen from among his animalistic peers to receive the breath of life. Ignored are the biblical record of long life and rapid invention of technology and the scientific crumbling of the evolutionary façade.

It is a shame that so much brain power is wasted, essentially arranging the deck chairs on the Titanic, by tying theology to a contemporary paradigm, as the Scholastics did in assuming Aristotle to be infallible.

Ross S. Olson, MD
ASA Member
5512 14th Ave. S.
Minneapolis, MN 55417
612-824-7691
ross@rossolson.org

The Two Books: An Appreciated Article

Thank you very much, Giuseppe Tanzella-Nitti, for your article on "The Two Books Prior to the Scientific Revolution" (*PSCF* 57, no. 3 [Sep 2005]: 235–48). I have just finished re-reading your article and remembered that I should send you a thank you note. Your article was delightful, informative, and in impeccable English. Not a hint of an "accent" or a misused word! Another strong point is that your faith is thoroughly infused into the article. That is often very difficult for the believing scientist. (I am a chemist.)

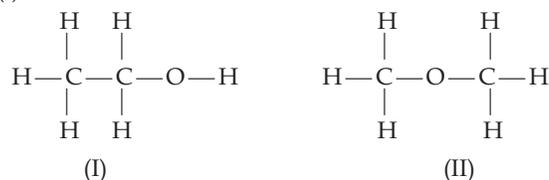
Your article is timely. Many churches and leaders have trouble with accepting (good) science and wish to take a literal meaning of the holy Scriptures. In this way, they may make arbitrary statements about science, for example, the age of the earth. Your article is an excellent reference for a balanced and objective view on the issue. Any forthcoming articles, say on astronomy? Thank you again.

In Christ our Lord,
Harry Alkema
CSCA Member
Burlington, ON Canada
Harry.Alkema@ec.gc.ca

Reduction in Science

I agree with Roy Clouser about the inadequacy of reductionist descriptions of natural systems, though not with his solution.¹ As the following examples show, the behavior of a multicomponent system is generally determined not only by that of its components, but also by the *relationship* between them.

1. Consider the wave emitted by an oscillator undergoing a combination of oscillations. The shape of this wave is determined not only by the amplitude and frequency of the components, but also by their *phase*. If identical oscillations are in phase, they reinforce each other, if out of phase they cancel. *N* components require the specification of *N* – 1 phases. This specification is at the level of the system, not the components.
2. Consider a gas. The properties of this can be derived from the motions of the molecules making up the gas. To do this, however, it is necessary to specify the relationship between these motions – namely, that they are *chaotic*.² A different relationship would result in different behavior. For example, if the motions were confined to a single direction within a pencil, the molecules would comprise a molecular beam.
3. Consider the substance ethanol (ethyl alcohol). Chemists describe this as being made up of molecules comprising two carbon atoms (C), six hydrogen atoms (H), and one oxygen atom (O). This specification is, however, incomplete. Chemists have also to specify the *arrangement* of the atoms in the molecule, as pictured in (I) below:



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.

P. G. Nelson
25 Duesbery Street
Hull HU5 3QE
England
p.g.nelson@hull.ac.uk

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-