

RELIGION AS BELIEF VERSUS RELIGION AS FACT

Steven I. Dutch

Natural and Applied Sciences, University of Wisconsin-Green Bay,
Green Bay, WI 54311-7001, dutchs@uwgb.edu

ABSTRACT

Religions perceive their doctrines not as opinions or subjective personal preferences, but as demonstrable facts, supported by historical documentation, experience, observation, and logical inference. The most dogmatic believers inhabit a mirror-image universe to that of science, with its own data sources, technical literature, rules of evidence, and means of reaching consensus. When scientists deal with issues like creationism, the widespread failure to understand how religions regard their doctrines frequently results in miscommunication and ineffective, even counter-productive, strategies. The unspoken assumptions made by scientists and dogmatic religious believers are so different that in extreme cases meaningful communication may be impossible.

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INTRODUCTION

Much of the discourse on the role of religion in society is pervaded by subtle, usually unrecognized assumptions about the nature of religious belief, which a few examples will illustrate. We commonly hear dogmatic religious movements criticized for attempting to impose their beliefs on others, or for not tolerating and respecting alternative points of view. On the other hand, our society does not hesitate to override the religious beliefs of parents who want to withhold medical treatment for a sick child. Nor do we see anything intolerant about prosecuting a medical quack who sincerely believes his remedy cures illness. Few people in the scientific community see any need to respect the views that tobacco does not cause cancer, or that the earth is less than 10,000 years old. Religious beliefs are also frequently dismissed as "untestable," but many theories about global warming or ozone depletion are also untestable, short of allowing global change to occur and seeing what happens. These latter examples show that the untestability of an idea does not preclude its being true, nor does it confer immunity from possible adverse consequences of making the wrong decision or even merely suspending judgment.

Why are the religious beliefs above treated differently from their non-religious counterparts? What separates the two sets of examples seems to be an unspoken assumption that religious beliefs are wholly subjective matters of personal preference, if not completely imagi-

nary. Some nonbelievers dismiss religious beliefs as mere delusion, others regard them as personal myths that may be useful for shaping a world view, guiding conduct, or providing a sense of purpose and orientation, but otherwise lacking any objective reality. Religious believers of tolerant outlook may believe God accepts a variety of belief styles, or forgives errors made in good faith. More pragmatically, they may believe that coerced belief serves no useful spiritual purpose, or that attempts to coerce belief have done more harm than good, or that coercion by one group merely invites retaliation if another group should gain power. None of these are statements of pure belief; they all contain quite definite factual assumptions about the nature of God and religious belief.

Young (2001) pretty well typifies the idea that religious beliefs are imaginary. In place of God, he proposes that a "cosmic religious feeling" can serve equally well, and that consciousness of our own moral responsibility can serve to replace "a god who dictates moral codes." His clear assumption throughout is that religion serves only to satisfy psychological needs, that any belief will do as long as it satisfies a given need, and that the evidence advanced by believers is nothing more than rationalizations for *a priori* beliefs. Young comes very close to a famous *Peanuts* cartoon where Linus says "You believe in Santa Claus, I believe in the Great Pumpkin ... It doesn't matter what you believe as long as you're sincere." The central premise is "it doesn't matter what you believe," because all religious constructs are imaginary anyway.

The historical search for the location of the Garden of Eden (Delumeau, 2000) or Noah's Ark (Collins and Fasold, 1996; Corbin, 1999), the investigation of miracles by the Catholic Church and other groups, and the creationist movement all show that many religious believers reject Young's model entirely (in this paper, "creationist" refers to the young-earth creation movement). Many believers regard their beliefs as supported by observation and historical documentation, as verifiable and testable, and frequently as taking precedence over logical analysis or empirical data. Indeed, they do not consider them beliefs at all, but concrete facts. I will use the term *dogmatic* to describe such believers. Understanding dogmatic belief systems is important to geoscience educators because these beliefs drive much of the opposition to evolution and the geologic time scale, because many students filter their education through these belief systems, and because dogmatic belief systems profoundly affect public perceptions of and support for science. Many observations in this paper apply to non-creationist and even non-Christian movements. For example, there are Islamic opponents of evolution whose motivation and rhetoric are very simi-

lar to Christian creationists (Edis, 1994, 1999; Sayin and Kence, 1999).

Lacey (1981, p. 243-245) shows in the following delightful anecdote how concretely some believers see their religion. When King Abdul Aziz first installed radios for communication in Saudi Arabia, one conservative sheikh was convinced that only the devil could carry messages so swiftly. He became such a nuisance that the king arranged a demonstration. He asked the sheikh how far the devil would carry the Word of God. When the sheikh said it was impossible, the King had a mutual friend read verses from the Koran over the radio from a distant city. The sheikh immediately became an enthusiastic supporter of the radio, praising it ever after as a miracle from God. This is a rare if not unique example of settling a religious debate by a real experiment, and it is a genuine, if highly unorthodox, use of the scientific method. There is a hypothesis, a test, and a refutation of the hypothesis based on the outcome. Best of all, the outcome was favorable to science.

This paper was under revision when the horrifying events of September 11, 2001 unfolded. Most Americans find the concept of a one-man suicide attack baffling; that nineteen individuals would deliberately kill themselves for a cause is almost incomprehensible. The terrorists' actions become more understandable if we realize that for them, the existence of a rewarding afterlife was a concrete reality. We cannot dismiss their belief in an afterlife as a comforting myth to avoid confronting the reality of death. They viewed dying for their cause and being rewarded as a straightforward matter of cause and effect, as reliable, certain, and proven as the cause and effect chain that brought down the World Trade Center.

Religious beliefs range from absolute nonbelief to absolute belief. It is quite possible to be as dogmatic about nonbelief as about belief. Dogmatists at either end of the spectrum tend to regard their beliefs as factually demonstrable and thus, their opponents as deluded, intellectually dishonest, or both. More moderate believers and nonbelievers believe the data support some position for or against the existence of God, but are prepared to admit the possibility of new evidence. They acknowledge the existence of ambiguity, recognize that equally rational individuals may come to the opposite conclusion, and show some understanding and empathy for their reasoning.

I consider it essential to distinguish between moderate fundamentalists and dogmatic believers because there seems to be a widespread tendency among those unfamiliar with fundamentalism to tar all fundamentalists with the same brush. Fundamentalists vary a great deal more than popular stereotype suggests. Many find fundamentalism satisfactory for their own needs but are quite aware that others may interpret the evidence differently, or even reject it, for legitimate reasons.

THE DOGMATIC RELIGIOUS WORLD-VIEW

The militant creationist group Answers in Genesis has an on-line Statement of Faith that neatly lays out many of the salient features of the dogmatic world-view (Answers in Genesis, 2000). A few significant excerpts, supplemented by a remark by Answers in Genesis founder Kenneth Ham (Ham, 1987) illustrate what science is up against. Table 1 presents the excerpts and a brief commentary on each.

We can now define the term "dogmatic" more precisely. Although dogmatic belief includes the idea that religious doctrines are factually true, what sets dogmatic believers most sharply apart from moderate believers and from most scientists is the belief that doctrines are so firmly established that they are immune to alternative interpretation, testing, modification, and possible refutation. Kenneth Ham and Answers in Genesis represent some of the more militant opponents of evolution, but the propositions outlined in Table 1 are implicitly assumed in most dogmatic literature. It is actually surprisingly uncommon to find such explicit remarks, just as one rarely finds a history book that has to remind readers that the Civil War really happened. Similarly, many dogmatic works will not bother to state explicitly that the Bible is inerrant, but will simply discuss Biblical events as though their factuality were beyond dispute.

Although this paper cites a number of representative dogmatic works, its conclusions are based principally on over twenty years of conversing with and observing dogmatic believers and the creationist movement. Boone (1989) and Marsden (1991) are surveys of the Religious Right. Balmer (2000) attempts to portray the dogmatic world-view from an inside perspective. McDowell (1999) has a massive bibliography of sources on dogmatic belief. Strahler (1987) and Pennock (1999) have excellent analyses of creationist arguments, and *Reports of the National Center for Science Education* chronicles recent developments in creationism. Readers are referred to those sources for additional references. Among the many relevant articles in this journal are those of Dutch (1982), Ferre (1983), Monroe (1987), Moore (1983), Newell (1983), Shea (1983), Strahler (1983) and Wells (1989). These selected papers deal with the philosophy of creationism and its implications for education. In addition there are many others outside the scope of this paper that address specific scientific claims of creationism.

In order to deal effectively with anti-evolutionists and other religiously-motivated opponents of science, we must attempt to see the world as they do (which is emphatically not the same as agreeing with them). The world-view that religious beliefs are demonstrable facts goes far beyond a simplistic assertion that "dogmatic believers think the Bible is true." Dogmatic believers believe their doctrines are concrete realities, valid in the same sense that quantum mechanics or plate tectonics are valid. In their view, if science does not accept their

Statement	Implications
1. The Bible is the written Word of God. It is divinely inspired and inerrant throughout.	Statements in the Bible are considered to be accurate, authenticated <i>facts</i> , not beliefs based on subjective criteria.
2. Its [the Bible's] assertions are factually true in all the original autographs.	Contrary to widespread canard, dogmatic Bible believers are perfectly well aware the Bible was written in other languages and they look to the original language for the most accurate meaning.
3. All of mankind are sinners, inherently from Adam and individually (by choice), and are therefore subject to God's wrath and condemnation.	Personal belief or cultural conditioning is irrelevant to the objective truth of beliefs. Warnings about divine judgment are not seen as any more "judgmental" than the Surgeon General warning of the dangers of tobacco.
4. The account of origins presented in Genesis is a simple but factual presentation of actual events and therefore provides a reliable framework for scientific research into the question of the origin and history of life, mankind, the Earth, and the universe.	Dogmatic Bible believers regard the supernatural as an objective, physically real class of phenomena whose existence is as certain as atoms or gravity. Dogmatic Bible believers regard Biblical miracles as real events, as reliably documented as, say, the dynasties of ancient Egypt.
5. The great flood of Genesis was an actual historic event, worldwide (global) in its extent and effect.	The Bible is considered as historically reliable as any other document, and as legitimate an authority as any scientific literature.
6. The view, commonly used to evade the implications or the authority of Biblical teaching, that knowledge and/or truth may be divided into "secular" and "religious" is rejected.	Much of the reasoning scientists use to distinguish between science and religion is irrelevant because it is flatly rejected by many dogmatic believers. Attempts to stress the tentativeness and limitations of science merely serve to reinforce dogmatic believers' convictions that their mode of knowledge and data sources are superior to those of science.
7. By definition, no apparent, perceived, or claimed evidence in any field, including history and chronology, can be valid if it contradicts the Scriptural record.	Evidence that contradicts the Bible is considered <i>ipso facto</i> wrong. Dogmatic Bible believers consider their ideas eminently testable and falsifiable, with the Bible as the norm for testing. They consider the Bible to have been validated by a wide variety of evidence, and therefore they consider this testing mode to be as legitimate as reference to the scientific literature.
8. Of primary importance is the fact that evidence is always subject to interpretation by fallible people who do not possess all information.	Dogmatic Bible believers do not see themselves as blindly rejecting scientific evidence that contradicts the Bible. Rather they regard the conflicts as "apparent," explainable in terms of bad data, faulty interpretation, fabrication, or ideological bias. They regard others as closed-minded for refusing to consider the Bible a potential source of evidence.
9. Refute or undermine in any way the biblical doctrine of origins, and the rest of the Bible is compromised (Ham, 1987, p. 59)	Any weakening of a literal interpretation of the Bible fatally weakens the whole fabric of Christianity. Note that the possibility of refuting the Biblical creation account is effectively foreclosed.

Table 1. Excerpts from the Answers in Genesis Statement of Faith and their implications.

evidence, that's science's problem, not theirs. Failure to appreciate fully the implications of this world-view is probably the single most crucial error scientists commit in dealing with dogmatic believers.

IMPLICATIONS OF THE DOGMATIC WORLD-VIEW

Although the attitudes and behavior of dogmatic believers are frequently alien and puzzling to observers outside the dogmatic belief system, every distinctive feature of dogmatic belief systems flows from the single premise that religious doctrines are objectively and factually true. The apparent paradox that dogmatic believers can accept miracles and at the same time be very sophisticated at picking out logical flaws in their opponents is not really a paradox. Dogmatic believers can be just as literate and perceptive as anyone else; they differ only in one key factual assumption.

Since dogmatic believers regard their doctrines as demonstrable facts, they do not see other belief systems as being on a moral par with their own but as inferior imitations or deliberate counterfeits. Some writers go so far as to deny that Christianity is a religion at all; they view Christianity, the genuine article, as different *in kind* from "religion," the imitation. A typical example of this claim is the following (Christian and Missionary Alliance, 2001):

Moreover, Christianity is not like other religions, merely a body of teaching, nor a round of ceremonies; nor is it even a code of ethics. ... In fact, as the term is commonly employed, Christianity is not a religion. It is a life.

Even at its most benign, a reminder that the essence of religion is the internal spiritual life rather than external ritual, utterances like this contain a powerful stereotypical notion that Christianity concerns itself with genuine interior spirituality whereas other religions conceive of themselves solely in terms of external ritual. (I located the above quote by entering "Christianity is not a religion" into a search engine. A quick substitution of "Islam" for "Christianity" turned up very similar statements made on behalf of Islam.)

Dogmatic believers do not see it as closed-minded or intolerant to claim theirs is the only true religion any more than a physicist sees it as intolerant to claim that one value for the speed of light is correct and all others are wrong. They do not see themselves as "imposing their beliefs" on others but as opposing fraudulent or socially harmful practices, on about the same plane as the medical community taking on medical quacks, or gun control advocates pushing for a ban on handguns. They see the harm done by, say, abortion, homosexuality, or evolution as just as objectively real and demonstrable as that caused by medical quacks or handguns. They re-

gard the fact that others may not share their beliefs as irrelevant, much the way astronomers consider the widespread belief in astrology irrelevant to its validity.

The idea that one religion is factually correct and all others erroneous leads naturally to the conclusion that it is legitimate, even obligatory, to oppose other belief systems. From there it is a slippery slope to the idea that adherents of other belief systems are not just mistaken, but criminal or even diabolical. History is replete with examples, of which present-day Afghanistan is merely the latest.

EVIDENCE IN DOGMATIC BELIEF SYSTEMS

Truth Concepts - Many dogmatic religious believers tend to be naïve realists (Barbour, 1974); they are convinced that facts and truth in the metaphysically absolute sense do exist and furthermore, that some truths can be known by humans. First, they believe that some truths, like those in mathematics, can actually be discovered by humans through purely natural means. Second, however, they believe that God has communicated metaphysically absolute truths to humans. They regard the record of these communications as genuine historical documents describing events that are as real and well documented as the Battle of Hastings. Asserting the tentativeness of science to dogmatic believers is likely to be counter-productive because they commonly view the tentativeness of science as weakness rather than strength.

Personal Experience - For dogmatic religious believers, personal testimony is a central part of their evidence. Dogmatic Bible believers are frequently shocked and offended to find that scientists do not regard personal testimony as valid evidence. Some converts came out of severely dysfunctional backgrounds, found in their beliefs a way of bringing order to their lives, and consider their experience to be overwhelming evidence of the validity of their religion. In some cases the effects of conversion were so dramatic that believers are firmly convinced they were miraculous. Other converts may have grown up in nonbelieving or nominal religious settings, became dissatisfied by the ambiguity and lack of focus provided by their original upbringing, and settled on a dogmatic belief system as filling the void.

It is both arrogant and futile to argue that people did not have the experiences they claim to have had, and people who have found dogmatic religion to be a great benefit to their lives are likely to be fiercely loyal, quite understandably so. Attempting to de-convert them is doomed to fail, but they may well be receptive, even relieved, by arguments that they need not give up their core beliefs to accept the findings of science.

LITERATURE

The core body of evidence for many religions, especially dogmatic Christianity, is a written scripture. Outsiders to the dogmatic belief system typically regard scriptures as a heterogeneous collection of documents that may contain various elements of genuine spiritual truths, personal opinions and semi-historical documents and myths. To non-dogmatists, the fact that Pontius Pilate was a real person does not prove there was a global Deluge; connecting the two is a non-sequitur. Dogmatic Bible believers, however, regard the Scriptures as a unified and coherent whole. The portions that can be independently verified are considered to have been so completely vindicated by history, archaeology and science (frequently reinterpreted to fit the beliefs) that the portions that cannot be so verified can still be taken as firmly established.

In what might be called the Strong Form of dogmatic belief, the scriptures are regarded as *literally inerrant*: the very words themselves are authoritative. It can be a real surprise to outsiders to witness how closely dogmatic believers scrutinize the semantics of a single word in their scripture. The alleged seamlessness and inerrancy of Scripture is, to dogmatic Bible believers, one of their most powerful tools. It enables them to point to verifiable facts in the Bible as evidence for the supernatural events as well. If the Bible is not a seamless whole, the effect is rather like snipping the string on a strand of beads. Evolution's threat to inerrancy is the main reason the conflict over evolution has been so heated (Table 1; Point 9). Other accommodations of Scripture to science, such as the earth orbiting the Sun, can be made by relatively minor reinterpretations of passages that do not otherwise have far-reaching implications. Accommodating evolution requires a wholesale reinterpretation of much of *Genesis* as non-literal. Furthermore, since traditional Christianity teaches that Christ's purpose was to repair the results of the Fall of Adam, dogmatic Bible believers feel that evolution poses a mortal threat to the entire basis of Christianity.

In addition to scripture, there is a vast body of supporting literature in all religions that fills a role analogous to the technical literature in science. Commentaries exist on just about every aspect of scripture and religious doctrine, and there is a huge literature on *apologetics*, justifications for belief and answers to objections by outsiders (McDowell, 1999). It is impossible to overstate the sheer mass of this literature, or its implications. Every imaginable religious argument has been critiqued from every imaginable viewpoint. For people who are immersed continuously in dogmatic literature, the truth of their doctrine seems massively documented beyond any rational doubt. In addition, since few outsiders are well versed in this literature, they appear to dogmatic Bible believers to be technically uninformed and unread in even the most basic literature. To believers in this *milieu*,

the average evolutionist scientist looks like a flat-earth believer, someone wholly unacquainted with the technical literature yet arrogantly demanding that everyone else discard well-established ideas to adopt a new theory. To be as blunt as possible, they see us as the crackpots.

Very few dogmatic Bible believers are scientists, and few of those are in fields where the age of the earth or the details of evolution have any direct application. Thus, when confronted with conflicts between the Bible on one hand and established earth history on the other, many dogmatic Bible believers apply their own version of Occam's Razor. Their own experience and reading convinces them the Bible is true, they see no pressing need or use for ideas that run counter to the Bible, and the simplest explanation that fits the data, as they see it, is that the Bible is correct and that scientists simply are wrong.

Observational Data - There is also a large body of observational evidence associated with dogmatic belief systems. Dogmatic Bible believers regard miracles as perfectly possible and thoroughly documented, though rare, events. The attitude of McDowell (1999, p. 662) is typical:

It is important to note that we do not use the Bible to confirm the possibility of miracles [which is taken for granted] but only, as we will see later, to report the historicity of certain miraculous events.

Some dogmatic Bible believers understand why science excludes miracles as an explanation for events, but many do not. Many see the exclusion of miracles as a purely *ad hoc* rationalization for nonbelief. Dogmatic periodicals routinely publish accounts of miracles, and since the possibility of miracles is taken for granted, accounts of miracles by otherwise reputable persons are accepted as simple matters of observation. Those who do not accept miracles are likely to interpret these claims as a mix of fabrications, delusions, wishful thinking, coincidence, real but rare natural phenomena, and perhaps a few anomalies still to be explained. However, many dogmatic Bible believers regard the evidence for miracles as a real observational data base that is excluded from science for venal reasons completely divorced from any sound intellectual motive.

Singham (2000) notes that adherents of what he terms popular science "have no difficulty believing that there are extraphysical entities capable of violating the laws of science at will." This is true regardless of the specific religious beliefs of the individual; people with weak religious beliefs are just as prone to believe in the paranormal and supernatural as dogmatic Bible believers (Sparks, 2001). Indeed, my own observations of pseudoscience have convinced me that most Americans do not really believe in cause and effect; they see it as a

useful rule of thumb, but subject to frequent and unpredictable exceptions, and not as a fundamental organizing principle of the universe.

In many ways dogmatic Bible believers inhabit a parallel universe to that of science with its own bodies of evidence, observational data, and technical literature. Communication between parallel universes is possible, but only if there is a portal between them. For some believers, the portal leads only through the Bible and effective communication may not be possible, but more open-minded believers acknowledge a role for logic and observation, and communication with these believers is possible. Those who do not understand how dogmatic Bible believers think will not find the portal.

IMPLICATIONS FOR GEOSCIENCE EDUCATION

The mission of a geoscience educator confronted by dogmatic belief systems is not to convert students, but to increase the student's understanding and knowledge of science. Ideally, we would like to move the students to the point where they can reconcile the findings of science with their beliefs with as much integrity to both as possible. If reconciliation is not possible, we would like students to understand why science reasons and evaluates evidence as it does, and to see that the methods of science are neither arbitrary nor deliberately intended to deny or undermine religious belief. Finally, science competes with dogmatic belief systems for public support and the allegiance of noncommitted students, and we would like to neutralize as much as possible the appeal of anti-scientific and pseudoscientific beliefs.

The two premises of dogmatic belief systems that create the most friction with science are first, the idea that doctrine can take precedence over logic or empirical evidence, and second, the belief in miracles. In extreme cases, the first premise may preclude any meaningful communication between science and dogmatic believers. The second premise is really a corollary of the first, and the problem is the belief in miracles as *possible scientific phenomena*, as opposed to personal belief in the possibility of miracles. No amount of observing patterns in nature can disprove the occurrence of rare singularities; indeed, one can never discount the possibility that an alleged miracle might be a real but rarely observed natural phenomenon. We should recall that meteorite falls were once dismissed as rank superstition. We can never disprove the idea that the ideas of, say, Mohammed, were inspired supernaturally or that a seemingly fortuitous event might have been divinely triggered for some purpose. It is a waste of time to try and will only serve to reinforce the stereotype of science as anti-religious. If someone chooses to construe real observed phenomena as supernatural in whole or in part, as long as the observations themselves are not in question, that is an issue of

personal faith, not science. We are not the thought police or the Inquisition.

Although some scientists naively assume the best strategy is to strike at the root of the problem, an authoritarian statement that miracles are inherently unscientific sounds (and is) arrogant and arbitrary. There are sound reasons why science can never accept miracles as the final explanation for phenomena, and we should explain what they are. First, as noted above, we can never be sure a claimed miracle is not a real but rare natural event. The mere fact that an event is unexplained now is no proof it will never be explained. Also, accepting an event as a miracle forecloses the possibility of further investigation of it. Even if miracles in fact occur, science must always regard the events as unexplained, but potentially explainable in terms of natural laws.

As noted earlier, belief in arbitrary suspensions of physical laws is widespread in society regardless of the level of religious beliefs. These general pseudoscientific beliefs are every bit as much a threat to science as those of dogmatic believers. It will probably be more effective, and certainly seen as more impartial, to embed any discussion of miracles in a broader discussion of science and pseudoscience. A good discussion of why science believes in invariable physical laws can serve to blunt many pseudoscientific notions without making dogmatic believers think they are being singled out for special attack.

When it comes to alleged real events like the recent creation of the earth or the Deluge, the issue is not *can* miracles happen but *did those specific events happen as described?* Again, there are a host of non-religious catastrophist theories around, such as those of Immanuel Velikovsky (Goldsmith, 1977). I use a number of strategies in coping with these issues, starting with an exploration of uniformitarianism and catastrophism. I show illustrations of contemporary and ancient sedimentary structures to illustrate the concept "the present is the key to the past." I show illustrations of stromatolites and dessication cracks in a local rock unit and point out that this rock must have formed in a quiet tidal flat environment for however long it took to deposit 100 meters of dolostone, perhaps a million years at a centimeter per century. I also discuss the Channeled Scablands and show that this was a catastrophe by any reasonable interpretation of the word, neutralizing the misconception that geoscientists arbitrarily deny the occurrence of catastrophes. Finally, I use a "head 'em off at the pass" approach. If I am aware of a common argument, such as attacks on the reliability of radiometric dating, I address it in the context of a general question like "how can we be sure radiometric dating is reliable?" This approach anticipates possible objections before they occur while at the same time not singling any one group out for attack.

CONCLUSIONS

In popular stereotype, dogmatic believers cling arbitrarily to their beliefs like a security blanket and are closed minded and rigid. In reality, they consider their doctrines to be documented, objective facts, and proceed quite rationally from that premise, often displaying great ingenuity in critiquing opposing belief systems and devising alternative interpretations of data. They see their religious studies as legitimate intellectual inquiry, and they regard themselves as open-minded because they are willing to entertain a type of evidence that they believe their opponents arbitrarily reject. It is obvious that any approach that assumes the inherent superiority of scientific reasoning over religious faith is doomed to fail, and will be seen as arrogant and uninformed.

Dogmatism is a matter of degree, and individuals vary in their intellectual sophistication and their readiness to adapt belief to new evidence. Although there tends to be a fairly strong correlation between dogmatism and religious affiliation, one can find open-minded and intellectually honest people in extremely conservative denominations and very dogmatic individuals in otherwise liberal denominations. One can also find dogmatic and rigid, and for that matter pseudoscientific, non-believers as well. Avoiding stereotypes is of the utmost importance.

The developmental scheme of Perry (1968) envisions students progressing from simple black and white dualism through increasing tolerance of ambiguity, then finally to commitment to some set of values while appreciating that other value systems may be possible. It is obvious, then, that students at the low end of the scale may not be able to cope well with challenges to their ingrained values. Furthermore, some people may never progress beyond the low end of the scale. Orlich (2000) presents data suggesting that only a third of the adult population reason at the formal operational level (can use abstract reasoning with facility), and that fully 20 per cent are at the preoperational level (reason at a very minimal level). An important conclusion, then, is that we cannot win them all. A person who says "you will never convince me that man evolved from monkeys" is absolutely right; such a person does not even have an accurate concept of evolution to rebel against. Many people lack the intellectual sophistication to deal with ambiguity or alternative interpretations. Faced with a choice between believing in evolution or sticking with tried and true doctrines, they will stick with the tried and true. Others find the prospect of a total overhaul of their world-view too threatening or overwhelming to face. Yet others resent the authority of intellectual elites and see opposition to evolution as a means of striking back. Finally, some, like Kenneth Ham, regard the Bible as the

ultimate arbiter of truth and consider anything in conflict with it to be automatically in error.

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ABOUT THE AUTHOR

Steven Ian Dutch received his B.A. from the University of California at Berkeley in 1969 and his Ph.D. from Columbia University in 1976. He has been a long-time observer of pseudoscience and related issues, and the observations in this paper are the result of over twenty years of interactions with dogmatic Bible believers. His other research interests include the Precambrian of the Great Lakes region, impact phenomena, and computer applications in geoscience education.

“It’s (Intelligent Design) just more of the same. Namely we can’t explain this, so there must be some sentient being that’s put it in place. It’s just the same reason that the cave folks who saw lightning said, ‘Whoa! We don’t know where that came from. It must be the Gods throwing stuff at us.’”

Norman R. Pace
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