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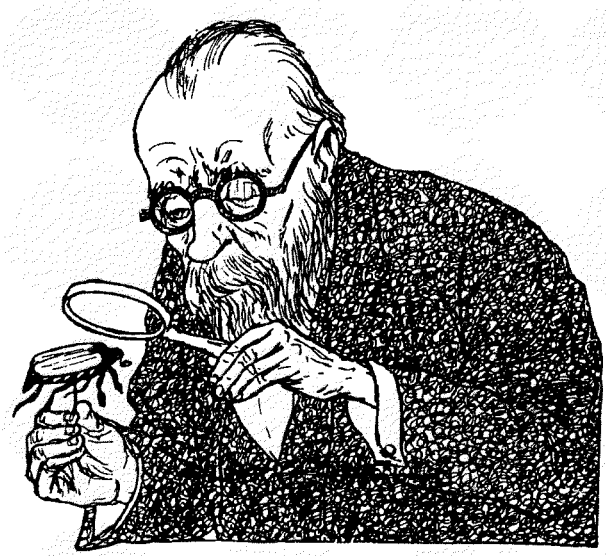

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SELF-CORRECTION CORNER

Two errors of fact occurred in my article, "Why Creationism Should Not Be Taught As Science: The Legal Issues," published in Issue I of *Creation/Evolution.*

On page 13 paragraph 3 it was stated that the "Tennessee law which John Scopes was charged with breaking" was declared unconstitutional. This is not so. John Scopes was convicted in Dayton, Tennessee, and fined $100, the usual fine for transporting liquor, which in this case seemed to be applied to transporting information. In June of the next year (1926) the case was appealed in the State Supreme Court. The judges were determined to clear up the issue and prevent a further appeal to the U. S. Supreme Court, so they, "having decided that the law was constitutional, nevertheless reversed the conviction on the ground that the fine had been improperly imposed by the judge," thereby implying that the law in question was simply not to be enforced. (Gail Kennedy, *Evolution and Religion.* New York: D. C. Heath, 1957, pp. 35-52.)

The second error occurred on page 19, next-to-last paragraph. There I stated that the sample resolutions appearing in the July-August 1975 and the May 1979 issues of *Acts & Facts* were used verbatim in Columbus, Ohio and Georgia. Popular newspaper accounts frequently declared this, but a careful comparison reveals no similarity in Ohio, or Georgia. The Florida bill, however, does show signs of strong influence, though it was drafted by another creationist organization, Citizens for Fairness in Education, in South Carolina. This same group was behind the Anderson, South Carolina resolution, which *did* take some sentences verbatim from ICR materials.

Fred Edwords

The Editors further regret an erroneous biographical note attached to Stanley L. Weinberg's article, "Reactions to Creationism in Iowa," in Issue II. Mr. Weinberg does not have a doctorate. Although he has taught in several colleges, his thirty years' teaching experience was mainly in the high schools. The errors occurred in the editorial office. Mr. Weinberg did not write or review the biographical note.

Phil Osmon

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CREATION/EVOLUTION III (Volume 2, Number 1)

THE BOMBARDIER BEETLE MYTH EXPLODED

by Christopher Gregory Weber

Dr. Duane T. Gish, assistant director of the Institute for Creation Research (ICR) has made some extravagant and unfounded claims about the bombardier beetle (genus Brachinus). This beetle defends itself by shooting boiling-hot fluids out its rear end at its attackers; Gish argues that no ordinary beetle could have slowly evolved into a bombardier beetle through any conceivable transitional forms because a transitional beetle with an incomplete mechanism would have either been burdened with a load of useless baggage, or else have blown itself to smithereens. In this article, we shall see how badly Gish has distorted the facts about this insect.

In his book *Dinosaurs: Those Terrible Lizards* (Creation-Life Publishers: San Diego, CA, 1977), Gish lays out his entire argument that transitional beetles are inconceivable. He describes how the bombardier beetle's explosive defense system is supposed to work, claiming to derive his information from the German entomologist Dr. Hermann Schildknecht. His argument is based on this description of the beetle's mechanism, and stands or falls with it:

> This scientist [Dr. Hermann Schildknecht] found out, first of all, that the bombardier beetle mixes up two kinds of chemicals—hydrogen peroxide and hydroquinone. Now the marvellous thing about this is, if you or I went into a chemistry laboratory and mixed up these two chemicals—*BOOM!* We would blow ourselves up.
>
> But not the bombardier beetle. He's too smart. When he mixes up these two chemicals he makes sure he adds another kind of chemical, called an inhibitor. The inhibitor somehow prevents the other two chemicals from blowing up. In other words, they just sit there together real peaceful like. The beetle then stores this liquid in two storage chambers, ready to be used when needed. . . .
>
> How does Mr. B. B. make the chemical solution explode just at the right time, in spite of the fact that it contains an inhibitor? Dr. Schildknecht found out just at the exact moment Mr. B. B. wants to

---

Chris Weber, one of the editors of this journal, is a computer programmer who has followed the creation/evolution controversy for over seven years. All the German translations in this article are his own.

> fire his two cannons, he squirts in an inti-inhibitor. The anti-inhibitor neutralizes (knocks out) the inhibitor, and the two chemicals (the hydrogen peroxide and the hydroquinone) can then react violently together and explode. (pp. 51-52)

Thus Gish is maintaining that the bombardier beetle juggles four chemicals in its defense mechanism. The hydrogen peroxide and hydroquinone spontaneously explode unless an inhibitor is added to prevent the explosion. The beetle fires off its defense mechanism by adding an anti-inhibitor to this mixture. Gish bases his entire argument on this inhibitor model. If any of the four chemicals, any of the organs, or the nervous system mechanism were missing in any of the transitional forms, then either the beetle would blow itself up, or else it would be lugging around a lot of useless baggage. Obviously, natural selection would not select for either one. At any rate, that's how Gish argues.

Actually, Dr. Gish totally misrepresents Dr. Schildknecht, who says absolutely nothing about an inhibitor. On the contrary, hydrogen peroxide and hydroquinone do not spontaneously blow up when mixed together; they just slowly turn brown as they oxidize. The only time they explode is when the beetle forces them to by adding two catalysts, a catalase to decompose the hydrogen peroxide, and a peroxidase to oxidize the hydroquinones and thereby break them down into the simpler quinones. Apparently Gish's translator does not read German very well. Drs. William Thwaites and Frank Awbrey of San Diego State University in California have even shown Gish there is no inhibitor and that the two explosive chemicals do not explode spontaneously. Yet despite this, Dr. Gish still continues to use this false argument.

Thwaites and Awbrey teach a two-model *Evolution vs. Creation* course at San Diego State. Leading creationists such as Dr. Gish present the creationist viewpoint during one session, and then Awbrey and Thwaites present the findings of empirical science during the following meeting. At one such rebuttal session in the spring of 1978, Thwaites gingerly mixed hydrogen peroxide and hydroquinone solutions together. The two professors took elaborate precautions to protect the class in case Dr. Gish's biochemistry turned out to be correct. The solutions only turned brown, failing to explode.

This is an easy experiment to duplicate. You can even try it at home, since hydroquinone can be purchased from your local photography shop (it's used for photographic developer), and hydrogen peroxide is available at your supermarket or drug store (it's used in women's hair coloring). This allows you to prove to your own satisfaction that hydrogen peroxide and hydroquinone do not spontaneously explode.

When Thwaites and Awbrey confronted Gish with this fact, he became flustered, and said that somehow the German word for "unstable" had been mistranslated as "explosive." When they asked him what his source was, he

replied that he had gotten his information from Hermann Schildknecht, Eleonore Maschwitz, and U. Maschwitz, "Die Explosionschemie der Bombardierkäfer (Coleoptera, Carabidae)," *Zeitschrift für Naturforschung*, Vol. 23 (1968), pp. 1213-1218. The purpose of this article is to study the nature of the catalysts that make the otherwise inert hydrogen peroxide and hydroquinone explode:

> During the "pop," the contents of the paired pygidial defense bladders of the bombardier beetle (hydrogen peroxide and hydroquinone) are squeezed in small portions into chitinous chambers, and there they are explosively transformed into oxygen, quinone, and water. This explosion-chamber reaction is catalyzed by enzymes, which are emptied as a dark brown 40-60% albumin solution out of one-celled annex-glands into the front chamber. [My own translation]

Thus Schildknecht is saying that the hydrogen peroxide and hydroquinone do not explode until the enzymes make them do so, and mentions nothing about any inhibitor. Let us see in more detail what Schildknecht has to say on the beetle's explosion mechanism.

Schildknecht's diagram of the insect's defense organs shows that there are two chambers, the larger inner chamber (called the "reservoir" by Eisner and the "collection bladder" by Schildknecht) empties into the smaller outer one (called the "vestibule" by Eisner and the "explosion chamber" by Schildknecht), which in turn empties into the outside world through an opening near the anus. There are two sets of these organs, one on either side of the anus. The collection bladder collects hydrogen peroxide and hydroquinone, which just sit there without exploding. The explosion chamber collects a brown gooey mixture of enzymes. This chamber has a thick chitin wall with numerous little holes in it through which single-celled glands secrete and deposit the enzymes into the chamber. When the insect becomes excited, a muscle opens up a little door on a hinge. Through this opening the two chemicals are forced into the explosion chamber, where the enzymes make them explode out of the insect's derrière as oxygen, quinone, and water. (The door opens *into* the explosion chamber so that the explosion will force the door shut and not injure the collection bladder. Schildknecht explains the chemistry of this reaction clearly:

> Not only did the results of our earlier work on the defense system of the bombardier beetle give the surprising result that this beetle manufactures a 25% solution of hydrogen peroxide and a 10% solution of hydroquinone, but we can now also show that the enzyme that sparks off these chemicals is also stored in an extraordinarily high concentration. In the explosion chamber a 40-60% albumin

> solution is stored which consists of one third peroxidase and two thirds catalase. We are concerned here with the secretion of the annex-glands which empty into the front chamber of the pygidial bladder, an extension of the anus.

Gish was made aware of all this in the spring of 1978. Even though he continued to insist that this insect could not have evolved and that it has some kind of inhibitor to keep the two chemicals from oxidizing, he reluctantly admitted that hydrogen peroxide and hydroquinone do not spontaneously explode when mixed, and that Schildknecht has nothing to say about any inhibitor.

Nevertheless, Gish still continues to use his old description in his debates. For instance, on January 17, 1980, in a debate with Dr. John W. Patterson at Graceland College, Lamoni, Iowa, Gish said:

> The bombardier beetle is a remarkable little creature that has this explosive mechanism. He stores two chemicals in a storage chamber, and he puts in an inhibitor to keep it from exploding or decomposing. He squirts it in the combustion tube, and then he adds an anti-inhibitor, and there all the enzymes there [sic]—and boom! An explosion goes off right in the face of his enemy. Beautifully timed! Beautiful mechanism! You have to have thick storage chambers, you have to have the two chemicals, you have to have an inhibitor, you have to have an anti-inhibitor, you've got to have those combustion tubes, you have to have the communication network *all present and functioning*, just as you have to have every part on the rockets to go to the moon present and functioning. How are you going to explain *that* step-by-step by evolution by natural selection? It cannot be done!

Gish already knew better. Why would he repeat an old error? If he is this unreliable in areas where we can check up on him, then how can we trust him in areas where we cannot? But even if his facts were beyond reproach, we would still have difficulty taking him seriously because he brings up the bombardier beetle to help prove that fire-breathing dragons may have actually existed. In the very book in which he describes the bombardier beetle (*Dinosaurs: Those Terrible Lizards*), he argues that old legends, Job 41:18-21, and the bombardier beetle all suggest that the unique crests on the heads of some duck-billed dinosaurs were the chemical storage tanks for their flame-throwing mechanisms. These dinosaurs were thus the fire-breathing dragons of myth and legend! Need I say more?

Although the main purpose of this article is to show that Gish's description cannot be trusted, we should take a little time to see how the bombardier beetle's defense mechanism could have gradually evolved. There's no problem explaining where the hydroquinone and the hydrogen peroxide came from. As

Thomas Eisner shows in his article "Chemical Defense Against Predation in Arthropods" (*Chemical Ecology*, 1970, pp. 157-215), hydrogen peroxide is a normal metabolic byproduct in insects, and various quinones are used to harden (or "sclerotinize") the cuticle of insects. All kinds of insects therefore secrete these chemicals. As a byproduct, hydroquinone tastes bad to predators and is the chemical that makes stink bugs stink. So, if an insects's cuticle became indented, forming little sacs to store some of this hydroquinone, it would have an advantage over its fellows even if its storage mechanism was not yet very efficient.

Schildknecht himself points out that the carabid family of beetles has little sacs like this. They have glands that exude enzymes into pygidial bladders that empty into the anus, even though these don't explode. So, even though the bombardier beetle is the only carabid beetle to shoot boiling liquid at its enemies, the other carabid beetles, living in different ecological niches, survive very well because, with their thick-walled little sacs, they can poison their enemies but not themselves.

Therefore, all the pre-bombardier beetle had to do was direct some of that hydrogen peroxide into its collection bladder, develop a little valve between the collection bladder and vestibule chamber, and finally supply the catalase and peroxidase in the vestibule. The hydrogen peroxide would make the insect more poisonous to eat than it was before. A muscle that pulled the duct between the two chambers open, and relaxed to let it close, would help the beetle be more selective about its poison discharges. Even if this valve structure was crude at first, it would have survival value until the side of the duct attached to the muscle could evolve into a little door. The enzymes would be useful the moment they appeared. Even if the beetle's new firing mechanism could not be aimed all that well or if the chemicals were not being secreted in the best proportions at first, the mechanism would still be useful from the start, and the beetle could refine it in time.

So, when Gish says, "How are you going to explain *that* step-by-step by evolution by natural selection? It cannot be done!" he is merely admitting that he has little ability in problem solving.

WHY CREATIONISM SHOULD NOT BE TAUGHT AS SCIENCE

by Frederick Edwords

PART 2. The Educational Issues

One can ask a number of questions about creationism: Is it a religion? Is it scientific? Is it legal to teach it in the public schools? Would it be practical to include it in the science curriculum?

This article deals with the last of these questions, looking at the educational consequences of creation teachings being given "equal time" in public school science. The legal, scientific, and, especially, religious issues are not ignored, however, for they have a direct effect on this very pragmatic issue of insuring an adequate education for public school students.

The Importance of Religion

Religions play a significant role in our society, particularly those relying on the Judeo-Christian Bible. Furthermore, those faiths promoting various literal interpretations of that book are becoming among the most vocal in the nation.

To neglect this fact in the public school curriculum, to give religion no place whatever, would imply either a myopic or anti-religious outlook. Therefore it is only reasonable that religion, the Bible, and, yes, even Special Creation, should have its place in the education of our youth.

This idea was well expressed by Jerry Bergman in the February, 1980 *Acts & Facts*, published by the Institute for Creation Research. He wrote, "The very fact that we usually do not mention religion or religious issues means that we are teaching very definite ideas about religion, especially that religion is not important. . . . To say that the schools can teach the entire world of knowledge but must exclude religion is censorship of the worst sort. . . . There is no academic freedom where every area of knowledge can be taught except one . . ."

Dr. Bergman then went on to add, "If schools are to be a place where students can debate important questions, it would seem that eliminating religious questions would shelter students from an important area of debate which is crucial for living a well-rounded life."

Fred Edwords has lectured and debated widely on the creation/evolution question, has designed a two-model slide show on the subject, is Editor of this journal, and is Administrator of the American Humanist Association.

It is refreshing to see such a liberal (dare I say humanistic?) idea appear in one of the most radical creationist journals of wide circulation. Dr. Bergman seems to be advocating classes in comparative religion, comparative anthropology, comparative sociology, or their like. So am I.

A Category Mistake

Since religious liberals and conservatives both agree that comparative religion belongs in the public schools, where is the point of contention? It is simply this: Creationists, including Dr. Bergman, would like to see religion, at least in the form of Special Creation, brought into the *science* classroom. And though some creationists have attempted to demonstrate that "scientific" creationism is not religious, Dr. Bergman apparently has not. In the aforementioned article he wrote, "Religion is a belief structure, and *all* fields of knowledge are based on belief structures, even though some fields of knowledge include more empirical content than others." This would seem to mean he thinks any religious implications should be forthrightly discussed in *every* subject area.

Certainly Christian Heritage College (a division of which is the Institute for Creation Research) does this. There isn't one course of study offered where the Bible isn't a textbook, a point the college boasts of in its catalog (Christian Heritage Courier, 1979).

But is this effort to religify every subject, from physical education to wood shop, practical for the *public* schools? Not unless our idea of practical includes pinpointing the religious differences between students so they can form their battle lines and create campus strife.

And there is an interesting contradiction here, too. If Bergman is trying to deny that a line can be drawn between the sacred and secular in education, we must ask if he is using the Constitution to support this. Most creationists cite the Constitution for their own ends. But the very Constitution cited draws just the sort of line between sacred and secular that Bergman seems to deny!

It would make more sense, then, to keep separate studies separate. Religion, including various creation stories, should be taught in a suitable context of its own and not miscategorized in the science curriculum. And within that context, each creation myth and each philosophy of origins should get equal time with the others. This would successfully meet the creationist demand for equal time on *religious* grounds, and ought to end that part of the battle.

Theories of Education

But what about the demand for equal time on *scientific* grounds? Assuming, for the sake of argument, that creationism is non-religious, that it attempts to offer evidence in support of its conclusions, and that it is a competing theory to evolution, shouldn't it be heard?

How one answers this question is determined by how one views education. If the purpose of the public schools is to be a forum for every possible scientific and non-scientific theory, if the job of teachers is to merely *expose* students to the various trends in our society, and various fringe theories, then creationism definitely has a place in the science curriculum. But this implies there is no such thing as knowledge, or at least there are no reliable experts who can be depended on to tell us any facts. After all, if the student is left to sort truth from falsehood, fact from fallacy, then there must be nothing the teachers feel confident enough about to forthrightly *teach*. If schools are to be debating societies, then the administration must take a totally non-committal position on what is true, and merely give equal time to all competing *opinions*. This would be an exercise of radical skepticism — or insecurity.

On the other hand, if education, in large part, amounts to passing on the discovered knowledge of one generation to the next, and if there is such a thing we can label as "knowledge," and if we accept there are some people who have more of this knowledge in certain areas than other people, then creationism could *not* be included. This is because, at present, the consensus of knowledgeable scientists in the fields related to evolution maintains there is simply no serious ground for holding creationism to be true. The evidence creationism is based upon has been found insufficient.

Now, parents have a right to choose, through the ballot box, the sort of public education they want for their children, the quality of school officials they will support in office. But, if they accept the "back to basics" model of education, if they want their children learning facts and not merely toying with opinions, then there is no ground for them approving "equal time" for creationism in the science curriculum.

This is a bitter pill to take for many. They see "equal time" as something American as apple pie. And it is, around election time. But education which imparts factual knowledge is not a political campaign, it is a learning experience. And truth is not determined by majority vote, but by the merits of the case.

Creationists, however, have two ready answers to this point. They either claim creationism is being discriminated against in the scientific community and so is not given a fighting chance to get its voice heard (evolutionists are narrow-minded bigots), or they charge that evolution is actually *not* accepted as much as people think (it is a "club secret" among scientists that evolution is bankrupt).

To answer these charges will require a separate article on the science issues. Suffice it to say here that this is the same tactic used by most all the pseudo-scientific charlatans in the business. If their views are rejected, usually because of poor evidence, they shout "conspiracy" and go directly to the public. It is an easy thing to reject standards when one's theory doesn't measure up. It is an easy step to take the *political* route when one's theory isn't hearty enough to make it over the rocky road of science.

So, in the context of a basic education system that recognizes the existence of knowledge and a body of professionals who have a consensus on some subjects, the introduction of "scientific creationism" into the science classroom would only open a can-of-worms. Soon every crackpot theory that had adherents enough to start a lobby would have to be included. Here's a probable list:

1. Astrology would be granted equal time with astronomy.
2. Pyramid power would be matched side-by-side with modern physics.
3. Divining rod technology would be taken seriously for the benefit of future oil geologists and hydraulic engineers.
4. The toxemia theory and Christian Science "negative thinking" theory of disease would get equal time with the germ theory.
5. The flat earth theory would get equal mention with the space program.

It would be easy to go on, but let's stop and detail this last one just to show how serious the issue really is and how similar the demands of these other theorists might be to those of the creationists.

Leveling with the Geographers

Charles K. Johnson is president of the International Flat Earth Research Society, an organization of 1500 members, *many of whom are doctors, lawyers, and other professional and educated people.* He holds that scientific evidence supports the flat earth hypothesis, and, like creationists, appeals to "well known" and "easily observable" facts. One sample bit of observable evidence for his position is the flatness of water. Anyone can see that water is flat. Therefore, if you expand on what you see right in front of you, the only possible conclusion is a flat earth! *Experimental* evidence for this disc shaped plane also abounds. For example, when Columbus sailed to America (and Columbus is one of the heros of the flat-earthers), he didn't fall off like his men thought he would. This is because the earth is not a globe. Johnson's wife, Marjory, comes from Australia, and Johnson declares, "She's sworn out an affidavit that she never hung by her feet in Australia. She sailed a ship over here, and she did not get on it upside down and she did not sail straight up. She sailed straight across the ocean. We consider that a very important proof that the world is flat."

To further complicate matters, Johnson sees the flat earth idea as a religious issue too. No doubt he can quote chapter and verse to show that the Bible, properly understood, supports his position. "The Bible is a great tangle of history and corruption and so forth," he says, "but the aim of it all is a one-world, flat-Earth society, for honesty and decency and that sort of thing." Certainly his view could be mentioned in comparative religion.

Although Johnson isn't hard at work lobbying or fighting court cases, he has gotten his view heard in the public schools. For example, he addressed students at Beverly Hills High School on at least one occasion, and with the continuing

good press he is getting he is likely to have other opportunities. NBC and the *National Enquirer*, not to mention local radio talk shows and newspapers all over the country have given his Society coverage.

The reason why so many believe the world is a globe, Johnson notes, is because science is promoting "a fraud to keep the common people in the dark." The Apollo moon program was just a movie. "Arthur C. Clarke wrote it and directed it. But he knows the Earth is flat." It seems the only redeeming feature of the globular theory is that it provides jobs.

To get the truth out, Johnson publishes the *Flat Earth Quarterly* "with the objective to restore the world's sanity." "We consider this the world's most superstitious age," Johnson states. "We try to get people to use their minds logically." (Schadewald, 1977; Ashland Tidings, 1978.)

Theories of Origins

Obviously, the creationists don't have the only alternate science in town. But let's narrow our focus a bit and concentrate on just the teaching of scientific hypotheses about *origins*. Here the creationists maintain there are only two basic views: creation and evolution. Because many would disagree, let's list some of the other possibilities:

1. Sudden appearance of chaos from nothing, and out of chaos come the gods who create man and the animals. (Hesiod's *Theogony* is an example of this.)
2. Sudden appearance of something superior which is now in a state of decline.
3. Gradual growth of something inferior into a state of perfection.
4. Cyclical fluctuation between perfection and imperfection.
5. An eternal and unchanging universe in which all apparent changes are only local and minor.

When faced with a list like this, creationists attempt to label everything listed as being evolutionary in some way, usually noting that all have some sort of gradual change present. The same criterion, though, would place Special Creation in the evolution pile as well. This is because Special Creation is like number 2, particularly in how the theory requires a declining cosmos in its interpretation of the second law of thermodynamics.

Nonetheless, whenever the point is raised that there are other theories of origins, and particularly other *Biblically based* theories, the creationists disagree. They regard the various efforts to "harmonize science with scripture" as acts of surrender. It is their position that the harmonizing theories say nothing *scientifically* different from modern evolution. That is, they make no unique predictions and appeal to no unique evidence; they are simply efforts to fit the Bible into the theories of modern science. For this reason, Special Creationists refuse to

call these theories *creation* theories at all (there is only one *true* creation theory). Dr. Duane Gish of the Institute for Creation Research made this plain in a debate on the religious issues with Dr. Jerry Albert in 1977, when he said, "We can drop this term 'Special Creationist' and 'Theistic Evolutionist.' You are either a creationist or you are an evolutionist, you can't be both."

That Dr. Gish's way of viewing these theories is inaccurate can be shown if we approach each Bible based theory in its turn.

Alternate Views from Genesis

The Day-Age Theory: This is the position that each "day" of creation in the Genesis account actually represents a "long period" rather than a typical 24-hour solar cycle. Some denominations give specific lengths of time to these periods, quoting II Peter, 3:8, which says ". . . one day is with the Lord as a thousand years, and a thousand years as one day." However, most Day-Age theorists prefer to be less specific and allow for millions of years.

What makes this theory unique is its predictions regarding the fossil record. To be verified, it would only have to be shown there was evidence in the rocks of six separate creation epochs, coinciding with the events of each of the six days of scripture. This means six separate and distinct creations (which may or may not have been followed by subsequent evolutions).

It is clear this theory does *not* harmonize with evolutionary geology. This is so because it requires a different order of events than evolutionists posit. Even creationist Henry Morris sees this. On pages 56 to 62 of *Biblical Cosmology and Modern Science*, he lists 25 discrepancies between Genesis and the evolutionary sequences. So serious is this problem, it has caused Day-Age Biblical theorist Davis A. Young to propose that the "days" of Genesis actually overlap each other. "If such overlap exists, then all apparent discrepancies between Genesis 1 and science would fall away." (Young, 1977.)

The Day-Age theory also does not harmonize with creationist geology. This is because it doesn't require that most all the fossils be laid down in a single year of world-wide flooding. Therefore, in the light of all this evidence, it appears the Day-Age theory is indeed a unique hypothesis deserving as much public school time as does Special Creation.

The Gap Theory: This is the position that there is a gap between the first and second verses of Genesis. The result is two distinct creations. The first creation involved all the now extinct life forms, like the dinosaurs, and the second, occuring in six solar days six thousand years ago, involved all the life forms we see today. Since the prehistoric animals were destroyed in a catastrophe other than Noah's Flood, flood geology is not as important in this model as it is in Special Creation. However, since they were not destroyed by the normal processes of change and gradual extinction, evolutionary theory plays an even

smaller part. This makes the Gap Theory unique. And the fact that it has *two* creations, rather than the *six* of the Day-Age Theory, proves it even more distinctive. It predicts that no fossil animals should be found this side of the second creation of six thousand years ago unless there is evidence that such animals were separately *re*-created.

Special Creationists don't like this theory because it accepts the idea of an old earth. However, like Special Creation, it accepts fixity of species and uses the standard creationist arguments to prove organic evolution is "impossible." Its flood model differs scientifically in one major respect from that of Special Creation. That is, it claims only "modern" animals died in the deluge.

Adherents of this unique viewpoint include the Jehovah's Witnesses and Armstrong's Worldwide Church of God, both being religions that claim to be truly literal in their interpretation of scripture, and both being strong propagandizers against evolution and for creation. If Special Creationists get equal time, so should these people.

Progressive Creation: This is the theory that God continually creates new things. There is no evolution. The evidence creationists constantly cite about gaps in the fossil record actually supports this theory better than it does that of Special Creation. This is because unexplained gaps seem to point to the Creator intervening in each gap, not to a one-shot recent creation. In fact, this theory can accommodate the existence of the geological column much better than can Special Creation (which depends on a turbulent flood to stack up the strata so nicely). Frequent evidences of catastrophism over time are another support for this theory which runs against the grain of the Special Creationists' singular catastrophic flood. But this also puts it out of step with evolution, which rejects the notion that catastrophies coincide with every gap, and that all gaps are unexplainable without divine intervention.

So, both Special Creation and Progressive Creation interpret the scientific evidence differently from each other and from evolution. Furthermore, both religious models also differ in theology. This can only mean that Progressive Creation, too, must be heard in any discussion of origins which introduces alternate models.

An Old Earth

The "compromise with evolution" these theories really seem to make is the acceptance of a very old earth; nothing more. Is this grounds for the ICR creationists to take adherents of these theories to task? Not at all, because ICR creationists have, on other occasions, shown apparent tolerance for these viewpoints, indicating they are "open" to this old earth option.

In particular, the narration that goes with slide 48 of *Creation and Evolution: A Comparison of Two Scientific Models* (an audio-visual aid for public

schools put out by ICR), declares: "The creation model does not require an immensity of time. The Creator could have accomplished creation in six days, six billion years, or instantaneously. A young age for the earth and a recent creation are thus options open for consideration by creationists, who are not committed to evolutionary uniformitarian geology."

This seems to imply that evolutionists are dogmatic, but creationists are flexible and able to consider more than one option. Do they mean it? Is this why they rarely debate the age of the earth, but prefer to ignore that point and get on to other things? Or is this deceptive?

If they are open, they shouldn't criticize "theistic evolutionists," who are also open and offering an option. But if their model *requires* a young earth, they should always say so, and slide 48 shouldn't say what it does. One thing is clear, however. They can't have it both ways in the public schools. They can't be "open" to "options" and still dogmatically declare there are only two possibilities. They can't throw "theistic evolutionists" in the evolution category simply because these people are willing to accept an old earth.

But Dr. Morris, the Director of ICR, seems to settle this question on page 71 of *Biblical Cosmology and Modern Science* when he vigorously proclaims, "It is high time that Christians face the fact that the so-called geologic ages are essentially synonymous with the evolutionary theory of origins. That latter in turn is, at its ultimate roots, the anti-God conspiracy of Satan himself!" (Morris, 1970.)

This quote, however, is ten years old. To be fair, what has he said lately? Well, in a cover letter to the March, 1980 *Acts & Facts*, Morris writes:

> One of the greatest obstacles to the return of real creation teaching in our nation is the indifference of so many Christian people to the issue. They often justify this attitude on the basis of their assumption that people can believe in theistic evolution (or progressive creation) and still believe in the Bible. They feel that the evolutionary ages of geology can somehow be accommodated in Genesis, by means (usually) of the "local flood" interpretation of the Noahic Deluge and the "day/age" interpretation of God's week of creation.
>
> That honest and consistent Biblical exegesis excludes this interpretation is clearly demonstrated in . . . the enclosed March issue of *Acts and Facts*. I hope this study will encourage large numbers of sincere Christians everywhere to take a more forthright, Scripture-honoring stand on true creationism.

In analyzing this general creationist attitude Dr. Richard Haas, in a statement signed by six other biologists at Fresno State College in 1972, hit the nail right on the head. He wrote: "It seems clear that the attempted inclusion of creationism stems from individuals convinced that not only is creationism a

viable alternative doctrine equivalent in scientific validity to the concept of organic evolution, but implicit in the requirement is the assumption that the Judeo-Christian fundamentalist approach is the sole such alternative. . . . It seems clear to us that this requirement reflects an arrogance that supposes that Judeo-Christian tradition is the sole valid framework within which one answers questions of ultimate cause while the myriad of other theological systems adhered to by men past and contemporary are not worthy of consideration. This is clear, for, if it were not the assumption, obviously any teacher would be obliged to consider all alternative creationist doctrines, a task that would occupy all his time." (Haas, 1972.)

Alternate Religious Views

But it doesn't stop there. Other religions have theories of origins which *also* make scientifically testable predictions. Let's look at a few of these:

The Hare Krishnas are creationists of a sort. They have their own creation research group, called the Bhaktivedanta Institute, which sends out periodic blasts at evolution and gives arguments in support of their theory of "production." As Jnana Dasa (1979) in *Back to Godhead* magazine explains it, "This theory proposes that biological forms do not arise from the spontaneous self-organization of matter, but rather under the direction of a superior intelligence. Furthermore, it suggests that life and consciousness are not material phenomena, the results of physiochemical reactions. Instead, they result from a distinct, irreducible, nonphysical principle or entity, which is present within the material body during an individual's lifetime, and whose departure from the body leads to the change called death." This nonphysical entity, the "Supersoul," is indestructible and eternal, a "particle of spiritual energy" that has neither birth nor death, but simply passes from physical body to physical body in a process of reincarnation.

Some of the evidence used to support this view is much the same as the negative evidence Special Creationists use against evolution. Krishnas talk about probability, "living fossils," lack of transitional forms, lack of *conceivable* transitional forms, necessity of design and intelligence in nature, and the inability of scientists to turn matter into consciousness.

On the positive side, however, are appeals to quantum physics. Here the Krishnas are looking for consciousness amid the subatomic particles, as are authors Fritjof Capra (*The Tao of Physics*) and Gary Zukav (*The Dancing Wu Li Masters*). They bring the evidence of modern physics into play in order to demonstrate their agreement with British astronomer Sir Arthur Eddington, who declared "the stuff of the world is mind-stuff."

The Krishnas, after satisfying themselves that "the nonexistence of inter-

mediate biological forms implies some kind of absolute information or guidance that transcends the categories of ordinary science," go on to propose how contact with this "transcendental source" can be made. The avenue "consists of an elaborate scientific method for establishing a personal relationship with the Supreme. This method, called *bhakti-yoga*, is quite similar to modern science, in that it depends on clearly specified procedures leading to reproducible results. It is experimentally verifiable, for it is based on direct personal experience attainable by anyone who carries out the procedures correctly." (Thompson, 1979.)

Whether most scientists would find this approach scientific is not to the point. Obviously the Krishnas and other mystics think it is, and therefore would probably want it seriously considered in the science curriculum.

A similar position is held by Scientology, giving mysticism even more clout. Scientologists reject evolution as a view that "promotes man as nothing but an animal evolved from mud." But they also reject traditional Christianity, saying, "Man does not *have* a spirit — he *is* a spirit." (Rev. Wolery, 1977.)

Buddhism presents an interesting paradox because it is an eastern religion which easily accepts biological evolution. This is because Buddhists reject the notion of an immaterial soul and tend in many ways to be materialists. Most Buddhist sects also reject notions of God. Yet the discoveries in modern physics interest them as much as they interest the Krishnas, though they might put somewhat different interpretations on them. The main cause of life, they maintain, is desire, and this could conceivably be understood in some physical, and hence testable, way.

The Mormons have a special problem all their own. In addition to being Day-Age theorists (God lives on the planet Kolob which rotates on its axis once for every thousand years of earth time, hence a day to God is a thousand years to us), Mormons are also rejectors of *ex nihilo* creation. Joseph Smith made it plain in the King Follett sermon when he said, "Now, the word create came from the word *baurau*, which does not mean to create out of nothing; it means to *organize*; the same as a man would organize materials and build a ship. Hence we infer that *God had materials to organize the world out of chaos* — choate matter, which is element, and in which dwells all the glory." (Swyhart, 1976.)

This view might also require equal time in science classrooms. Why? Because House Bill 690 of the Georgia State Legislature defined "scientific creationism" as ". . . the belief, based upon scientific principle, that there was a time in the past when all matter, energy, and life, and their processes and relationships were created ex nihilo and fixed by creative and intelligent design." If other bills attempt to do the same thing, then the Mormon position will have to be viewed as a specie of evolution, a view Mormons surely will not tolerate. (They are among the leaders in the effort to get creationism into the public schools.) Therefore, creation from nothing and from something will both have to be considered.

Other Classroom Subjects

So far we have only been dealing with the science curriculum. Yet the issue goes far beyond that. In 1976, Creation Life Publishers put out a creationist school history textbook. One of the authors, Mary Stanton, wrote in the March 1977 *Acts & Facts* that *teleology*, or God's guiding purpose, must be included in history studies. She sees history and the Bible as "two of God's media for revelation."

An advertisement for this Public School text, which is called *Streams of Civilization*, says the book offers: "Sound Christian teaching of history. The great men of the scriptures take their rightful places. Presents Noah and the flood as historical fact. Shows Jesus as more than just a man." (Institute for Creation Research, 1976.)

Yet, as if this weren't enough, Stanton opens up the biggest can-of-worms of all by pointing an accusing finger at historians who "continue to make Rome the first center of the Church," and who "give credit to Rome for establishing the solid foundation of Christianity and for spreading the Gospel during the first centuries after Pentecost." (Stanton, 1977.) Her book, of course, changes the emphasis to the Byzantines, a fact that will guarantee a counter equal-time demand by Roman Catholics.

What may be good religion to the protestant fundamentalist is clearly not good secular history for public schools in a pluralistic society.

The Creation Explanation by Robert Kofahl and Kelly Segraves is another creationist book that talks about history. Although this volume isn't intended for public school use, and although it is primarily about science, it does illustrate the creationist position on historical matters. On page 116 it speaks about the origin of human language in this wise:

"Scientific data from the languages of many tribal peoples reveal form as highly developed and structured as our own. This suggests that while language has obviously changed with time, it has not necessarily been evolving upward from primitive simple language. The biblical view is that man has had complex language from the beginning of the race."

On pages 117 and 118 the book goes on to challenge the idea of cultural evolution. In typical creationist fashion, "authorities" are quoted to show the impossibility of early man developing from the hunting and gathering stage through the agricultural village stage to city-state civilizations. "In other words, the factual evidence for the evolutionary transition has not been discovered. That it took place is, therefore, a matter of faith, not historical evidence." To the creationist, civilization springs full blown on the scene from almost nowhere, leaving the Ark as the only possible explanation.

As creationists begin demanding a two model curriculum in *history*, as well as science, two novel alternate views of history immediately come to mind:

1. Erich Von Daniken has gained fame, and wealth, for his "Chariots of the Gods" theory. In his view, "ancient astronauts" from other worlds were the source of most human societies and were instrumental in their development. Another author, physicist Dr. Irwin Ginsburgh, goes even further and maintains that Adam and Eve were astronauts who landed on earth 6,000 years ago. In his book, *First, Man. Then Adam!*, Dr. Ginsburgh maintains that the coming of Adam and Eve from another world pulled man out of the stone age. Interbreeding between humans and these "astronauts" answers the age old question: "Where did Adam's sons find wives?" (McCandlish, 1979.) Should this get equal time?

2. Dr. Maxine Asher rejects Van Daniken's hypothesis in favor of her own view that early civilizations sprang up from the remains left by the sinking of Atlantis 92,500 years ago. This idea could easily appeal to the same historical evidence Kofahl and Segraves cite in *The Creation Explanation.* In the view of Asher and other Atlantis searchers, modern civilization has not yet caught up to the level that was present on Atlantis in its heyday.

We could go on and branch out into still other subjects of study. Then it would be necessary to have psychology students learning exorcism and spell casting. Law students would have to get all the details on trial by ordeal and how to apply the water treatment for the detection of witches. And, of course, let us not forget the stork theory of human reproduction as a requirement in sex education.

When Bette Chambers, president emeritus of the American Humanist Association, was asked in a recent TV interview why she would not favor teaching creation and evolution side-by-side, she replied, "Because creationism is religion and evolution is science. It's mixing apples and oranges and coming up with fruit salad." Of course we can see now how the introduction of creationism will lead to a fruitier salad than most people suspect, one that will have the schools teaching everything from primeval soup to nuts.

Startling Views of Creation Scientists

At this point, some people will sneer incredulously, "All that wierd occult stuff isn't factual knowledge. There's no chance it will get into the school curriculum. Who are you trying to kid with this alarmist scare tactic?"

But there is no kidding going on when one realizes that most of this material can already be found in most *high school libraries*, and when one sees that Transcendental Meditation, astrology, psychic phenomena, and UFO research have already been taught in some schools. These ideas are all around us, students are thinking about them, as are their parents. It is thus an easy thing for such subjects to find their way into the regular curriculum unless a decided effort is

made to confine them to the library and possibly to classes in social science.

But even if we stick our heads in the sand and imagine such problems don't exist, that such studies have no chance in the public schools, we must still face up to the "wierd" teachings of the creationists themselves! None of the fringe ideas previously mentioned can hold a candle to creationist astronomy. The proof is in the reading.

On pages 66 and 67 of *Remarkable Birth of Planet Earth*, Dr. Henry Morris offers his explanation for the existence of certain astronomical oddities — "the fractures and scars on the moon and Mars, the shattered remnants of an erstwhile planet that became the asteroids, the peculiar rings of Saturn, the meteorite swarms . . . reflect some kind of heavenly catastrophe associated either with Satan's primeval rebellion or his continuing battle against Michael and his angels."

He adds . . .

"Angels, both good and bad, can be shown Biblically to have considerable knowledge and power over *natural processes* and, thus can in many cases either cause or prevent *physical catastrophes on earth and in the heavens.* In any event, this type of cause *warrants further research* as a potential explanation for apparent disturbances in the stars and planets since their creation." (Emphasis added.)

Dr. Morris says objects in our solar system would behave oddly due to these star wars, "in view of the heavy concentration of angels, both good and evil, around the planet Earth."

Morris even suggests that *astrology is true* due to "evil spirits" who live on the stars and use their demonic forces against the earth. However, outside these angels and devils, Morris doesn't believe in extraterrestrial life. He explains it in this wise on page 63:

"This possible association of angels with the stars, incidentally, is the *only* suggestion that Scripture makes concerning intelligent life on other worlds. There are definitely no men, or man-like intelligences, living on other planets or stars . . ." Perhaps this is why creationists often feel the space program is a waste of time.

Now, will creationism require equal time for *this* in astronomy and science courses? Must we keep our telescopic eyes peeled for Michael and his angels? And must we teach anti-science in the science classroom, inculcating apathy toward the space program and other scientific research that goes against the grain of creationists?

Yes we must. And we will also have to consider Dr. Duane Gish's position that certain dinosaurs breathed fire. And, since dinosaurs lived at the same time as man according to creationism, this accounts for the dragon legends that are mentioned in the mythologies of various world peoples (Gish, 1977).

One could list a whole catalogue of creationist oddities or "wierd ideas,"

ones that put pyramid power and the Loch Ness monster to shame! (Oops, I forgot. Creationists believe in the Loch Ness monster too. The proof is in the 1979 Films for Christ production called *The Great Dinosaur Mystery*.)

A Matter of Academic Freedom

In our day and age, classroom time in the sciences is at a premium, particularly in the secondary schools where the entire field must be covered in one junior or senior high school year. With so much to teach, there is simply no room for side-issues, controversies scientists don't take seriously, wild new proposals, and the like. The student has his or her hands full just mastering the basic material. Can you imagine losing *half* the time in two-model education? Can you imagine losing much *more* in the necessary *multi*-model education that would include astrology, Atlantis, the human aura, and the creation story of the Hopi Indians? So much time would be robbed placating these various pseudo-scientific and religious groups that little time would remain for providing the learning necessary for students who wish to pursue careers in science.

The basic question is, should generally rejected theories about science get equal time with established positions which have the weight of evidence behind them and the consensus (or near unanimity) of scientists? Put another way, should *any* unestablished generally unaccepted theory get equal time with theories that had to go through the long process of proof and production of evidence?

Creationists argue that giving their view equal time is just "fair play." But the idea of applying a "fairness doctrine" to science education reveals a lack of understanding of what science is about. Science doesn't work on "fairness" but on *merit*. The position that has the best evidence, has withstood a long barrage of criticism, has been modified in the face of new data and is in harmony with it, and has the most support from knowledgeable workers in the field is the theory that should be given the emphasis in education. Any other approach would imply that science is simply a matter of capricious opinion, and that one theory is just as good as another. This may be true in religion, where the ideas cannot be verified, but science is quite another matter. This is why science can neither be treated on a "fairness" system nor mixed with religion.

Furthermore, it is contrary to the idea of academic freedom to attempt to mandate one minority group's ideas of "fairness" in the public schools. In some of the proposed "two-model" legislative bills, teachers not conforming to the creationist idea of fairness could expect fines or loss of jobs. But the teaching of evolution is not similarly required or enforced. As Mayer (1978) argues, "It is a feature of academic freedom that the content of a discipline is not prescribed by law."

But, as with their approach to science, the creationists have an alternate

view on academic freedom too. To them, academic freedom means telling teachers what to do, where to do it, how to do it, and the degree to which it must be done. But there is nothing free about setting such requirements or using intimidation in order to get a particular view added to the curriculum. Nor is it academic freedom to force the teaching of every possible view on a subject.

Correctly defined, academic freedom is the freedom of the scientific community to establish by research and consensus what the most reasonable position is, and then to be allowed to present that position, without coercion or censorship, in the schools.

A Matter of Honesty

But, aside from freedom there is the issue of credibility. Jerry Bergman, in his booklet advocating equal time for creationism (1979), correctly notes: "Establishing teacher credibility requires presenting material in nondogmatic ways according to the merits of the facts." But this is not what equal time for creationism would do. The "merits of the facts" happen to favor evolution. But the two-model approach implies that informed scientific opinion is *equally divided* on the issue of origins. To teach that this is the case when it is not, and when the evidence for evolution is clearly demonstrable, is to dishonestly mislead students. Such an act is unethical and the betrayal of a public trust. Furthermore, it is an irony when one considers that creationists profess to do this in the interest of increasing morality in society. (Evolution supposedly promotes amorality.)

If we take Bergman at his word, and go by the "merits of the facts," then we will operate on a merit system in science and give every theory its just due (and no more). This means creationism would indeed have a place in the science classroom — as a discredited theory on a par with Lamarkianism, or as a minority fringe theory on a par with Velikovsky's *Worlds in Collision*. That would be honest.

And while we are on the subject of honesty, it would be wise to appraise creationist textbooks and audio-visual aids on how they live up to that virtue. Let us begin with the Creation-Science Research Center's *Science and Creation Series*.

Richard M. Lemmon, when reviewing this series for the California State Department of Education (1975) noted that, "The discussions of protein accumulation on the prebiotic Earth (pages 63 to 66 of the 'Handbook for Teachers') is a bad and, I fear, deliberate, distortion of the scientific research of the past two decades." He also noted: "The 'Handbook for Teachers,' page 27, says that 'genuine science gives no firm evidence that the earth is more than several thousand years old.' One hundred years ago that statement may have had some credence among educated mankind. Today it is only laughable. The

world's libraries are full of books that give *overwhelming* evidence to the contrary." His overall conclusion was: "These books are totally unfit for adoption in our schools. Any use of these books in any achool will cripple the students' understanding of science."

The Institute for Creation Research in their audio-visual aid, *Creation and Evolution: A Comparison of Two Scientific Models*, make a number of statements that scientists in general would regard as false or misleading. Here are just a few: "As a matter of fact, however, neither creation nor evolution is a valid scientific theory. . . . if the evolution model is a true model, we would expect to discover living things evolving from non-living, inanimate substances. . . . Creationists maintain that the Second Law of Thermodynamics thus directly contradicts evolution. Evolutionists believe, however, that there must be a way out of this apparent dilemma." Evolutionists are represented as being Lyell-style uniformitarians who believe that "most geological formations have been caused by present processes . . . acting at essentially present rates." It should be no surprise, then, that many scientists find this audio-visual aid, and most other ICR two-model materials, a gross misrepresentation of the evolutionary position.

So, if creationists wish to talk about "fairness," something should be said about the fairness of having creationists author the two-model materials without consultation from evolutionists. And shouldn't Hari Krishnas be allowed to author some two-model textbooks, and Day-Age theorists as well?

Clearly, it is dishonest to falsely imply that (1) scientific opinion is equally divided on creation and evolution, (2) the case is equally good for both models, (3) there are only two models possible, (4) the evidence supports creationism, and (5) evolutionists believe absurdities. Yet most creationist school materials make these implications. Therefore, one can only conclude that the two-model approach, as now advocated, is not suitable for the public schools.

A Matter of Courtesy

Besides honesty and quality of education, there is such a thing as courtesy. Nell Segraves of the Creation-Science Research Center said in an interview, "Most of the creation science is anti-evolution, showing the flaws in the evolutionary thinking." This would seem to mean that creationism is mostly polemical attack and denunciation. Such has been a common criticism leveled against creationist textbooks, particularly *Biology: A Search for Order in Complexity*. Marvin Moore, a creationist writing in *Liberty* magazine (1978), had this to say about the book: "The three factors that raise a question about its appropriateness as a textbook in a public school classroom are its defense of Biblical creationism, sometimes with religious language; its attempt throughout to discredit the evolutionary theory; and its occasional belittling of scientists who believe in evolution." Dr. Conrad Bonifazi, Professor of the Philosophy of Religion at the

Pacific School of Religion in Berkeley, California said, "The art of teaching itself is brought into disrepute by the introduction into it of denunciatory elements." (1972.) Since evolution is not taught in that way, why should creationism be?

There are, however, non-creationists who would enjoy having the two model approach in the public schools. Many of them are atheists and freethinkers who see such two-model teaching as an opportunity to "debunk religion." They want to bring back the good old days of the 19th century when orators like Robert Ingersoll criticized religion at large public gatherings and newspapers published the complete text of the speech the next morning. They enjoy a good fight, and wish for another Darrow to battle another Bryan in a rousing fracus. They feel such opportunities in the public schools will bring about a reduction in the effects of religion on society.

And there is a basis of validity in this. After all, since the Bible is at bottom the basic source of creationist beliefs and the ultimate authority appealed to in every jam, then the Bible cannot help but be part of the creation model. Therefore, where the Bible makes testable claims, it would be fair in any two-model course to test them. Where those claims don't stand up to the test, religion based on them would be effectively "debunked." Is this desirable?

A concern over such possible debate in the public schools led Herbert Stern (1972) of the University of California at San Diego to declare:

> The teaching of divine creation as a scientific theory demeans religion and I therefore oppose it. For most people in this society religion is the highest form of spiritual expression which carries with it perceptions of truth that are unknown to the empirical searches of science. To treat a religious vision of [origins] on the same footing as a scientific one is to drag religion into a spiritual gutter and to stimulate a fake conflict in the youngster between a system of thinking which has over the centuries sought to cultivate the loftiest of motivations and a system which has sought to bring meaningful order into the immediacies of human experience. Any educational program which seeks to make these utterly different human concerns into a single and conflicting search for meaning is one which has declared bankruptcy in its own confidence. A scientist who must prove the wisdom of evolution by arguing the absurdity of special creation is as unwelcome to me as the minister who must prove the wisdom of religion by citing the absurdities of science.

Zoologist Richard D. Alexander (1978) warned: "When creation theorists strive to introduce creation into the classroom as an alternative biological theory to evolution they must recognize that they are required to give creation the status of a falsifiable idea — that is, an idea that loses any special exemption from scrutiny, that is accepted as conceivably being false, and that must be

continually tested until the question is settled. A science classroom is not the place for an idea that is revered as holy."

Science Teaching

Creationists, however, argue they will only be teaching the "scientific" creation model, not the religious one. What many fail to remember is that most believers in creationism tie their whole religious value system to that very "science." Therefore their religious morals, sense of meaning in life, and many other things will rise or fall with the rise or fall of "scientific" creationism. If this were not so, if creation "science" were not so important to creation religion, the creationists would not be making such vigorous moves in the direction of getting more *religious* schools to teach it, in addition to the public schools. And Dr. Morris would not write statements of the type he does in his Director's Column in *Acts & Facts*—to wit: "We do not know what the future may hold. Unless the Lord returns first, however, we believe the case for scientific creationism is so sound that, by His grace, we may yet see a real nationwide reintroduction of creationism as a viable alternative into our schools and colleges. The ultimate results, in terms of a revival of Biblical Christianity in our national life and in individual lives, are exciting to contemplate." (1974.)

Some freethinkers find it exciting to contemplate too, as an opportunity to create a rise in atheism. But Dr. Morris and other creationists are confident that the efforts to Christianize America will win out over the opposition. Is this confidence well-placed? Yes, because equal-time teaching of creationism doesn't end with just two model textbooks. The next step is to demand that at least half the science teachers be creationists in a sort of "affirmative action" program for fundamentalism. The *Creation-Science Report*, put out by the Creation Science Research Center, notes that efforts in this direction are already in progress. Vol. 1, No. 2 (1980) says, "Luther Sutherland has been working with the New York Board of Regents to have included questions on the creation model in the Board of Regents exam for teachers. This would force a change in teacher training." Mayer (1978) knew it all along. "A hidden premise is thus revealed. If creationism is to be taught in science classrooms, then teachers must be trained to teach it — not in a general or Christian sense, but in a manner acceptable to a small, fundamentalist minority. It is not simply the textbooks that creationists strive to control, but teacher training as well." (And, one might add, teacher certification.) You see, the end result is the thing the creationists are concerned about, not just the process. Morris has indicated in debate and in writing that an atheist or liberal Christian teacher would probably not do justice to the teaching of creationism or the two-model approach. His opponents agree, in a way. Biologist Richard Haas of Fresno State College (1972) put it plainly: "Whatever the merits of creationist points of view such arguments clearly do not belong within

the public schools except in courses devoted to theological subjects taught by persons specifically trained in these areas." In other words, if creationists demand special teachers for creationism, let them be religious teachers, because science teachers aren't qualified to deal with this issue.

Stimulating Learning

Richard Bliss of ICR, however, feels he has research to show that the two-model approach is ideal for science teaching. He thinks teachers trained to use it will be better teachers and their students will be better learners. He summarized his research in Impact No. 60 in the June, 1978 issue of *Acts & Facts*. Let's look at the data presented there.

Using the "Pre-test, Post-test, Control Group" design on high school biology students in Racine, Wisconsin, randomly divided into classes by computer, and using teachers all trained in two-model instruction who were equally divided in their preference for either creation or evolution, Bliss began his experiment. Normal "traditional" material in *Biology: Living Systems*, by Oram, Hummer, and Smoot, was taught to the control group. *Origins: Two Models, Evolution/ Creation*, by Richard Bliss, was involved in the experimental group's instruction. The pre-test prior to the course showed no significant difference between the control and experimental groups. Thus both started at basically the same level. After the instruction, the post-test results showed a significant gain (at the .001 level) by the experimental (creation/evolution two-model) group. They did better in learning *both* the evolutionary data and arguments, and those for creationism. They had more positive attitudes toward the subject of biology in general. Furthermore, "those students in the experimental group in the middle and high IQ range showed a significant increase in preference toward the creation model after they had examined all the data. In other words, they became more creationistic in their point of view and less evolutionary." And finally, the two-model group "seemed to develop more critical thinking habits than those who studied origins from an evolutionary model only." (Bliss, 1978.)

It seems, then, that the student virtues inculcated by the Bliss two-model method are higher motivation, better grasp of the data, more ability and inclination to think critically, and more open mindedness, making students "willing to change their views when new data arrive." Dr. Jerry Bergman (1979) praised this study, adding that "the strongest pedagogical argument for teaching both theories is that it permits comparisons and contrasts. Teaching by contrasts helps the student to integrate new knowledge within the total framework of the subject. Also, by teaching with an open-ended approach where problems are not solved or 'closed' and students are left on their own, students are stimulated to continue searching."

To the average person, or school board member, this sounds highly desir-

able, and may even make it seem "unconscionable from a pedagogical and scientific point of view, to teach only evolution to students in the public high schools." (Bliss, 1978.) But is the teaching of evolution alone really that backward? Let's use some of the critical thinking Bliss praises and take a closer look at his study.

Bliss had two advantages which make his experiment unfair. First, *he* designed the supposedly fair and balanced two-model teaching. Second, his own two-model textbook (1976) was involved. Apparently no evolutionists took part in either the training of the teachers in two-model instruction, or in the writing of the two-model textbook. All this was done by Bliss, a creationist at Christian Heritage College.

Previously, I explained how creationist two-model instructional materials are unfair, imbalanced, and inaccurately portray evolution. This is particularly true of Bliss' two-model textbook used in his experiment. It is no wonder, then, that more students became creationists after such a course of study! Creationist two-model teacher training is probably no less inferior. Richard M. Lemmon's previously mentioned review of the teacher's handbooks in the *Science and Creation Series* published by the Creation-Science Research Center, seems to clearly show this.

But there is another challenge possible. Normal "traditional" material in biology, like that used by the control group, generally doesn't put as much emphasis on origins as does creationist material. This means a student getting a "traditional" biology education will know less about origins than one getting a two-model education. We are thus forced to ask, is education in origins as all-important as the creationists make it out to be? And, if it is, what would be the results of more concentration on origins in the "traditional" curriculum? Surely, in this latter case, the control group would do much better than it did in Bliss' experiment.

All the above points indicate that a new study may be necessary. But this does not clear the air. There is still the thought that a new experiment, of a fairer design, will still show a significant benefit for those learning under the two-model system. Would any criticism then be possible?

Dr. Bergman is quite correct in his advocacy of teaching by "comparisons and contrasts." This is why this has been done in textbooks on many subjects such as history. Students get more involved when teachers inspire them to think for themselves rather than just memorize by rote. But since when is it necessary to teach pseudo-science side-by-side with legitimate science in order to stimulate thinking? Since when is it necessary to give students the option of believing falacies and misrepresentations of facts in order to get them to think? There are enough real and *genuine* controversies in science today without dragging in controversies from the 19th century, such as creationism. Though students would certainly benefit from learning *why* creationism was rejected, there is no

point in deceiving them into thinking it is a live scientific controversy today. (It is indeed a live *social* and *religious* controversy today, which is why it belongs in comparative sociology or religion classes.)

Creationists are constantly citing scientists who challenge various aspects of evolutionary theory in the scientific journals. Where these challenges are not outdated, they could be useful instructional tools for aiding students in the better understanding of evolution in particular and biology in general. *This* material would supply the valuable "comparisons and contrasts."

Controversy is part of science, and a necessary ingredient of its self-correcting operation. Students should be made aware of this so they will learn to appreciate the primary virtue of science that creationists seek to obscure: namely, that science is not dogmatic and not a creed laid down in advance of the data. Students should also work with the sorts of *evidence* and *reasonings* scientists use. This will allow them to learn not only the facts, but the *method* of science. Then, and only then, will they be ideally suited to forge new scientific revolutions in the future.

But to confuse students with generally rejected pseudo-science would not only be a waste of time, it could have harmful effects. Students trust their teachers to deal in facts. When teachers do not, or combine fact with fallacy in a mixed presentation, students can easily fall for the fallacy. This was made clear in Scot Morris' article "Believing in ESP: Effects of Dehoaxing" (1980) in which he deceived 80% of the university students in his classes into believing in ESP by giving them a deceptive presentation of "evidence."

Obviously, if creationism is legitimate science, students should have a fair chance to learn its evidence. But if it is as nonsensical as Von Daniken's "ancient astronauts" (which is not included in history studies that give alternate viewpoints), it should be left out. The consensus of knowledgeable scientists today, and the science articles published in *Creation/Evolution*, demonstrate why creationism should be left out.

Fundamentalist Christian Schools

Still, creationists believe truth is on their side. That is their right. And they can therefore teach creationism as much as they please in the Christian schools. But here is where we can test their sincerity.

Do creationists *really* believe two-model education is superior from a pedagogical standpoint? Do they *really* value the teaching of critical thinking? If so, then we would expect them to use only the two-model approach in the Christian schools. We would expect them to set an example of "fairness" and "balance" so at least *their* students would have the opportunity to have their minds stimulated by this superior teaching method. And, of course, Christian Heritage

College, a division of which is the Institute for Creation Research, ought to be leading the way in this.

Dr. Gary Parker, Professor of Biology at Christian Heritage, explained in the *Christian Heritage Courier* of November 1979 how he teaches biology. His article is entitled "Bios-Logos: Bible-Based Biology"; here is part of what he had to say:

> In our introductory course (Biology 101), concepts and examples of "skin in" and "skin out" biology are presented as reflections of God's power as Creator, Sustainer, Judge, and Redeemer; and students are challenged to live as responsible stewards and ministers of God's reconciliation. . . . Pathological processes (disease, aging, and death) are presented in terms of the Fall and our mandate — following Christ's example — to bring healing and restoration wherever possible. . . . In Biosystematics, we contrast the evolutionary concept of species origin with the concept of variation within created kinds, and we try to give students the background and interest to proceed, should the Lord so lead them, with the development of a taxonomic system that will be true both to God's Word and to God's world, the twin criteria for true progress in science.

In other words, Dr. Parker teaches creationism, loading in the religious doctrine of the college, and brings up evolution only to knock it down. But maybe this is because these college students have been "brainwashed" by evolution in the public schools before they get to the Christian college. We need, then, to carefully examine the Creationist attitude toward Christian *primary* and *secondary* schools.

Scientific Creationism, edited by Henry Morris, is frequently sold to Christian secondary schools. This is a book that gives only the Creation side of the question. Christian schools are encouraged to use it as a central science text, supplemented only by general science material, not by books giving the opposite viewpoint.

In the September 1979 issue of the *Christian Heritage Courier*, Dr. Morris criticized the progressive education of John Dewey because it caused "the concept of education from kindergarten to graduate school" to be "reoriented from the teaching of a fixed body of knowledge to the teaching of methods of inquiry to be applied to the continually changing facts of existence." He noted that this concept of education was not always part of American education. "There was once a time when a search for truth could lead to truth! . . . This meant, of course, that there were absolutes to be discovered, in both science and Scripture, and that man's duty was to find and teach the truth in both." Therefore, when progressive education came in, "human experience and opinion, expressed democratically through the state, became the ultimate arbiter of

'truth.' " The result of all this was a rise in drug addiction and sexual promiscuity, not to mention the confusion and despair of existentialism. Therefore: "Today, the ideal of a wistful search for truth by a community of scholars operating in academic freedom has an air of unreality, to put it mildly, or futility, to put it bluntly." To Morris, the solution is simple. Bring back the Biblical-based education of the past. After all, in its proper and primary role, "education is concerned not with discovery of truth, but the transmission of truth already discovered." Furthermore, "true education is responsible under God for the transmission of truth — *not the transmission of untruth!* True education is *conservative* . . ." (This last quotation was printed in red in the original.)

We can't forget, however, that some *non*-fundamentalist educators challenge aspects of progressive education too. They favor more teaching of facts, and a "back to basics" approach. But this is not all that Christian Heritage creationists are saying.

Neal Frey of the Department of History and Social Science at the college develops the idea further (1979), leaving no doubt on where he stands. He writes:

> Only two types of knowledge exist — humanistic knowledge, whose view of being is not Christ-centered and whose center of value is nature or man, and Christian knowledge, whose views of origins and value are Biblical and Christ-centered. . . . "Neutral" knowledge does not exist. There are no value-free facts, nor fact-free values: . . . There can be no knowledge without values, no education without initiation into some value system. From the standpoint of value, all education is moral training. The momentous question is not, Shall education inculcate value? but, Shall education inculcate man-centered value or Christian value? . . . All branches of true knowledge are subdivisions of theology, dealing with various spheres of life under an absolute Trinity. . . . If students are merely exposed to rival systems of knowledge — hence to mutually contradictory assumptions of value — without having Christ-centered, Biblical truth rigorously defined, organized, and persistently brought to bear on the subject in question, those students will commonly select from each system the elements which to them seem most plausible, and will amalgamate them into a world view labeled "Christian." . . . Christian education should not insulate students from humanist scholarship. It should keep humanism at bay, at arm's length, while repeatedly and faithfully inculcating intellectually consistent Christ-centered knowledge based on scripture. It should not deprive students of a truly Biblical liberal arts education by merely giving the Christian side "equal time" with humanism.

There it is. The alleged education benefits of equal-time two-model instruction are not really accepted by creationist educators. In fact they are rejected as inferior! These further comments by Neal Frey show why.

> Nor will Christian truth triumph in competition with humanist error in the disciplines . . . The delusion that Christian truth could so triumph unaided is based on an unscriptural, over-optimistic reading of human nature. It ignores original sin, which predisposes man against the truth. Man has a vested self-interest in error and in the self-centered organization of knowledge. . . . Truly "free thought" is the liberty to think in Christ-centered terms. Thought which has slipped out of militant subservience to Christian truth — which has become man-centered — is no longer free. But in the current intellectual climate, humanist scholarship passes for enlightened free inquiry, while consistently Christian intellectual enterprise is stigmatized as "biased" and "narrow."

Added to this Christian Heritage College seems to have rigid requirements in the hiring of teachers to go along with the above philosophy of education. Dr. James J. Veltkamp, professor in Education at Christian Heritage lays it down (1979):

> *In the Christian school, college, or university, the instructor does not have the right to teach or publish without supervision.* [In red in the original.] And when such supervision is exercised by the authorities appointed and empowered by God, that direction is not inconsistent with true liberty. . . . Let us not fall into the snare of much secular thinking about academic freedom which insists that there be no standard of faith and character, of doctrine or life, for faculty members. . . . We must also be alert and resolute to bar from our classrooms all those in the bondage of humanism who question the inerrancy of the Bible, who doubt the literalness and historicity of the first chapters of Genesis, . . . and who promulgate uniformitarian evolution under the sanctity of the adjective *theistic.*

Dr. Veltkamp, a challenger of what he calls "intellectual libertinism" minces no words:

> *What right have these instructors to such academic freedom* with its tremendous potential for influence? . . . *Who supervises those thinkers and teachers* to whom we entrust so much, while, in the name of academic freedom, safeguards are multiplied to free them from supervision? These questions themselves epitomize the monopolistic power of the national liberal-arts religion of secularism, with its mythological quest for the truth. [Emphasis in red in the original.]

The illustration with this article includes a communist hammer and sickle under the words "Academic Freedom." A profile of Darwin is to the right of it. This should leave no doubt that bringing creationism into the public schools is a straightforward effort to eventually remove evolution and bring dogmatism back into education. Appeals to more stimulating education through the two-model approach are nothing but pretense. Pleas for "equal time" are nothing but emotional ploys. And the whole thing is just a stop-gap maneuver on the path to a far more radical solution.

Public Opinion

Nonetheless, who can deny the public has strong opinions on this matter? Regardless of the legal, scientific, and educational issues, many people seem to want creationist doctrines taught in public school science classes. Don't their voices count for something?

That these voices may be in a majority is indicated by a few polls which have been taken. For example, in 1973, a random survey was made of 1,346 homes in the Del Norte County Unified School District in California. Residents were asked the question, "Should evolution be taught in the public schools?" The results were 58% answering yes, 34% answering no, and 8% undecided. When these same people were then asked, "Should creation be taught in the public schools?" 89% said yes, 8% said no, and 3% were undecided. (Bliss, 1978.)

In the same year, creationists surveyed 1,995 homes in Cupertino, California and found that 44.3% believed in creation, 23.3% believed in evolution, 3.5% believed in both, 10.6% believed in neither, and 18.3% were undecided. When asked the question, "Should scientific evidence for creation be presented along with evolution?" 84.3% of these people said yes, 7.8% said no, 6.3% were uncertain, and 1.6% said neither. (Bliss, 1978; Weinberg, 1978.)

The Midwest Center of the Institute for Creation Research conducted a random telephone survey asking, "Should evolution only, creation only, both evolution and creation or neither evolution or creation be taught in the public schools?" The predictable answers came: 5.2% saying evolution only, 18.9% creation only, 64% both creation and evolution, and 11% neither. Bliss (1978) concluded, "While these data are limited, they nevertheless provide a good sampling of what adults feel is fair and proper for public schools." Weinberg (1978) added in his article, "Yet if these very limited investigations reflect anything like the actual situation — as I believe they do — then their results are a tribute to the poor job we have done in teaching evolution."

University students, as well as the public, seem to share this approval of two-model education in origins. This was brought out in a paper published in *Origins* in 1979 by Jerry Bergman. In reviewing the literature, Bergman noted

the Christensen and Cannon survey of Brigham Young University students in the years 1935 and 1973. When given the statement, "Man's creation did not involve biological evolution" in 1935, 36% of the students agreed. But in 1973, that figure jumped to 81%. When given the statement, "The world's creation did not take millions of years," the 1935 students gave only a 5% favorable response while the 1973 students gave a 27% favorable response. Over 1000 students were used in each sampling.

Bergman also noted John C. Troost's 1966 survey of secondary school biology teachers in Indiana. This study "showed that 173 out of 325 felt that evolution was a theory and not a fact, and 163 out of 330 thought that evolution should be presented as one of several alternative theories."

Bergman's own study was conducted at Bowling Green State University in Ohio. His subjects were 442 undergraduates in teacher-training programs and 74 graduate students taking courses in the area of biology. The results were that 91% of the undergraduate and 71.8% of the graduate students felt that both models should be taught in the schools.

Bergman admits, however, that Bowling Green is a "conservative" school and that only 5 out of his total sampling of 516 were biology majors. Yet, in spite of this, he maintained he was testing the "assumption" that "the vast majority of teachers would opt for teaching only evolution" and that his study helped demonstrate how "a clear majority of both parents and teachers are in favor of the two-model approach to origins." This conclusion was then used by him to question the opposition given to two-model teaching of origins in professional journals such as the *American Biology Teacher*. Perhaps a survey of biology teachers, who are more knowledgeable in this area of science, should be taken to answer him.

But regardless of the shortcomings of these various surveys, the question remains, how are we to regard this public outcry concerning the scientific teaching of origins?

One thing to be realized is that this outcry is part of an overall dissatisfaction with the public schools, and creationists have been effectively playing on that dissatisfaction. It also comes at a time when considerable public pressure is being brought to bear against "objectionable" textbooks. Mel and Norma Gabler in Texas challenge textbook selections every year. TV evangelist Jerry Falwell feels that America is in a moral crisis. "For our nation this is a life-and-death struggle, and the battle line for this struggle is the textbooks." (Park, 1980.) As a result, Judith Krug of the American Library Association notes that 300 reports of book-banning or censorship were received by that organization in 1979, a number greater than at any other time in at least 25 years. One example was the Anaheim, California school board which, under pressure, weeded out most of the works of William Shakespeare, Charles Dickens, and Mark Twain in the city schools.

The people have power, and can have whatever type of education they choose to vote for. So the only response that can be given is that the public seems poorly informed on scientific matters, has not explored all the problems and ramifications of two-model teaching of origins gone into in this article, and is presently taking steps that seriously infringe on the constitutional protection of minorities from majority (or supposed majority) religious views.

It is not wrong to forthrightly declare the public is in error. They have been wrong before. Nor is it wrong to protect the integrity of science and science teaching from those who would impose public rule over matters of fact and evidence.

Creationists, however, don't seem to respect science in this way. Ariel A. Roth, editor of *Origins*, put out by the creationist Geoscience Research Institute at the Seventh Day Adventist College, Loma Linda University, had this to say in *Liberty* magazine (1978). "Part of the problem is that evolutionists believe themselves to be *the* authority regarding the question of origins. They hold that contents of textbooks and curriculum should not be left up to the public or legislative bodies, but to those with 'qualified professional judgement.'" He is promoting democracy here, but in a most anti-intellectual manner. Carried to its logical conclusion, this would mean that if the public wants education, they should teach themselves, since Roth thinks they know what they want to be told, and hence must know what is true.

In view, then, of the public's possible favoring of the two-model idea in education, is it right to say they should have it if they want it? No. It is more correct to say they *will* have it if they want it. It is their choice. And the only task remaining for scientists is to start educating the electorate before the people cut their own educational throats.

There is a freedom issue at stake here, too. The two-model approach, with its obvious religious overtones, won't only bring religious *issues* into the science classroom, but possibly religious *controversy*. Science teachers will, regardless of which side they are on, find it hard to keep their own religious views private. Therefore, they will become marked men and women in the community if they are a minority. Children will find themselves exposing their private beliefs during class discussions. Creationists may or may not want it this way, but, in actual practice, that is what will most likely happen. We must therefore ask the public if they support such invasion of privacy.

That the public might not really want two-model education is still a possibility. At least some students are expressing their dissatisfaction with creationism being forced on them, and this is a good sign. For example, when Nancy Leman, a junior college student at Palomar College in San Marcos, California, protested an evolutionary reference in her sociology book, a fellow student, Doreen Rabb, wrote the following letter to the San Diego Union shortly after the August, 1979 incident.

> I and 40 other students had to sit through Nancy Leman's constant interruptions as she tried to force her Christian's view of life on the class. I resent the lost class time spent trying to satisfy Ms. Leman's uncalled-for comments.
>
> Ms. Leman simply does not understand that the entire world is not Christian, and does not want to have religion thrown at them. When I registered for sociology this summer, I was registering for a science class, not a religion class.

Perhaps if more students challenged creationism in this way, or lobbied for adequate education in the disciplines, the public might gain a better understanding of what is at stake.

Conclusion

The American people are somewhat unique in the fervency with which they so often adhere to fundamentalist Protestant beliefs. But this is a fact that cannot be denied, and should not be left out of public education. Material about the nature of various American, and perhaps world, religious beliefs ought to be presented to students. Qualified instructors in this area should be sought. It must be understood, however, that biology teachers are not so qualified, and the science curriculum is the wrong category in which to place religious, or religious based, material. The Constitution makes a distinction between sacred and secular, and so should the public schools.

The public, of course, can have the matter any way they like it, but they should be aware of what each approach to education implies, and what some of the problems will be if one particular minority scientific or religious theory is brought into the science classroom. They should try to understand that mixing religion with science confuses students about the nature of both. They should be informed that there is no major controversy between scientists on creation and evolution, but that the controversy is mostly between scientists and non-scientists. And they should realize that if creation is to be given equal time with evolution, astrology should be given equal time with astronomy; astrology's following being equal to that of creationism, and the theory being equally outdated.

Though education should promote critical thinking, it should do so in an overall context of passing on factual information. Critical thinking is a tool, not the whole ball of educational wax. A debating society is not a school, and mere *exposure* to variant opinions is not education. The practical necessity of seeing to it that students are adequately prepared for possible careers in science should not be overlooked. The teaching of pseudo-science as science does not further this aim.

If creationism were just another pseudo-science, however, there wouldn't be the pressure to have it taught. Creationism has such force only because it is a *religious* theory, or is supportive of one. People, therefore, have a larger emotional stake in seeing to it that it is included. But this guarantees religious strife since there are so many creation theories, not to mention so many non-creation theories, related to origins. Furthermore, there are various religious alternatives on history, geography, and most other courses of study. To bring creationism in, then, would open up an explosive can-of-worms that would quickly endanger the constitutional guarantee of church-state separation. It would also rob the educational system of valuable class time that should be devoted to imparting the knowledge of our day.

Creationists argue, however, that two-model education stimulates students. No doubt it does, but religious pseudo-science is not the only possible educational stimulant. *Real* controversies in science are far more preferable in this age of rapid scientific progress.

Furthermore, creationists don't seem sincere about the educational advantages of two-model learning. They don't use it in their Christian parochial schools, and in fact claim it is inferior. (An evaluation team from the Western Association of Schools and Colleges felt that Christian Heritage College practiced "indoctrination" not education, and that this would militate against accreditation of the college.) Furthermore, ICR creationists successfully saw to it that a course at Iowa State University in "critical judgement" was terminated because it dealt critically with creationism (Zuidema, 1980). Though creationists participate in a two-model course offered by Drs. Awbrey and Thwaites at San Diego State University, they have not promoted this in a manner consistent with their espousal of two-model education — perhaps because instructors on the evolution side are also included, instructors who are competent at critiquing creationist beliefs.

Creationists want to write the textbooks and certify the teachers. And though they push their creationist-controlled two-model teaching in *all* tax supported schools, colleges included, and demand equal time for creationism in all tax-supported institutions, such as the Smithsonian, their main emphasis is on the public secondary and primary schools. This is because, there, creationists can more easily involve parents and play on religious sentiments. School boards are far more accessible to public outcry because they are directly elected. College boards of regents are often appointed. Legislation affecting public schools is also easier to obtain than legislation affecting colleges or museums.

Public pressure is what the creationist movement is about, which is why creationists put such emphasis on public opinion polls that favor two-model teaching. But scientific evidence is not determined by majority vote, a fact creationists hope the public will forget.

The promotion of two-model teaching in science by creationists then, seems

only to be a way of getting Christian fundamentalist doctrines into the public schools to neutralize the effects that evolution teaching might be having on the spread of such fundamentalist beliefs. It is also to "win more souls for Christ." Appeals to "fairness" and "equal time" are simply emotional ploys, and two-model textbooks are simply maneuvers. The final aim is a triumphant creationism.

For one to espouse two-model teaching in science, one must ignore or be unaware of the educational havoc it will cause, the social problems, the legal complications, the effect on the quality of science, the effect on religious liberty, and the effect on academic freedom. To still espouse such a view after all these facts are made clear requires a myopic narrowness of view and an incredible singleness of purpose unique to the business of professional religious pseudoscience.

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EQUAL TIME FOR FLAT-EARTH SCIENCE

Robert J. Schadewald

Paul Ellwanger, head of Citizens for Fairness in Education in South Carolina, has promoted a model creation/evolution bill to be introduced in state legislatures. My immediate reaction on seeing this bill was to rewrite it slightly. I preserved most of the creationist wording, but altered the bill to require teaching of flat-earth theory whenever conventional astronomy is taught. I sincerely believe that my bill should be introduced in every state legislature in which the creationist bill is introduced.

In fact, I hereby volunteer to write a flat-earth version of any creationist bill introduced anywhere, if only someone will introduce my version. The parallels between flat-earthism and creationism are numerous and precise. Literal interpretation of certain parts of the Bible is a motivating factor for modern flat-earthers, and they have an elaborate system of "scriptural science" just as do the creationists. The flat-earthers of 19th century England had a skilled corps of lecturers who preached and debated. Because opponents were frequently unprepared for the ingenious arguments of the Universal Zetetic Society (the flat-earth organization), the flat-earthers usually won their debates. Lecturers from the San Diego based Institute for Creation Research use the same debate tactics, and enjoy the same success.

My flat-earth bill is "zetetically" correct, and accurately describes flat-earth theory. It is not really a parody, as it's impossible to parody something ludicrous.

No doubt bills could also be drafted demanding equal time for astrology, Mary Baker Eddy's Christian Science theory of disease, or Von Daniken's "ancient astronauts." This would be a useful pastime for specialists in these areas who, like me, want to make it plain to legislators and the public the absurdity of creationist legislation.

Bob Schadewald is a free-lance science writer, specializing in the off-beat. He has spent five years doing research on the history of the flat-earth movement and three years researching the creationists.

Bill No.:
Introduced by:
Date:

A BILL TO BE ENTITLED
"The Balanced Treatment for Flat-Earth Science and Spherical-Earth Science Act"

An Act to require balanced treatment of flat-earth science (Zetetic Astronomy) and conventional astronomy in public schools; to protect academic freedom by providing student choice; to ensure freedom of religious exercise; to guarantee freedom of belief and speech; to prevent establishment of religion; to prohibit religious instruction concerning the shape of the earth; to bar discrimination on the basis of planar or spherical belief; to provide definitions and clarifications; to declare the legislative purpose and legislative findings of fact; to provide for severability of provisions; to provide for repeal of contrary laws; and to set forth an effective date.

Be it enacted by the Legislature:

Section 1. Requirement for Balanced Treatment. Public schools within this State shall give balanced treatment to flat-earth science and to conventional science. Balanced treatment to these two models shall be given in classroom lectures taken as a whole for each course, in library materials taken as a whole for the sciences and taken as a whole for the humanities, and in other educational programs in public schools, to the extent that such lectures, textbooks, library materials, or educational programs deal in any way with the subjects of the earth's form and figure, the sun, moon, planets and stars, the form and dimensions of the universe, and its recent creation.

Section 2. Prohibition against Religious Instruction. Treatment of either spherical-earth science or flat-earth science shall be limited to scientific evidences for each model and inferences from the scientific evidences, and must not include any religious instruction or references to religious writings.

Section 3. Requirement for Nondiscrimination. Public schools within this State, or their personnel, shall not discriminate, by reducing a grade of a student or by singling out and making public criticism, against any student who demonstrates a satisfactory understanding of both spherical science and flat-earth science and who accepts or rejects either model in whole or part.

Section 4. Definitions. As used in this Act:

(a) "Flat-earth science" (Zetetic Astronomy) means the scientific evidences for the earth's being an outstretched plane and inferences from those scientific evidences. Flat-earth science includes the scientific evidences and related inferences that indicate: (1) The earth is an outstretched plane; (2) The known, inhabited earth is approximately circular, with the north pole at the center and

a 150 foot wall of ice at the southern limit (outer edge); (3) The earth floats on the waters of the Great Deep, and there is fire below those waters (sometimes called Hell); (4) The earth is covered by a dome which also rests on the waters of the Great Deep; (5) The sun and moon are 32 miles in diameter and circle the region of the equator at an altitude of about 1500 miles; (6) Eclipses of the moon are caused by an unseen dark body passing in front of it; (7) The earth and universe were created about 4004 B.C.

(b) "Spherical science" means the scientific evidences for the sphericity of the earth and inferences from those scientific evidences. Spherical science includes the scientific evidences and related inferences that indicate: (1) The earth is a spinning ball; (2) The earth circles the sun, which is 93 million miles away; (3) Eclipses of the moon are caused by the earth's shadow; (4) Other planets are large bodies, some of them larger than the earth; (5) The earth itself is merely a minor planet of a minor star in an undistinguished galaxy; (6) The universe is billions of light years in extent; (7) The earth and universe are billions of years old.

(c) "Public schools" means public secondary and elementary schools.

Section 5. Clarifications. This Act does not require or permit instruction in any religious doctrine or materials. This Act does not require any instruction in the subject of the shape of the earth, but simply requires instruction in both scientific models (of spherical-earth science and flat-earth science) if public schools choose to teach either. This Act does not require each individual textbook or library book to give balanced treatment to the models of spherical-earth science and flat-earth science; it does not require any school's books to be discarded. This Act does not require each individual classroom lecture in a course to give balanced treatment, but simply requires the lectures as a whole to give balanced treatment; it permits some lectures to present spherical-earth science and other lectures to present flat-earth science.

Section 6. Legislative Declaration of Purpose. This Legislature enacts this Act for public schools with the purposes of protecting academic freedom for students' differing values and beliefs; ensuring neutrality toward students' diverse religious convictions; ensuring freedom or religious exercise for students and their parents; guaranteeing freedom of belief and speech for students; preventing establishment of Theologically Liberal, Humanist, Nontheist, or Atheist religions; preventing discrimination against students on the basis of their personal beliefs concerning the shape of the earth; and assisting students in their search for truth. This Legislature does not have the purpose of causing instruction in religious concepts or making an establishment of religion.

Section 7. Legislative Findings of Fact. This Legislature finds that:

(a) The subject of the form, figure, and origin of the earth and universe is treated within many public school courses, such as general science, earth science, physics, astronomy, history, philosophy and social studies.

(b) Only spherical-earth science is presented to students in virtually all of those courses that discuss the shape and origin of the earth. Public schools generally censor flat-earth science and evidence contrary to the spinning ball theory.

(c) The spherical theory is not an unquestionable fact of science, because it cannot be proved beyond a doubt, and because it has not been accepted by some scientists.

(d) The spherical-earth theory is contrary to the religious convictions or moral values of some students and parents, including individuals of many different religious faiths and with diverse moral values and philosophical beliefs.

(e) Public school presentation of only spherical-earth science without any alternative model of the earth abridges the United States Constitution's protections of freedom of religious exercise and of freedom of belief and speech for students and parents, because it undermines their religious convictions and moral or philosophical values, compels their unconscionable professions of belief, and hinders religious training and moral training by parents.

(f) Public school presentation of only spherical-earth science furthermore abridges the Constitution's prohibition against the establishment of religion, because it produces hostility toward many Theistic religions and brings preference to Theological Liberalism, Humanism, Nontheistic religions, and Atheism, in that these religious faiths generally include a religious belief in a spherical earth.

(g) Public school instruction in only the spherical theory also violates the principle of academic freedom, because it denies students a choice between scientific models and instead indoctrinates them in spherical-earth science alone.

(h) Presentation of only one model rather than alternative scientific models of the earth's shape is not required by any compelling interest of the State, and exemption of such students from a course or class presenting only the spherical theory of the earth does not provide an adequate remedy because of teacher influence and student pressure to remain in that course or class.

(i) Attendance of those students who are at public schools is compelled by law, and school taxes from their parents and other citizens are mandated by law.

(j) Zetetic Astronomy (flat-earth science) is an alternative model of the earth which can be presented from a strictly scientific standpoint without any religious doctrine just as spherical-earth science can, because some scientists have concluded that scientific data best support flat-earth science and because scientific evidences and inferences have been presented for flat-earth science.

(k) Public school presentation of both spherical-earth and flat-earth theories would not violate the Constitution's prohibition against establishment of religion, because it would involve presentation of the scientific evidences and related inferences for each model rather than any religious instruction.

(l) Most citizens, whatever their religious beliefs about the shape of the

earth, favor balanced treatment in public schools of alternative models of the earth's shape for better guiding students in their search for knowledge, and they favor a neutral approach toward subjects affecting the religious and moral and philosophical convictions of students.

Section 8. Short Title. This Act shall be known as the "Balanced Treatment for Flat-Earth Science and Spherical-Earth Science Act."

Section 9. Severability of Provisions. If any provision of this Act is held invalid, that invalidity shall not affect other provisions that can be applied in the absence of the invalidated provisions, and the provisions of this Act are declared to be severable.

Section 10. Repeal of Contrary Laws. All State laws or parts of State laws in conflict with this Act are hereby repealed.

Section 11. Effective Date. The requirement of the Act shall be met by and may be met before the beginning of the next school year if that is more than six months from the date of enactment, or otherwise one year after the beginning of the next school year, and in all subsequent school years.

HOW *NOT* TO CONDUCT A PANEL ON EVOLUTION AND CREATION

by Craig Howell

The current resurgence of old-time fundamentalism and the attendant revival of the theory of Creationism as a challenge to the principles of evolution have obviously caught many mainstream religious and scientific leaders off-guard.

Finding it difficult to take Creationism seriously, and yet wanting to be thought fair to all sides of a growing controversy, these mainstream leaders can easily fall into traps which serve to muddle the issues—to the great advantage of the Creationists.

An unfortunate example of this was provided this past fall at the Annual National Conference on Church and State, sponsored by Americans United for Separation of Church and State (AU). AU describes itself, quite rightly, as "a 33-year-old non-profit, non-partisan, non-sectarian organization of individuals of every religious persuasion (and some of no religious persuasion) who are working together to help preserve and protect our American heritage of religious liberty."

The kick-off event of the AU Conference was a panel discussion on the announced topic: "Scientific Creationism, Secular Humanism, and Public Schools." Inasmuch as AU publications had consistently attacked the Creationist movement as a religious front that had no business dictating public school curriculum, I went into the panel expecting a thorough dissection of our opposition.

To my astonishment and chagrin, I found that the AU panel was stacked *against* a credible pro-evolution position.

The two major speakers on the panel were attorney Paul James Toscano of Brigham Young University Law School and Julius B. Poppinga, President of the Christian Legal Society. Although both panelists discussed the evolution vs. Creationism controversy, this was not in fact the primary focus of either speaker. Instead, they focused on certain legal issues which they thought were at the root of the Creationism debate. But their manifest confusions on the subject of evolution invalidated both their presentations.

Toscano's speech was a summary of a lengthy law journal article he had just written on "The Establishment of Humanism in the Public Schools: A Dubious Neutrality." Toscano declared that the Supreme Court has effectively estab-

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lished secularism as the preferred public religion because it has said that all laws must serve a secular purpose and that no law may favor theistic religious belief over alternative religious attitudes. He provided what he regarded as the axioms of secular humanism and pronounced it a religion, because its assumptions were a matter of personal taste and could not be proven. Toscano then proceeded to serve the same sentence of religiosity on the theory of evolution "and other unseen realities"—all such theories are just as mystical, subjective, and ultimately unproveable as any religious belief. "A religious mystic can refute evolution with as much logic — or as little — as the secular historian can refute the Resurrection of Christ," Toscano asserted.

By this light, of course, it would seem unfair for public schools to teach one kind of "religious ideology" such as evolution without granting equal time to other kinds of religious ideology such as Creationism. Since true religious neutrality is impossible to attain in our public schools, Toscano suggested that parents who send their children to religious schools should not have to pay taxes to support public schools which are dedicated to secularism. (Toscano averred that he was personally committed to secularism and would not want his children in religious schools.) This was the only solution that Toscano could square with our country's tradition of pluralism and diversity; he objected to secular humanists who "imposed" their religious ideologies such as evolution on all public school children.

If you are ready to grant that all science is really religion, or that Creationism is just as scientific as evolution, then Toscano's conclusions might be difficult to evade. But his speech left me (and evidently many others at the Conference) dizzy, as though we had just strolled with Alice Through the Looking Glass, where everything is the reverse of the way they usually are. Unfortunately, the other speaker, Mr. Poppinga, was not a very good guide for getting us back to reality. Instead, in some ways he compounded Toscano's confusion.

Like Toscano, Poppinga equated secular humanism and theism as "philosophies which can be given religious expression." He further declared, much to my consternation: "Evolution is to Humanism what Creationism is to Theism"—an analogy which casually eliminated the very possibility of a theistic religion that is compatible with evolution. Was he unaware that this is the very combination which presumably has prevailed within the general public since the time of the Scopes Trial? Poppinga said he personally preferred the Genesis account over Darwin; but in any case, public schools should not "indoctrinate" students in evolution to the exclusion of Creationism. Students should see both sides and should make up their own minds.

The question and answer period from the audience following the two speakers was just as unsatisfactory and confused as the main presentations. Many of us were greatly perturbed by the analysis offered by Toscano and Poppinga and felt that the pro-evolution position had not been put forward effectively;

unfortunately, no one was able to disentangle the chaos into something more sensible. Some of the audience seemed to have been persuaded by the speakers into thinking that evolution may not be much better than Creationism after all (although the scientific merits of either case played virtually no role at any point during the panel discussion). One questioner took a somewhat differing approach, arguing that public schools shouldn't be teaching anything at all about the origin of life because different religions had different perspectives.

It is not my purpose in this article to undo all the confusion created by Toscano and Poppinga; other articles in this journal should be addressed to those points. But I think it was a great waste that a leading organization such as Americans United should sponsor a panel so dominated by a position antithetical to its own, especially when the audience had come from all over the country to learn (among other things) how to offset the pro-Creationist pressure on school boards and textbook writers.

It is time we started taking the Creationists seriously as a political force. And that means it is time to sit down and educate ourselves about how to combat them, without apology—much less without surrender.

UPDATE ON CREATION BILLS AND RESOLUTIONS

The chart below shows the states where creation bills and "equal time" school board resolutions have been introduced, and the results thereof. We appreciate the work of the creationist Citizens for Fairness in Education (2820 Le Conte Rd., Anderson, SC 29621) for keeping track of these things. It saves us a lot of trouble.

The promotional piece which featured this chart stated the case fairly: "There is no law in any one of the fifty states prohibiting the presentation of creation-science; nor is there any law mandating exclusive teaching of evolution. That makes creation-science presentation in our public schools optional, and optional it will remain unless balanced treatment is mandated by law." This piece, dated October, 1980, then went on to add, "We do not recommend the 'resolution' (non-mandatory) route because it leaves fairness in the 'options' category." This is the opposite of the position taken by the Institute for Creation Research, in San Diego, California.

States with an asterisk (*) by them have used the 1979 "model" bill draft issued by Citizens for Fairness in Education. Their 1980 "model" seems to have more chrome and bigger fins, and is the basis for Robert Schadewald's article in this issue. The creationist plan is to push the newer version in the 1981 legislative sessions.

State	Bill introduced	Bill number(s)	Legis. yr(s)	Houses passed	Resolutions passed/counties		Comments
Florida*	x	H. 107 S. 90	80	0	–	–	Both died in committee.
Georgia	x	H. 690	79 80	2	x	(several)	Did not get final passage. Bill dead.
Illinois*	x	S.1478	80	0	–	–	Died in committee.
Iowa	x	S. 261	79	0	–	–	Died in committee.
Kentucky	x	H. 889	80	0	–	–	Died in committee.
Louisiana	x		80	0	–	–	
Minnesota	x		80	0	–	–	Defeated in committee.
New York*	x	A.8569	80	0	–	–	Died in committee.
Ohio	–	–	–	–	x	1 Columbus	
S. Carolina*	x	H.3444	80	0	–	–	Died on House agenda.
Tennessee	x	H. 749 S. 997	76,77 79,80	0	–	–	Died in committee
Texas	–	–	–	–	x	(several) Dallas	
W. Virginia	–	–	–	–	x	1 Kahawha	
Wisconsin	–	–	–	–	x	1 Racine	
Washington	x	S.2444 H. 994	74	0	–	–	Died in committee

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