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SKEPTICS STING CREATIONISTS

by Ian Plimer

This article (edited for space) first appeared in Vol. 9, #3 issue of "The Skeptic", publication of the Australian Skeptics. Dr. Plimer is head of the department of geology at the University of Newcastle. He is a self-confessed creationist basher.

On 6-23-88 I sent -- unsolicited and anonymously -- a rock specimen composed of a fibrous clay mineral which looked like paper to the Creation Science Foundation.

Without examining, testing, or soliciting mineralogical opinion, Andrew Snelling (director of CSF) published an article about the specimen in the October 1988 issue of "Creation Science Prayer News" under the title "Paper in Rock." The article announced: "This wouldn't matter much, except the rock is supposed to be more than 200 million years old. Consequently the evolutionary geologists can't allow it to be paper because man supposedly wasn't around then. They conveniently ignore it as an oddity."

The credibility of the Australian creationist movement was also exposed and the results are described below.

CHRONOLOGY

=> July 23, 1988: A safe, anonymous source sends a specimen of "paper in rock" to CSF.

=> October 1988: Andrew Snelling (Ph.D. in geology from the University of Sydney) publishes the results of his "discovery" in CSF's own broadsheet in a section titled "Getting It Right."

=> April 19, 1989: Snelling presents his [usual] creation-science case at a creation-science conference. Plimer arranges for Patrick Lyons, a Western Mining Co. geologist, to challenge Snelling at question time about the paper in the rock. A vigorous exchange results. Plimer had anticipated this exchange and arranges for Lyons to present yet another sting on the same specimen: Lyons tells Snelling that the rock is the mineral palygorskite [a paperlike substance].

=> May 1989: "Creation Science Prayer News" publishes an article under the heading "Research News." In it, there is no admission of

or apology and retraction for a gross, careless mistake. Instead they say: "Because the sample contained what definitely looked like thick paper or cardboard, there was always the temptation to rush into print and sensationalise the discovery. However, information now to hand suggests that it is highly likely the 'paper' [is] the mineral palygorskite. . . ."

CREATIONIST CREDIBILITY

The specimen . . . contains neither paper nor the clay mineral palygorskite. It consists of attapulgite, a clay mineral very similar to palygorskite. Attapulgite is used as cat litter. It would be tempting to write that the creationists are up to their necks in it.

Simple hand examination can easily demonstrate that the specimen is not a "paper rock," but an attapulgite-palygorskite group mineral. The technique for differentiating the two is a simple, inexpensive (\$20), well-known technique: X-ray diffraction. Dr. Snelling has presumably learned and used these procedures in his training at the University of Sydney.

CONCLUSION

It is clear that at no time was any real research carried out on the rock sample. A simple test would have revealed that [it] was not paper. A slightly more complex test would have shown it was not palygorskite.

If we consider that the discovery of paper in a rock sample 200 MY old would have provided astounding evidence for the fundamentalist hypothesis of a young Earth, it is incredible that no research was conducted. Failure to do this research support[s the] contention that CSF is not interested in science, research, or facts. It is merely concerned with the publication of anything that fits a preconceived dogmatic position.

CSF has been stung twice by the same sample. It has proved that it is unable to distinguish between cat litter and paper, which might suggest to the more perceptive of its supporters an alternative use for CSF's many publications.

Of itself, it is unimportant that CSF is so ignorant of scientific procedures that it can be fooled so easily (scientific illiteracy is not a crime -- it is just a shame). It isn't even of much importance that CSF should choose to promulgate specious facts to its subscribers, who always have the option of not renewing their subscriptions.

What is of concern to the rest of us is that CSF should publicly proclaim itself to be a body involved in scientific research and that it should seek, using political tactics, to have its peculiar brand of pseudoscience included in the science curricula of [our] schools.

(Note: Australia has no equivalent Establishment Clause in their constitution, so the legal issues are very different from those in the U.S. -- Ed.)

BAS INFLUENCE by Robert Sheaffer

The following was broadcast on ABC-TV's popular show "Entertainment Tonight," 6 February, reaching an audience of millions:

The E.T. Insider begins today with the news that did NOT happen, the predictions of those tabloid sages who can see the future. According to a San Francisco publication called the "Bay Area Skeptics Information Sheet", psychics made the following predictions for 1989 which did not come to pass:

Eddie Murphy did not get married. Prince Charles did not have a nervous breakdown. Ted Kennedy didn't marry Donna Rice. And, a UFO did not crash in Kansas.

Newspaper coverage for the "BASIS" article was picked up by the "Oakland Tribune" of 5 February in which it ran a line "Unhappy Mediums: Here's one prediction that came true in 1989: Bay Area Skeptics said the nation's psychics would make fools of themselves, and they did."

ESP AND dQ OVER T by Harold Morowitz

ESP, "extrasensory perception," has become the most widely known term from the general field of psychical phenomena. Of all the borderline effects, ESP comes closest to scientific respectability by being perceived as similar to the paradigms of normal science. However, confusion exists because ESP has two quite different meanings.

One school of thought believes that information may be transmitted from one individual or object to another individual or object by means of physical signals that we have not as yet discovered. These carriers may be electromagnetic waves in some little-studied spectral range, or gravity waves, or some other type of ill-characterized energy transmission. Such a postulate has the virtue of being within the framework of contemporary physics. Other advocates of ESP believe that transmission involves methods that are totally outside the range of measurement of physical devices and are not energy dependent in the thermodynamic sense.

The first concept of ESP does not fit the ordinary meaning of the

words, for if a physical signal is sent from a source with a sending device to an individual with a receiver, there is nothing extrasensory about the process. It is de facto sensory; we have only failed so far to locate and characterize the sense organ. Such phenomena may be very interesting, but nothing revolutionary is being explored that is likely to change our philosophical concepts or science. I would suggest that we use the term USC, "unidentified sensory communication," to describe such phenomena. This may cause some confusion with the University of Southern California, but usage doubtless will make clear which USC is intended.

The second type of ESP, or true extra sensory perception, is an entirely different kind of idea. If it is proved to exist, it will seriously alter our ideas about physics and biology. This kind of ESP would, as we will show, violate the Second Law of thermodynamics and force a basic reformulation of most of science.

To examine this discrepancy between psychic phenomena and normative science, we go back to the mid-1800s. The Second Law of thermodynamics states that spontaneous processes always tend toward maximum disorder. The measure of this submicroscopic chaos is called "entropy", and changes in this quantity are computed from the changes in the heat, dQ , divided by temperature, T .

Shortly after the original findings about entropy increase, James Maxwell posed the following paradox. He imagined two boxes of the same gas of equal volumes and equal pressure with a wall between them. In the wall he assumed a tiny trap door operated by a minuscule creature. When the being saw a molecule approaching the door from the right and no molecules approached from the left, it opened the door; otherwise the door was closed. As this process was repeated, an excess of molecules was built up in the left-hand chamber and a deficit developed in the right.

Carrying this out from sufficient time would result in all of the molecules on the left and none on the right. The hypothetical creature became known to science as Maxwell's demon. His devilishness consisted of defying the Second Law of thermodynamics by spontaneously changing the state of the gas from the disordered uniform distribution to the more ordered state showing a concentration difference.

DEMON EXORCISED

The annoying demon hung around in physics for a long time, until he was exorcised by using the powerful methods of information theory that had just been developed by C. E. Shannon. In order to know when to open the door, the demon would have to make observations, that is take measurements on its environment. The demon would require photons or some other physical signal to see the molecules. Such signals require the expenditure of energy. This power expenditure leads to at least as much molecular disordering in the measurement as can be gained by opening and closing the door at the appropriate times.

The crux of this scientific argument is that you cannot get something for nothing, EVEN INFORMATION. Energy must be expended in learning about the state of the system. This reasoning, which was put in more detailed mathematics by information theorists, resolved the problem that Maxwell had set over half a century.

Now assume the possibility of extrasensory perception. In the problem set by Maxwell it would correspond to a demon who would know the state of approaching molecules without any accessory disordering reactions. This would of course violate that revered Second Law. And as everybody who remembers that $PV = nRT$ will be quick to see, a difference in the number of molecules in the two boxes is equivalent to a difference in pressure. Such a pressure differential allows a force to be exerted on a piston and permits mechanical work to be done.

After one round of such work the demon could once again engineer a pressure difference and power could be generated. Thus if true ESP exists, we can design a device to continuously convert the heat of matter into work. Among other benefits to mankind the energy crisis would immediately be solved.

By this time you are probably looking at your leg to see if some demon author is pulling it. Not so! In plain old-fashioned physics extrasensory perception, if it exist, could counter the laws of thermodynamics and usher in a golden age of energy. The Maxwell demon is not an essential part of the argument. Any knowledge of the state of a system obtained without taking a physical measurement lowers the entropy and opens up the previous possibilities. All right, supporters of ESP, the ball is in your court.

While musing over these matters, I chanced upon an article reporting on a number of secret CIA memos from the 1950s that had just been released under the Freedom of Information Act. One such document revealed the secret agency had considered using ESP to spy on unfriendly powers. This suggests limitless possibilities, a "mind tap" without a court order and countless other invasions of privacy. In any case, this memo demonstrates how far psychic thinking has crept into the establishment mentality.

Come, come, gentlemen, I thought, are we to be a nation of "Second Law and disorder," or are we going to flirt ideologies, alien even to the laws of physics? With ESP and the laws of thermodynamics, we can only have it one way or the other. There is no happy medium.

(From "Mayonnaise and the Origin of Life," Bantam, courtesy J. Taube.)

OH MY, OMARR

Who is the best-know astrologer in the United States? Sydney Omarr, whose daily horoscope is syndicated nationally in more newspapers than any other column save Ann's and sister Abigail's.

This most popular of all astrologers polished his crystal ball, looked up the charts of the opposing Super Bowl contenders and made a nice pile of horse pucky so soft and full of innocuous gas that any way you smelled it was posies: "[Joe Montana] is on a high cycle." "An upset is not outside the realm of possibility." Etc. .

..

However, there was one little ragweed in the pile. The entire feature article ("San Jose Mercury", January 19, 1989), after a numbing, mumbling, bumbling mish-mash, said only one single thing, the second half of which could rightly be classed as a prediction: "If San Francisco wins, IT WON'T BEAT THE POINT SPREAD" (emphasis added).

Oh Sid, we do so hope that all your astrology junkies who ran to their bookies to cash in on the best advice the aspects have to offer called you after the game. They should ask you to open your coffers -- filled from the purchase of your books and horoscopes -- to reimburse them for the bum counsel you gave.

If you don't think you owe them anything for accepting your stinkers, you might act more responsibly by adding a P. T. Barnum caveat in 36-point bold print at the front of your soothsaying. Or you might refer your worshipers to the "Mercury" comics page next to "Robotman," where your daily horoscope appears.

Omarr is probably safe. The faithful are very long on patience and very short on memory.

TRUE HERBALISM

by Dan Dugan

I don't usually read the garden column in the paper, but the headline caught my eye: "10 false beliefs damaging image of true herbalism." Marie Hammock, writing in the "S. F. Examiner" of August 6, 1989, reviewed a talk given by Verro Tyler of Purdue U. to the Herb Growers and Marketers Association in late July.

Tyler really worked over the belief system of what he calls "paraherbalism," the unscientific use of herbs. He named ten false beliefs: 1) A conspiracy by the medical establishment discourages the use of herbs; 2) Herbs cannot harm, only cure; 3) Whole herbs are more effective than their isolated active constituents; 4) Natural and organic herbs are superior to synthetic drugs; 5) The doctrine of signatures is meaningful (significance of form and shape); 6) Astrological influences are significant; 7) Reducing the dose of a medicine increases therapeutic potency (homeopathy); 8) Physiological tests in animals are not applicable to human beings;

- 9) Anecdotal evidence of therapeutic value is highly significant;
- 10) Herbs were created by God specifically to cure disease.

He concluded that "More misinformation regarding the safety and efficacy of herbs is currently being placed before the public than at any previous time, including the turn-of-the century heyday of patent medicines." Tyler says that true herbalism is "the wise use of safe and effective herbs by an interested and informed public, the scientific study and testing of herbs and the honest reporting of such results in the literature the public reads. It also includes the production and ethical marketing of herbs."

It seems to me that when you take away the ten false beliefs you don't have much left to call "true herbalism." In any case, kudos to Marie Hammock and the "Examiner" for good reporting.

SCIENCE WON MEDIUM

Dr. Kevin Padian, a professor of biological evolution at UC Berkeley, addressed the January meeting of BAS. His topic was the California Science Framework, a document on which a committee of the State Department of Education (DOE) has been working for over a year. The committee had 16 people, only three of whom were professional scientists. Dr. Padian was the director.

The Framework document, available from the Department of Education, Box 944272, Sacramento 94244, is 187 pages in its final draft. It has no legal force: its purpose is to give direction to textbook publishers for what the DOE wants the public schools (K-9) to have in the classroom. There is no DOE textbook adoption policy in grades 10-12, but the influence from the lower grades cannot be overlooked.

California is the leader in textbook adoption because of sheer numbers. That, coupled with the practical economics of the system, are such that only three or four different text books are printed for each subject, so most of the rest of the western states will get what California chooses. The stakes are very high.

It seems a little silly to have to say that the Science Framework is to provide a framework for science education. Unfortunately, fundamentalist Christians raised such a stink about the whole process that much of the public perception has been that the Framework is a document only about biology. Because of the Christian right-wing interference, most of the outside debate turned about the creation/evolution question.

Padian shocked us with the revelation that the thirteen non-scientists on the committee reacted mostly to pressure. Sheer volume. Letters from highly qualified specialists did not match the quantity of the creationist's barrage, so it is perhaps remarkable that the final document has any integrity at all.

COMPROMISE

The hard reality is that the militant fundamentalist right politicized the whole process. The forging of a framework for the California science curriculum should be based upon the best prevailing evidence, presented in the classroom in the most pedagogically sound fashion. The flood of fundamentalist lobbying disrupted the normal process and cast a political pall over the entire proceedings, resulting in revisions to placate creationist threats.

There were some at the BAS meeting who thought Padian's committee had sold out to the creationists. Skeptics suggested that, contrary to what Kevin said -- "science won big" -- science may have won the battle but it lost the war. Some in BAS thought that any concession, however minute, amounted to capitulation. These skeptics pointed out that since the creationist position is absolute they cannot accept compromise, so what is the percentage in offering it? The creationists would go to court and challenge everything that contradicted their faith anyway.

Dr. Padian's energetic efforts since the committee closed the document have been directed at changing the perception presented by the press. Newspapers nationwide have focused on the changes made in later revisions without saying anything about what remained in the work. The sentence, "Evolution is a fact." was taken out, and that brought a deluge of print about how evolution was removed from the Framework, which is a gross distortion. The Fourth Estate seemed to convey the idea that science lost big. Padian wants us to see that science won big -- that the concessions to creationists were not substantive.

Since, like it or not, the process became political, political reality is one of compromise. The real question is if the general thrust of the document was compromised. "Evolution" is used over 200 times in the final draft. It says that evolution is a fact as well as a theory, and that evolution MUST be taught as an integrative principle -- evolution cannot be avoided in the teaching of science. Padian argued that the general thrust had not been sabotaged.

There may even be some hidden benefit to the public perception that evolution is played down or out of the Framework. It might serve to mute some of the harangue against modern science education according to the guidelines of the Framework.

NEW VS. OLD

The old Framework lacked detail. It didn't integrate the whole of science with general themes, and even conveyed some misunderstanding if not downright error. It emphasized fact over theory, even suggesting that science lacks doubt about major theories.

This new Framework emphasizes theory over fact. Theories are robust, alive, interesting and educational. Theory is more important than fact; the new Framework seeks to displace memorization of facts with teaching investigation and formation of theories. It tries to make what we know, AND HOW WE KNOW IT, the goal of science education.

The new Framework seeks to work within the entire science curriculum to show how theories interact and influence interdisciplinary thinking. Good theories give themes that knit knowledge together. The new Framework distills six themes that must be presented in texts:

- => Scale and structure
- => Energy
- => Evolution
- => Systems and interactions
- => Patterns of change
- => Stability

MISCELLANY

Someone raised the question of individual belief. Should the classroom have as its goal the direction and formation of belief? Kevin pronounced a very important point: "Education does not compel belief -- only understanding. We don't CARE what a student believes," he said.

Education can only have as its function to help the student understand nature by the best available evidence. What or how the student incorporates that understanding into his or her personal life is of no concern or even interest to science education.

Padian took occasion to dispense with a couple of very common misconceptions about his specialty, evolutionary biology. The first is that evolution is goal-seeking, or progressive. Evolution in a particular direction does not imply that there is "progress" in that direction. The only thing that "works" from an evolutionary point is survival.

In this sense it might be argued that insects have "progressed" the most because they are easily the most durable form of animal life on the planet. Modern science has failed, with all its technological wizardry, to eradicate a single species. (Some heretics have even suggested that man's only function is to provide a meal ticket for bugs: they eat us and our food.)

The second one is the even more common notion that mutations are mostly harmful. Many have suggested that more than 99.99% are harmful. The reality is that mutations are almost all neutral, producing no observable change whatever. For the few mutations that do have some effect, what they might produce is a function of the environment: the same mutation might be deleterious in one

circumstance and beneficial in another. The "value" of a mutation is therefore subjective, undetermined of itself.

Science won at least medium.

CREATIONISTS ISSUE A PHONY SCHOOLBOOK

by William Bennetta

The Foundation for Thought and Ethics (FTE) a fundamentalist group in Richardson, Texas, has produced a religious book that is being promoted to biology teachers as "a supplemental high school text." Called "Of Pandas and People", the book is simply a reworking of some doctrines of "creation-science" -- the pseudoscience by which fundamentalists purport to show that the Holy Bible is an infallible account of history, that the universe was created supernaturally (and essentially in its present form), and that humans do not share any ancestry or evolutionary history with other organisms.

The teaching of "creation-science" in public schools was precluded in June 1987, when the Supreme Court decided "Edwards v. Aguillard". At issue was a law that authorized "creation-science" instruction in the schools of Louisiana. The Court -- affirming an appeals-court judgment that had found "creation-science" to be a body of anti-scientific religious beliefs -- characterized "creation-science" as "a religious viewpoint that rejects evolution in its entirety." Teaching it in public schools would violate the establishment clause of the First Amendment, which forbids any law that would establish an official religion.

In "Pandas" we see a new restatement of that "religious viewpoint." All the material that the book presents has appeared in earlier screeds issued by creationists, but the FTE's writers have subjected that material to a purging. It no longer refers to biblical passages or miracles. It disguises the biblical God as a nameless "intelligent agent" whose only evident function is to make organisms in a non-evolutionary way. And it is not called "creation-science" anymore.

It is the same old stuff, however, and quite recognizable to anyone familiar with the writings of "creation-scientists": false statements, doubletalk, misleading analogies and straw men, gilded here and there with distorted quotations from legitimate scientific literature. Here are two examples:

In denying that organic evolution has happened, the writers face this problem: Their assertion is demonstrably false. Cases exist in which speciation -- the evolution of a new species -- has been directly observed, and many science teachers know this. (See Catherine A. Callaghan's "Instances of Observed Speciation" in "American Biology Teacher" for January 1987.)

The writers try to skirt this truth by saying, on page 19, that speciation is not evolution: "Evolution requires the expansion of the gene pool, the addition of new genetic information, whereas speciation represents the loss of genetic information." That is not even wrong. It is absurd. It has no basis or meaning in science, and it evidently is aimed at people who think that anyone who says obscure things must be wise.

Now look at chapter 6, which purports to refute the view that biochemical similarities among organisms bespeak evolutionary relationships. As the writers acknowledge, the chapter draws from a dramatically titled book that first was published in 1985: "Evolution: A Theory in Crisis", by Michael Denton. It was not a scientific work but a mystical, mass-market book that included much of "creation-science," and it soon became a favorite among fundamentalist preachers and their followers.

Soon, too, it was discredited by scientists, because Denton had not bothered to learn anything about evolutionary biology before he started to write. He was preoccupied with notions that science had abandoned long ago, such as the idea that organisms should represent a linear progression or "ladder" of forms, and his book was ludicrous. (For a succinct analysis, by Michael Ruse, see "New Scientist" for 13 June 1985.)

Despite all that, "Pandas" reverently recycles Denton's stuff, including the mistake that he made as he tried to guess what biologists infer from biochemical evidence: He guessed that they think that today's mammals, today's birds and other modern organisms have evolved from still another MODERN species. Then he did some meaningless exercises with the protein cytochrome c.

Cytochrome c is a showpiece in the study of evolution, for it occurs -- with variations in the sequence of its amino acids -- in a wide range of organisms. By charting the variations, biologists chart evolutionary relationships. Denton tried it too, using data from Dayhoff's "Atlas of Protein Sequence and Structure", but he got it all wrong. He confused, for example, a modern bacterium with its ancestor that lived 2 billion years ago, and he made the - "astonishing" finding that there was no "intermediate" between the modern bacterium and a modern horse or pigeon. The bacterium was not the horse's or pigeon's ancestor!

The writers of "Pandas" borrow Denton's inane technique and use it to erect and kill a series of straw men. For example: They cite data about the cytochromes of a modern pig, a modern duck and each of several other modern organisms, and then they announce, on page 144:

"[T]he cytochrome c of wheat (Figure 6-11) is equally separated and distinct from the cytochromes of other eukaryotes, whether a pig, a duck, a turtle, a bullfrog, a carp, a silkworm moth, or a yeast. None of the species is ancestral to any other."

Right. But no biologist thinks, in the first place, that any such "ancestral" relationship exists. No biologist holds that a modern carp is the ancestor of a modern duck or a modern yeast.

Similarly, and with fatal results for another straw man, the "Pandas" writers compare the cytochrome c of a modern moth with the cytochromes of a modern human, a modern penguin, a modern turtle, a modern tuna and a modern lamprey. The only significant part of their exercise is the way in which they describe it: They say that it "compares the cytochrome c of a silkworm moth to the cytochrome c of five vertebrates supposedly widely distributed up and down the evolutionary ladder." Their notion that scientists credit an "evolutionary ladder" -- a concept that science discarded some 200 years ago -- shows again how isolated these "creation-scientists" are from science.

An advertisement for "Pandas" ran in the November 1989 issue of "The Science Teacher", the monthly journal of the National Science Teachers Association (NSTA). According to the advertisement, the book had "been prepared with academic integrity," and had been "Authored by mainstream, published science educators." Those claims were specious.

The opening pages of "Pandas" show two authors (Percival Davis and Dean H. Kenyon), an "academic editor" (Charles B. Thaxton), thirty-five "critical reviewers" and eight "editors and contributors," but none of them is identified by any affiliation or profession. They are just naked names. Let me provide some clothing:

PERCIVAL DAVIS, also known as P. William Davis, teaches biology at Hillsborough Community College in Tampa, Florida. I called him on 5 August 1987 (after I learned of the FTE's work on the book that eventually would become "Pandas") to ask for a copy of his curriculum vitae, and I then iterated my request in letters sent on 6 August and 3 September. He sent nothing. I wrote again on 30 November 1989 (when "Pandas" had been published and was being advertised), noted that he was being billed as a "mainstream, published science educator," and again asked for his "cv." Again, he sent nothing.

DEAN H. KENYON is a tenured professor of biology at San Francisco State University -- a position that he got before he got fundamentalist religion. His conversion evidently took place in the early 1970s. Since then, he has contributed almost nothing to the formal scientific literature. He keeps his tenure and title, however, and these equip him for a unique role in the creationists' show: He belongs to a respectable department of biology, but he publicly endorses various doctrines of "creation-science."

In 1981 he went to Little Rock to testify, in the federal court there, for an Arkansas statute that would have authorized the teaching of "creation-science" in that state's public schools; but he then left town before he could be called as a witness. Later he

wrote an affidavit supporting the Louisiana statute that was nullified by the Supreme Court in 1987.

I wrote to Kenyon in August 1987 to request his "cv", but he did not reply. I wrote again in December 1989, and this time he answered. But instead of sending his "cv", he asked me for mine. He thus invoked a maneuver that is favored by his kind: When a pseudoscientist is asked about his claims or credentials, he may try to deflect attention from them by demanding the credentials of the questioner -- even if the questioner is making no claims and has nothing to support or defend.

That was the case here: *I* was not making any claim about being a "mainstream, published science educator" or anything else; nor was any publisher making any such claim on my behalf. I was sorry that Kenyon had expected me to accept his trite gambit, and I did not correspond further with him.

CHARLES B. THAXTON claims a doctorate in physical chemistry but seems not to have done any scientific work since he left college. He works at The Julian Center, a religious community (in Julian, California) whose doctrinal statement says that biblical scriptures "are the final authority when speaking on any matter: doctrinal, historical, ethical, or scientific," and that there are "evil spirits, called demons," that eventually will be put into a "lake of fire" by God.

The Center's listing of faculty calls Thaxton an "outstanding scientist" but does not mention any scientific work or interests. When I wrote for Thaxton's "cv" in 1987, he sent two evasive answers. When I tried again, on 30 November 1989, the reply came from Thomas T. Anderson, a lawyer (in Indio, California) who has been involved in various creationist causes. "Dr. Thaxton," said Anderson, "has decided to follow my advice and not send you the requested information. It would be appreciated if hence forth [sic] any correspondence concerning this matter be sent to me."

Such are the "mainstream, published science educators" who have concocted "Pandas". None of the three is listed in the "American Men & Women of Science", but all appear on the FTE's letterhead as members of the FTE's "Council of Academic and Educational Advisors."

As for those "reviewers" listed in "Pandas": Some, as far as I can tell, have not been conspicuously associated with "creation-science" heretofore. Some others, such as Norman L. Geisler, surely have been. Geisler is a creationist minister from the Dallas Theological Seminary. He gained brief fame in 1981, when he was a witness in the trial engendered by the Arkansas "creation-science" statute -- the trial from which Dean H. Kenyon disappeared without testifying. Under cross-examination, Geisler admitted that he not only liked "creation-science" but also thought that unidentified flying objects were "a satanic manifestation in the world for the purpose of deception."

Three more of the "reviewers" listed in "Pandas" demand attention here. They are J. David Price, John L. Wiester and Walter R. Hearn, and they already have won prominence in the game that the FTE now is playing: trying to put "creation-science" into public schools by offering bogus publications to science teachers.

In 1986, under the aegis of the American Scientific Affiliation (ASA) -- a religious organization with a misleading name -- Price, Wiester and Hearn produced a handsome booklet of creationist pseudoscience. And the ASA then mailed copies to tens of thousands of high-school teachers.

The booklet, "Teaching Science in a Climate of Controversy", sought to convince teachers that scientific inferences about the history of life on Earth were just flimsy fancies. The writing was restrained, but the content was classic creationist quackery. (See my article "A Question of Integrity," in the spring-1987 issue of "California Science Teacher's Journal".)

Soon after I saw the advertisement for "Pandas" in the NSTA's monthly, I spoke with the NSTA's assistant executive director, Marily DeWall, and I summarized what I knew about the book's content and history. She replied by saying that no more advertising for "Pandas" would be taken by the NSTA's publications. This was a right decision, consistent with the NSTA's concern for scientific integrity. "Pandas" is bogus from cover to cover, and it has no place in science classrooms.

BOOK REVIEW

by Yves Barbero

"Cosmic Catastrophes" by Clark R. Chapman and David Morrison, 302 pages, including a glossary and index (Plenum Press, \$22.95).

Finally, a truly useful analysis concerning cataclysmic celestial events for those of us who have little or no math and even less formal scientific training. And imagine the pleasant surprise when we have it in well-written English to boot.

For years I've been catching a newspaper article here and a longer magazine piece there. Occasionally, they were excellent expositions but more often than not, they were written by a bored reporter or a scholar with an ax to grind or in a language only he and a dozen or so peers could understand.

What was needed is finally provided by the Chapman/Morrison book. "Cosmic Catastrophes" covers all the bases: impacts from space, the death of the dinosaurs, the much-talked about nuclear winter, the new science of chaos theory, the origin of the moon, colliding worlds, comets, craters, climatology, the greenhouse effect, the ozone depletion, supernovas (a particular delight was reading what

the 1987 supernova in the Southern Hemisphere meant insofar as scientific theories were concerned) and the death of the Sun.

The book also provides an excellent thumb-nail history of the uniformitarianism verses catastrophism debate. This is important in the context of the scientific creationist's tactics. The creationists use the early 20th-century view of uniformitarianism in their debates, and modern uniformitarianism is a very different concept. Few lay readers get an insight to this information except those of us strange enough to regularly read Stephen Jay Gould in "Natural History" magazine.

Yes, the authors do cover scientific creationist claims in some detail, and our old friend, the late Immanuel Velikovsky, is analyzed as an example of "catastrophism gone wild." The book even covers other fringe catastrophism notions, including one very popular at the time of Nazi Germany when academic (Jewish) science was rejected. Fringe science is not always just merely silly. It's sometimes dangerous.

The book is thorough, provides a useful glossary, is written for the intelligent layman, seems biased for ecological concerns (atmospheric warming is well covered), insists on the scientific approach and even names names. It's an ideal book to give to a bright kid or a discerning adult. I can find little to fault it except that I would have liked it to have been longer.

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