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The Earth's Magnetic Field: Closing a Loophole in the Case for its Youth

by D. Russell Humphreys, Ph.D.

According to recently evaluated data, the *total* energy in the Earth's magnetic field is decreasing rapidly (Humphreys, 2002). This contradicts frequent evolutionist claims that a minor ("non-dipole") part of the field is storing up enough energy to compensate for the large and steady loss of energy from its main ("dipole") part. These claims stem from an epic battle between a creationist physicist, Thomas G. Barnes, and an evolutionist geologist, G. Brent Dalrymple.

Field Fisticuffs

Three decades ago, Dr. Barnes (1971) began publicizing a "trade secret" about the earth's magnetic field. The field's main ("dipole") part has been losing energy rapidly and steadily since it was first measured in the early 19th century — about 15% in 170 years! He showed how such a loss was fully consistent with a very reasonable explanation: that the electrical resistance of the earth's core was steadily dissipating the field's energy as heat (Barnes, 1973). He pointed out that such a rapid energy loss could not continue for more than about ten thousand years, making a powerful case for a young magnetic field, and hence a young earth.

For nearly a decade, evolutionists ignored this argument, hoping it would go away. Finally, Dalrymple (1983a,b) published several papers intended to quash Barnes' case. He pointed out that Barnes had ignored strong fluctuations in the field prior to about three millennia ago, and many reversals of the field's direction recorded in the geologic strata. He implied that the present decline of the field was merely another magnetic reversal in progress. Barnes (1984) answered by arguing that magnetic reversals and fluctuations had never occurred.

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Book review

Unleashing the Meme: Is this the End of our Existence?

by Peter Line, Ph.D.

The Meme Machine
by Susan Blackmore
Oxford University Press, New York, 1999. 264 pages, $14.95 (paperback)

On the cover of the 13 March 1999 *New Scientist*, which featured an article on memetics, was the statement "You don't exist: It's just a trick of the memes." Basically the article suggested that our existence is an illusion — the only reason for our being allowed to think we exist is because, in creating our minds, strange evolutionary replicators, called memes, craftily incorporated an illusion of self-consciousness for the sole purpose of replicating and spreading themselves (Blackmore, 1999a). In this strange new world of memes, humans are given little more dignity than mobile robots used by mind viruses as hosts.

The term "meme" was coined by the well-known atheist and evolutionist Richard Dawkins, and made its debut in his book *The Selfish Gene* (Dawkins, 1976). Susan Blackmore, a freelance writer and former reader in psychology at the University of the West of England, Bristol, and currently one of the most prominent and outspoken memetic theorists, states that a "meme is an evolutionary replicator, defined as information copied from person to person by imitation" (Blackmore, 2001).

Using the general principles of evolutionary theory, better known as Universal Darwinism, Blackmore has built on the foundational speculations of Richard Dawkins, Daniel Dennett, and other memeticists, as well as ideas from cultural anthropology, psychology, cognitive science and neuroscience, to produce a book-length exposition of what she calls a science of memetics. Dawkins wrote the fore-

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A Fan Enters the Ring

Although I was rooting for Barnes in the debate, I did not find his arguments about reversals and fluctuations persuasive. After studying the issue, I concluded that the evidence for past magnetic reversals is very strong (Humphreys, 1988). To explain them, I generalized Barnes' theory to allow for rapid motions of the electrically conductive fluid in the earth's core. I proposed that such motions would produce rapid (day-to-day, week-to-week) reversals of the magnetic field during the Genesis flood, and strong fluctuations in the field for several millennia after the flood. I also predicted evidence that would support my theory (Humphreys, 1986). Later, two experts in that discipline found such evidence (Coe and Prévot, 1989).

In 1990, I published a more detailed physical model for the reversals, and I showed that the field would lose energy during the reversals and fluctuations even more rapidly than today (Humphreys, 1990). The loss rates mean that the field is definitely less than tens of thousands of years old, and they are fully consistent with a 6000-year age. An article in the prestigious journal *Nature* (Coe *et al*., 1994) disclosed more evidence for rapid reversals, evidence again confirming my 1986 prediction.

After that, as far as I know, evolutionists stopped using scientific journals to attack the Barnes-Humphreys theory. Back in 1986, after seeing my paper, Dalrymple did not take the opportunity to be one of its official reviewers, even though his review would have been published verbatim. I suspect the skeptics wanted to keep the original Barnes version of the theory as a "straw man" for behind-the-scenes attacks, without calling attention to my less-vulnerable version.

Whatever the reason, criticism of the theory retreated to less scientific and less public arenas, such as skeptics' web sites. There the attacks have persisted, mainly centering on another of Dalrymple's claims, involving the "dipole" and "non-dipole" parts of the field. The next section explains what those parts are, and the following section explains what Dalrymple claimed about them.

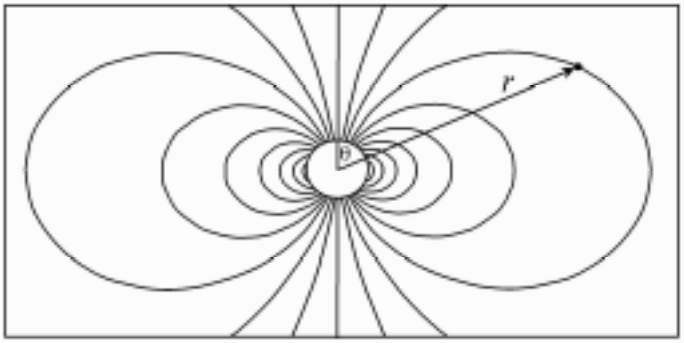

Figure 1. *Pure dipole field around a sphere.*

Dipole and Non-dipole Fields

Figure 1 shows the magnetic lines of force in a pure dipole field. The lines emerge from and converge toward two regions called "poles" (hence, "*di*-pole"), north and south. What makes it a "pure" dipole field is the fact that the lines have the particular shape I have shown. Several things can produce a pure dipole field shape. One would be a very small but powerful bar magnet at the center of the sphere, as Figure 2(a) illustrates.

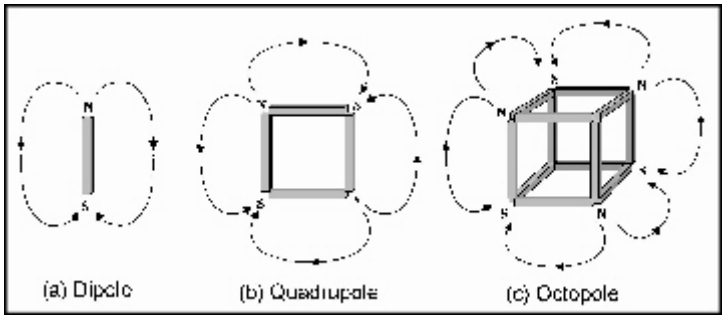

Figure 2. *Dipole and non-dipole magnetic fields from bar magnets: (a) dipole, (b) quadrupole, and (c) octopole. Each source can have various orientations relative to the coordinate axes.*

The earth's magnetic field does not have a purely dipole shape. In various places it can differ from a dipole field by as much as 10% in direction or intensity. Geomagnetic specialists describe the deviations mathematically by adding more magnets. That is, to the pure dipole field of a tiny bar magnet, they might add a small amount of a four-pole ("quadrupole") field, such as a square of four bar magnets would produce, Figure 2(b). If that does not quite account for all the deviation, they add a yet smaller "octopole" part, such as a cube of bar magnets would produce, Figure 2(c). They can continue the series for as many parts as is feasible. The sum of all the non-dipole parts is the non-dipole field.

Of course, bar magnets are not the actual sources of the earth's magnetic field. The real causes are electric currents, most of them in the earth's core. A roughly six billion ampere, doughnut-shaped loop of current (Figure 3), thousands of kilometers in diameter, causes the dipole part. Smaller loops (hundreds of kilometers in diameter) of smaller currents (thousands to millions of amperes), in all sorts of orientations, are a likely cause of the non-dipole parts of the field (Figure 4). Another possible cause would be a small displacement (a few hundred kilometers) of the main loop of current northward of the center.

Many different combinations of current loops could produce the field we ob-

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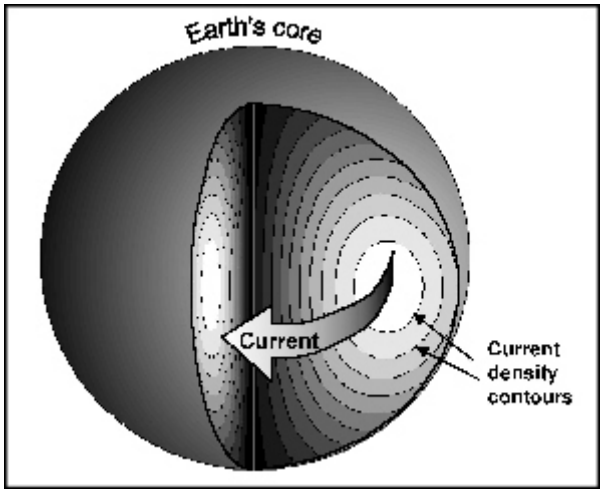

Figure 3. *Current producing the dipole part of the earth's magnetic field, about six billion amperes.*

serve, but the mathematical specification of the magnitude of the sources of the field is unique. That is, a specific amount of "dipole moment" produces the dipole part of the field, a specific amount of "quadrupole moment" produces the quadrupole part, and so on.

Raiders of the Lost Energy

Now we can specify Dalrymple's second claim. Referring to the report (MacDonald and Gunst, 1967) Barnes was publicizing, Dalrymple wrote:

> "The same observatory measurements that show the dipole moment has decreased since 1829 also show that this decrease has been almost completely balanced by a corresponding increase in the strength of the nondipole field, so that the strength of the total observed field has remained about constant." (Dalrymple, 1983b, p. 3036)

Dalrymple's use of the word "strength" above is ambiguous. If he meant "strength of the nondipole field" to mean the various non-dipole moments, then it is not clear how to compare them to the dipole moment or each other. Magnetic moments (dipole, quadrupole, octopole, etc.) have different physical units (ampere-meters^2, ampere-meters^3, ampere-meters^4, etc.), so comparing them is like comparing apples and oranges.

The same confusion afflicts his phrase "strength of the total observed field." If he meant "magnetic field intensity" (called *B*), that quantity varies from place to place and day to day. However, Dalrymple is not a physicist, so it may be unreasonable to expect him to use physics terms precisely. The context of his quote above is "energy," and if we use that word in his statement, we get a physically meaningful claim:

> "… the decrease [of energy in the dipole part] has been almost completely balanced by a corresponding increase in the [energy] of the nondipole field, so that the [energy] of the total observed field has remained about constant."

This is consistent with the general thrust of Dalrymple's argument. He appeared to be claiming that energy lost from the dipole part was not being dissipated as heat but being stored up in the non-dipole part. Later, he hoped, the stored energy would be converted back into a dipole field of reversed direction, as strong as before. That way, the field might maintain its energy through reversed and normal cycles for billions of years. As far as I know, the skeptics have not clarified Dalrymple's ambiguity, but they appear to be intuitively interpreting it the way I have.

Better Data Since 1970

Barnes answered Dalrymple by dismissing the non-dipole part of the field as "noise" (Barnes, 1984). While that statement incorrectly ascribes unreality to the non-dipole part of the field, it correctly implies that the non-dipole fields had not been measured very accurately up to that time. Dalrymple had based his second claim on a recent increase in the non-dipole energy [McDonald and Gunst, 1967, p. 28, Figure 3(e)]. However, the increase was small compared to the scatter in the data points. To estimate energies, the non-dipole parts need to be more accurately measured than the dipole parts (Humphreys, 2002). The 1967 data were simply not good enough to support Dalrymple's point.

However, shortly after 1967, the non-dipole measurements began to get better. The International Association of Geomagnetism and Aeronomy (IAGA) organized a systematic global effort to gather and publish more accurate data on the earth's magnetic field. In 1970 they published the International Geomagnetic Reference Field (IGRF), a table of 129 numbers describing the dipole and non-dipole parts of the field that year. Every five years since then, they have published more tables. The whole set of 903 IGRF numbers from the years 1970 to 2000 are the most definitive description we can get of the earth's magnetic field and the changes in it (Mandea *et al*., 2000).

The Results: Good News for Creationists

Last year, spurred by not-infrequent questions on the issue, I downloaded the IGRF web site data and began turning the mathematical crank to determine the amount of energy in the dipole and non-dipole parts for each year. The details are in my *Creation Research Society Quarterly* technical article (Humphreys, 2002), which should be preprinted on the Society's web site soon. The bottom line is that from 1970 to 2000, the dipole part steadily lost 235 ± 5 billion megajoules of energy, while the non-dipole part gained only 129 ± 8 billion megajoules. Over that 30-year period, the net loss of energy from all parts was 1.41 ± 0.16 %. At that rate, the field would lose half its energy every 1465 ± 166 years

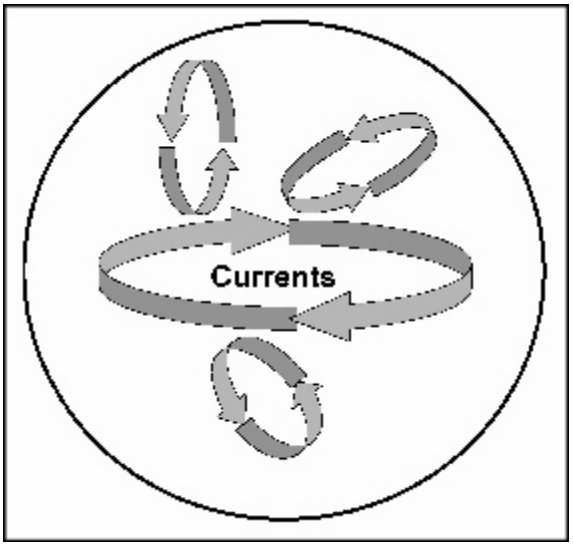

Figure 4. *Currents producing the non-dipole parts of the earth's magnetic field.*

(Figure 5). That high rate implies the field is young.

You may be wondering something about the non-dipole energy: even though its increase was not enough to account for the dipole energy loss, why should it increase at all? The increase is an expected consequence of my theory of reversals and fluctuations (Humphreys, 1990, p. 137). Small swirls and eddies of fluid flow in the core should carve small loops of electric current away from the main loop, as Figure 4 suggests. That would remove energy from the dipole part of the field and add it to the non-dipole parts.

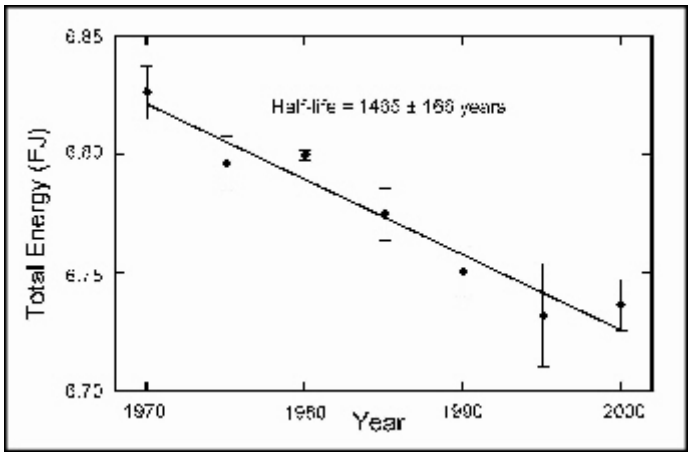

Figure 5. *Observed decrease of the total energy in the earth's magnetic field. Energy is in exajoules (1 EJ = 1 billion billion joules = 278 billion kilowatt-hours).*

However, the small current loops would lose energy faster than the larger loops. The reason is that the decay time of a current loop is proportional to the square of its diameter (Humphreys, 1986, p. 119). The non-dipole parts of the field lose their energy as heat *faster* than do the dipole parts.

Interestingly, the paper Dalrymple cited agrees with me. It commented that fluid motions drive the dipole energy "destructively" into the non-dipole part, causing a higher rate of energy loss as heat (MacDonald and Gunst, 1967, p. 25). Dalrymple seems to have overlooked that comment, since it casts doubt on his hope that the non-dipole energy would be preserved.

As long as the dipole field is strong enough, it will give more energy to the non-dipole part than the latter dissipates as heat. During that time the energy in the non-dipole part should indeed increase. Eventually, however, when the dipole component gets small enough, it will not be able give enough energy to the non-dipole part to compensate for the losses therein. Then, according to the theory, even the non-dipole energy will start decreasing.

At all times, however, the sum of the energies in both parts should decrease — as we see it doing today. Dalrymple's hope is dashed. Barnes was right.

A Tribute to Thomas G. Barnes

Last year Dr. Barnes went into the presence of his Creator and Savior, after a long and fruitful life of service in creation science. It is entirely fitting that these data gathered in the last thirty years should vindicate the insight he had back in the early 1970's: that the earth's magnetic field is as young as the Bible says it is.

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word to Blackmore's book, *The Meme Machine*, and, not surprisingly, he enthusiastically recommended it.

What makes humans different

Blackmore's main thesis rests on the assumption that what makes humans different from other animals is the ability to imitate. When imitating another person, information about something is passed on, and this something has been given the name meme. Passing on a story to another person would count as a meme, because something has been copied. Memes are said to be selfish, like genes, and to indiscriminately spread themselves around, unconcerned about their effects on the host — that is, on us.

Most of our thoughts, it is suggested, are potential memes, but unless they are spoken, they die out immediately. We learn that memes are produced whenever we speak, although the majority of these memes are eliminated during their travels. Memes can also be carried, for example, on radio and television, in written words, in the actions of others, etc.

Because few of the available thoughts become successfully-copied memes, Blackmore argues that the selection pressure is enormous among these potential memes. Successful memes (i.e., the ones that get passed on again) are proposed to be those which not only attract attention, but also induce the host to mentally rehearse them repeatedly. Thus, it appears that memes are nothing more than bits of, presumably, meaningful information that is passed on. These can be accepted or rejected by the receiver.

Incredible claims

Blackmore makes incredible claims as to the explanatory power of memetic theory — from the evolution of the human brain and the origin of language, to why we talk and think too much. Celibacy, birth control, adoption, and altruism are all explained in terms of memetics. According to Blackmore, memetic selection created books, telephones, fax machines, computers, and radios. Even the Internet is suggested as having been created by memes.

There are alien and alien-abduction memeplexes, as well as near-death experiences, Tarot cards, clairvoyance, and a host of other New Age memes and memeplexes. A "memeplex" is a buzzword, used in memetics, that is an abbreviation for "coadapted meme complexes." Memeplexes are groups of memes that cohabit and cooperate together in individual brains, because they replicate better as part of a group. With a theory that makes such sweeping claims, no wonder a reviewer of the book in the journal *Science* commented,

> "Blackmore addresses such large issues — our big brains, language, sex, altruism, religion, the concept of self — that her analysis becomes hopelessly superficial. In each case, huge literatures and complex issues are skimmed and found wanting in a few pages, paving the way for the new memetic approach, which is itself presented in only a few more pages" (Wilson, 1999, p.206).

Regarding the spread of altruism, it is proposed that, because altruistic people become popular, their memes are copied and, hence, spread to others. But, working against altruism is its tendency to be expensive in terms of time and money. Nonetheless, it is said that other "strategies" are available for the spread of altruistic memes. What predictive power, then, does the altruism meme explanation give?

Altruism memes, we are told, spread when the counter pressures are less antagonistic; that is, when time and money are available and other strategies are not employed. So, when is this exactly? It seems that one can only be sure that the counter pressures are less antagonistic when the altruism memes are actually spread. But this is a tautology. The meme concept has been criticized for its tautology, even amongst those in the evolution camp. For example, Jerry Coyne, in a review of Blackmore's book in *Nature*, commented,

> "…memetics seems completely tautological, unable to explain why a meme spreads except by asserting, *post facto*, that it had qualities enabling it to spread. One might as well say that aspirin relieves pain because of its pain-relieving properties. The most interesting question — why some memes spread and not others — is completely neglected" (Coyne, 1999, p.768).

Truth trick

Also, there are non-altruism memeplexes that "trick" their way into altruists to take advantage of the free ride. These non-altruism memeplexes supposedly exploit the situation in altruists by being copied, and hence spread, along with the genuine altruism memes. Apparently, there is another trick used by memeplexes, called the "truth trick," which is used in many religions, and, we are told, seems to be employed actively amongst creationists:

> "At the extreme, people will even tell lies for God and manage to convince themselves and others that they do so in the name of truth — as when 'Creation Scientists' proclaim 'The Truth' that the earth is only six thousand years old, and back it up with denials of the fossil record, or claims that the speed of light has slowed since the creation so as to give the illusion of a vast universe and an ancient planet" (Blackmore, 1999b, p.189).

Dare one suggest that the 'truth trick' is working even more successfully amongst some Darwinists — those who believe that the universe was created out of nothing by nothing, that life in all its complexity was created without any intelligent input, and that our minds are but illusions created by non-conscious mind viruses.

Universal Darwinism

Blackmore tries to bring legitimacy to memetics by bringing it in under the umbrella of Universal Darwinism, as if that concept had legitimacy. Universal Darwinism is the application of Darwinian thinking beyond the limits of biological evolution, to any system where there is variation, selection, and heredity. The meme, as well as the gene, are considered to be evolutionary replicators obedient to Universal Darwinism. The idea of the meme being an outright second replicator, not held on a leash by the genes, is important to memeticists because it allows the

meme to operate purely for its own benefit, and hence become replicated. Blackmore tries to discourage comparisons between memes and genes by insisting that

> "…genes and memes are both replicators but otherwise they are different. The analogy between genes and memes has led many people astray and will probably continue to do so for a long time" *(ibid*, p.66).

In the book, Blackmore fails to heed her own advice repeatedly, as on several occasions she attempts to use analogies between memes and genes to rescue memetic theory. For example, when explaining the difficulty in defining the unit of a meme, she draws an analogy between the uncertainties as to how many words or notes define the unit of a meme, with the uncertainty as to how many nucleotides define a gene. In fending off criticism of memetics, Blackmore states,

> "Memes are no more 'mythical entities' than genes are – genes are instructions encoded in molecules of DNA – memes are instructions embedded in human brains, or in artifacts such as books, pictures, bridges or steam trains" (*ibid*, p.17).

This is a poor analogy because we know that genes are made up of DNA, and are located on chromosomes that reside within cells (within the nucleus of eukaryotic cells). But no one knows what memes are made of or where they are located (Dawkins, 1999), except that they are thought to reside somewhere in the brain, although some memetic theorists, including Blackmore, believe that memes also exist outside of brains (Blackmore, 2001).

Brains and language

A memetic theory is proposed as a better explanation of how we supposedly evolved a large human brain that exceeds our needs. It is suggested that, at the turning point in man's evolutionary history some 2.5 million years ago, when we began to imitate each other, this second replicator, the meme, was only then unleashed, allowing memetic selection for larger brain size to commence. Blackmore's hypothesis, that memes created the human brain, assumes that having a large brain is necessary to be good at imitating, and leads her to predict a positive correlation between brain size and the ability to imitate. No evidence is presented in support of this claim, and, concerning brain size increase, Coyne states,

> "…there is no evidence that brain-size increase had anything to do with memes — there are as many explanations (including language, social grouping, hunting) as there are evolutionists, and no way to judge which theory is best" (Coyne, 1999, p.768).

Many people who are not locked into a materialistic view of life would consider intelligent design of the human brain a much more plausible explanation.

It is argued that the function of language, and the reason we talk so much, is to spread our memes. Blackmore believes that language shows "obvious signs of intricate design" (Blackmore, 1999b, p.94), and expresses doubt that a conventional neo-Darwinian explanation of the evolution of human language is feasible without the help of a second replicator, the meme. She proposes meme-gene co-evolution to explain the mystery of language origins, arguing that

> "…once imitation evolved and memes appeared, the memes changed the environment in which genes were selected and so forced them to provide better and better meme-spreading apparatus" (ibid, p.93).

Hence, according to Blackmore, the big brain and the function of language serve the same purpose — that is, to spread memes. An assumption underlying the meme-gene co-evolution hypotheses (to explain the language development) is that the most successful meme spreaders were the most articulate people, and that these articulate people were preferred as mates by others. At first glance this statement may seem reasonable, but as Coyne (1999) has pointed out, people not usually associated with eloquence, such as sports heroes and super-models, are also high up on the list. One of the many weaknesses with memetics is that,

> "Although Blackmore deems memetics a scientific idea, nearly all of her suggested tests are either impossible to perform or unable to rule out competing theories" (Coyne, 1999, p.768).

And, it might be added; some are refuted by actual evidence.

Memes are claimed to have no "conscious intentions; nor do they actually strive to do anything at all. They are simply (by definition) capable of being copied, and all their apparent striving and intentions come from this" (Blackmore, 1999b, p.162). If memes are not conscious, and do not strive to do anything, then how can memes conspire together to form memeplexes that, in turn, create complex illusions to convince their hosts that they have a self? Why all the competition between memes, or between memes and genes, when memes do not strive for anything, and how can memes perform, for example, altruism tricks if they have no intentions?

A mass of memeplexes

Blackmore claims that both science and religion are a mass of memeplexes, but defends the view that science is a more superior memeplex than religion. She presents the science memeplex as if it was a truth filter by stating,

> "Science is fundamentally a process; a set of methods for trying to distinguish true memes from false ones" (*ibid*, p.202).

If memetics were true, then how could a science memeplex distinguish true memes from false ones without making conscious intelligent decisions? These and other contradictions with memetics, the lack of evidence for the theory, and the grand claims concerning the explanatory power of memetics, makes it more akin to a tall tale than anything scientific.

In memetic terms, all we are "is a massive memeplex running on the physical machinery of a human body and brain — a meme machine" (Blackmore, 1999b, p.235). The self is viewed as an illusion, and described as a vast memeplex, called the "selfplex." It is further suggested that

> "There is no truth in the idea of an inner self inside my body that controls the body and is conscious. Since this is false, so is the idea of my conscious self

having free will" (Blackmore, 1999b, p.237).

To Blackmore, evolutionary theory and memetics belong to science, but how can this be known, as neither she nor anyone else would, in her memetic world, have a real conscious self with a free will to determine this? If our minds are just the products of conspiring memes, then memes control our thoughts. Thus, they could deceive us into believing anything, including that evolution and memetics belong to science. Then again, if we are only illusions created by memes, and the memes themselves are not conscious, who is there left to deceive and be deceived. Clearly, if memetics were true, then there would be no basis for reasoning or truth. All our thoughts would be meaningless if our minds are only illusions.

Getting out of the way

For those who choose to live with the bleak consequences of memetics as ultimate revealed truth, there are even tricks on how to live as though one does not exist. Concerning making decisions, one is advised

> "…to have faith in the memetic view; to accept that the selection of genes and memes will determine the action and there is no need for an extra 'me' to get involved. To live honestly, I must just get out of the way and allow decisions to make themselves" (*ibid*, p.244).

One wonders how a person is supposed to function without making decisions, and what would happen to society if everyone lived according to such a philosophy, as decisions simply do not make themselves. Perhaps one should not despair too much about the meaninglessness of non-existence, which memetics implies, as Blackmore reassures us that "Life really is possible without hope" (ibid, p.245). It is doubtful that many people will find such reassurance comforting. The doctrine of viewing ourselves as mere "meme machines," if actually believed, is, according to Mary Midgley, not a way of life that anyone could actually live, but would most likely result in "helpless fatalism, quickly followed by general breakdown" (Midgley, 2000, p.78).

At the close of her article in *Scientific American*, Blackmore commented,

> "Unlike religions, the great meme-complex of science includes methods for throwing out ideas that are vacuous, nonsensical or plain wrong. It is against these criteria that memetics, quite rightly, will be judged" (Blackmore, 2000, p.61).

Perhaps you will accuse me of jury tampering, but I believe the verdict on memetics is already in — memes are the illusion, not us.

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Peter Line's undergraduate major was in biophysics and instrumental science. After that he completed a Masters Degree and a Ph.D. , both in the area of neuroscience, at a Melbourne University. He currently resides in Carrum Downs, Australia and works as a research officer.

Speaking of Science

Commentaries on recent news from science

Dawkins Attacks Private College that Teaches Creation

The BBC News reports that Richard Dawkins, author of *The Blind Watchmaker* and one of today's most vocal proponents of gradualistic Darwinism, has accused a private "faith" college in England of teaching "ludicrous falsehoods" because it steers its students toward a Biblical world view. Prime Minister Tony Blair defended the school, saying claims it was teaching creationism were "somewhat exaggerated." Emmanuel College was recently rated by inspectors as an outstanding school, but Dawkins and other scientists want its science curriculum to be re-examined.

Apparently the hubbub began with two speeches given March 8 at the college by Ken Ham, prominent American creationist. The college's science curriculum policy clearly states its intent to build on a Biblical foundation rather than a humanistic one. In this, it claims to be in the tradition of Francis Bacon, Robert Boyle, and Isaac Newton.

It's interesting to compare the reaction of the scientific elite with the attitudes with the elites of another era. Put miters on Dawkins and his colleagues, and you have history repeating itself: accusations of heresy, and demands for an inquisition. Darwin has become the new Aristotle, the standard by which truth must be judged.

Instead of applying political pressure, and insisting on conformity to the opinions of those in power, Dawkins and the humanists should act like scientists: engage in honest debate about the evidence.

Anonymous. 2002. School attacked over evolution teaching. *BBC News*, 14 March, 2002. http://news.bbc.co.uk/

Journal Decries US Creation Export to Europe

The journal *Current Biology* contains a news report concerning the recent flap regarding Emmanuel College and Tony Blair's perceived neglect to denounce creationism. (See previous item.) It be-

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Meeting report

61st Meeting of the Society of Vertebrate Paleontology

by Don Ensign

The 61st Annual Meeting of the Society of Vertebrate Paleontology was held October 3-6, 2001 on the campus of Montana State University in Bozeman, Montana. The event was divided into two major sections: paper and poster presentations. The conference abstract booklet lists 235 papers and 281 posters.

The papers and the posters often shared common themes. A series of papers dealt with groups of dinosaurs such as sauropods, theropods, ceratopians and others, often with accompanying poster presentations. Ancient marine reptiles and pterosaurs received attention, as did hominids, ancient mammals, amphibians and fish. There was considerable notice given to birds and their supposed ancestry from reptiles.

Perhaps the most entertaining paper concerned a bizarre fossil reptile called *Longisquama*. The authors set forth the idea that strange strips of skin extending from the animal's body were not feathers. After the paper was read, a gentleman in the audience found their view to be contentious and vigorously argued that the structures were indeed feathers. However, such moments of drama were rare, and most of the papers were rewarded with polite applause.

Technical innovations in the field were noted, and a full symposium was dedicated to fossil preparation. Other papers were presented on tomographic x-ray analysis, bone paleohistology, and global positioning system (GPS) for mapping dig sites. Numerous papers were dedicated to the discovery of individual fossil specimens with special attention to their supposed cladistic and evolutionary significance. The emphasis on cladiograms, phylogenetic speculations, and over-specialized terminology added significant tedium to many presentations.

I was especially looking for two lines of evidence consistent with a creation science/catastrophist evaluation of the fossil record: 1) evidence of fossilization via rapid burial, and 2) evidence of massive fossil graveyards or areas of mass extinction. Both items are relevant with respect to a global flood as described in Genesis. The papers and posters at this year's annual meeting presented an array of remarkable finds in these areas.

Rapid Burial

Junchang and Xiaolin reported using a scanning electronic microscope (SEM) to investigate soft tissue from a pterosaur found in western Liaoning Province of China (Cretaceous group). The SEM results revealed "very thin, short impressions of integument derivatives" cloistered thickly around the neck. There was "clear integument" between the toes, similar to the webbing of ducks' feet. Elastic fibers existed on the surface and near the margins of the wing membranes. Possible blood vessels were found on the internal elastic fibers. (10)

Coria, Chiappe and Negro reported finding dozens of sauropod dinosaur *in ovo* skin patches from northwestern Patagonia (Cretaceous group). These patches, some several square centimeters in size, were found on the sauropod egg fragments. The embryonic integuments are made of non-overlapping tubercles which have distinctive shapes. The ground tubercles are irregular and apically-projecting polygons. There are also larger tubercles that form parallel rows and flower-like tubercle arrangements. These embryonic integument patterns differ from those of the adult sauropod, which have large, polygonal tubercles on a pebbled surface. (3)

From the same Auca Mahuevo Argentine site were found the first sauropod dinosaur (titanosaur) nesting structures. The irregularly-shaped, egg-filled depressions, are about 1.0-1.5 meters in diameter. According to the report, "Green, fissile mudstone fills the interior and instertitial spaces between eggs, which lack any apparent spatial arrangement." These egg-filled depressions are thought to be excavated nests. "Entombment of the eggs by finer-grained muddy sediment during subsequent flooding provides the lithologic contrast necessary to recognize these structures, and suggests the eggs were not buried by the animal in the substrate." (6)

In another report, Chiappe *et al*. updated accounts from previous years about the same Patagonian site. According to this report, "dozens of *in ovo* sauropod" (titanosaurs) with "exquisitely preserved skulls" and thousands of egg clutches were discovered. Some of the egg beds extend laterally for several kilometers with "concentration of egg clutches approximately 5 clutches/100 square meters on average." (2)

A problem for flood geology?

Flood geologists are presented with a real problem at this site. These egg clutches were distributed at a minimum of four stratigraphic layers. A similar occurrence is described in a report from Chullanam province of Korea where possible sauropod and ornithopod dinosaur and turtle eggs and clutches were found on "at least five different stratigraphic levels." (17)

While these egg clutches do demonstrate rapid burial, they also show that several sequential rapid burials occurred. Did the Genesis Flood transgress and regress several times in one area, allowing successive dinosaur egg laying communities to form and be buried? Michael Oard has addressed this question and has suggested two possible mechanisms: "vertical tectonics of newly deposited Flood sediments and a sea level drop due to rapid current circulating clockwise on a large shallow continent." (12) It seems that these mechanisms would have to occur several times during the Flood to allow the stratigraphically-separated egg clutches to be rapidly buried. This problem needs more work.

From the Mooreville Chalk Formation in Alabama came a report of an amniote egg with an embryonic ornithischian dinosaur. This egg was preserved in a site representing "fully marine conditions." It is theorized that the egg dropped from the "bloated and floating body of a gravid female." (8)

The supposed oldest bird tracks in China have been found in the Tu Cheng Zi Formation, Liaoning Province. The Tu Cheng Zi Formation, formerly believed to be middle or late Jurassic, lays stratigraphically under the Yixian Formation that have produced the so-called feathered dinosaurs, *Sinosauropteryx*, *Caudipteryx* and *Protarchaeopteryx*. Recent fission track dates give the age of 146.9 $\pm$ 4.8 Ma. Lockley *et al.* indicate this may have been a "shore-bird-like species." (9)

In another report on the preservation of

soft body tissue in theropod dinosaurs, several interesting items were presented. An *Ornithomimus* from the Dinosaur Park Formation of Alberta, Canada, and a *Gallimimus* from the Nemegt formation at Tsaagan Khuushu, Mongolia, both having a "beak-like structure at the buccal margins of the premaxilla and dentary." This latter specimen displays lamellae on the beak, like those of modern ducks. This structure may have also allowed the animal to display straining behavior. The third dinosaur is a dromaeosaur, from the Yixian formation in China, whose entire body was covered with three types of integumentary fibers. The fibers were most notable on the back of the forearm and "show a herring bone pattern like that of the feathers of *Caudipteryx*." M.A. Norell and his fellow authors concluded, "The integumentary covering shows that feather-like structures were present before the origin of modern birds and their evolutionary origin cannot be correlated with the origin of flight." (11)

While the last part of this statement is true, as seen above (the Tu Cheng Zi bird track account), even using evolutionary criteria, birds existed before this integument-covered dromaeosaur.

Fossil Mass Burial Sites

From the Ulansuhui formation (Cretaceous group) in the Nei Mongol Autonomous Region, China, members of the Mongol Highland International Project reported finding nearly 12 complete and "beautifully preserved" ornithomimid dinosaur skeletons. They were collected "from an area of 10 square meters, representing the first record of a high density accumulation" of these dinosaurs. "The single horizon contains only one species of ornithomimid with different ontogenetic stages preserved, suggesting that the group may have been killed catastrophically." Gastroliths were also found within each articulated ribcage. (7)

Single-species bone beds were found at the Mother's Day Site (Jurassic group) in Carbon County, Montana. So far, out of "all the hundreds of elements recovered," only juvenile *Diplodocus* dinosaurs have been found. These fossil remains are found in "fine grain mudstone" which, according to the report, represents an "ancient mudplain," based on lithology and taphomony data. Some of the limb bones have "a vertical to sub vertical orientation," and numerous complete and articulated manus and pes indicate some of the individual animals in the deposit may have been mired before death. Diagrams of the bones suggest "some degree of current flow running northwest/southeast prior to lithification in the sediment." This current was likely to have been of "low energy" because of some articulated bones, such as a "string of six distal most caudal vertebrae." Also found at this site were numbers of small pebbles (possibly gastroliths), the first ever associated with young sauropod dinosaurs. (15)

A similar setting was described from the Javelina Formation (Cretaceous group) in Big Bend Park, Texas. The site is the first bone bed containing remains of only the juvenile sauropod dinosaur, *Alamosaurus*. The deposit setting was described as a shallow lake. These bones, from at least three individuals, were dispersed through a two-meter interval. "Many limb bones have high angle plunges that in extreme instances approach vertical. This bone orientation pattern, the contorted nature of the entombing sediments, and the suggestion of large sauropod footprints at the upper contact of the bone-bearing unit suggests that this site experienced bioturbation (dinoturbation) probably by adult sauropods." (4)

A site in the Chanares Formation (Triassic group) in Argentina was reported to present taphonomic evidence of mass mortality. This locality has 100 individuals representing a diverse number of taxa (archosaurs, cynodonts, dicynodonts) "entombed in concretions with matrices of relic glass shards diagenetically replaced by Calcite." Both adults and juvenile animals were found "entombed within early diagenetic concretion and were safeguarded from subsequent destructive pedogenic and/or digenetic processes..." The authors commented, "... it is feasible that volcanism led to catastrophic flooding of the landscape via damming and/or diversion of local drainages." (14)

A different type of flooding event was proposed for Middle Paddock, in the mid-Viscan Ducabrook Formation, Queensland, Australia. A single fossiliferous unit contains isolated, disarticulated, and size-sorted elements of Chondrichthyes, *Gyracanthides*, Actinopterygii, Rhizodonitormes, Dipnoi and Tetrapoda. These remains have varying degrees of fragmentation, weathering, and abrasion. The researcher concluded, "Although the taxa may have co-existed, the individuals represented in the assemblage were sampled from temporally disparate communities. Predation, subaerial exposure, and transport by strong river currents had a substantial impact upon the remains. They were finally deposited by a twin-peaked, high-magnitude, storm-induced, flood event." (13)

The National Park Service is conducting, through the Natural Resources Preservation Program, a 3-year project to prospect and document fossil bone beds in the Scenic member of the Brule Formation (Oligocene group) in South Dakota's Badlands National Park. During the first year (2000) of this project, 351 new sites were found with 231 "scientifically important specimens" collected. One bone bed, known as the "Pig Dig," contains at least 8 taxa "and a great abundance of elements that occur en masse." This site was most likely attributed to "a catastrophic event" because of the "articulation on many specimens." Other locations, like the Brian Machius and Buffalo Alley sites, contain even greater taxonomic diversity with high degrees of disarticulation. "The Brian Machius site is an attritional assemblage, owing to carnivory. The Buffalo Alley site is more typical of Badlands flood plain, attritional bone beds found throughout the park." (1)

The Swan Lake Quarries of the White River Formation (Oligocene group) in Converse County, Wyoming, was reported to have started to yield a "richly fossiliferous" lake deposit over a 2-km^2 area. There are four meters of interbedded limestones, shales, bentonites, and mudstones that make up the lake sediments. The limestone and shales contain "prolific leaf, stem, roots, seeds, and pollen plant material." There are "millions of gastropods and pelecypods" in 18 separate limestone lenses. Vertebrate mammals, fish, and birds are found in the mudstone and limestone in two different quarry sites. "Local stratigraphy with volcanic ash beds allow lateral correlation of the Swan Lake deposits to one of the richest mammal and reptile localities in North America with thousands of recorded specimens." Phytolith and pollen studies of the "teeth and stomach contents of excellent mammal skeletons" yield information on the diets of the herbivores. (16)

Scientists working at eastern Oregon's John Day Fossil Beds National Monument are striving to complete an ambitious project. Widely distributed deposits of abundant plant and animal fossils from hundreds of locations in eastern Oregon are being "correlated..., now provide more precisely comparable and laterally variable interbasin depositional environments that can be ordered chronologically." The linking of various fossil areas such as the John Day region,

the Owyhee region, the Northeast Basin, and sites near the ancestral Cascades "insures the accurate tracking of 'staggered' processes and events in multiple local paleoenvironmental settings." (5)

These are just some of the fascinating reports of new fossil finds that should prompt those creation scientists and flood geologists who are interested in fossils to attend events like the Society of Vertebrate Paleontology meeting.

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(3) Coria, R., L.M. Chialle, G. Negro. Sauropod Embryonic Integument from Auca Mahuevo (Late Cretaceous). p. 42A.

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(13) Parker, K. E. Australian Lower Carboniferous Tetrapod Site: Taphonomy and Geology. p. 87A.

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Donald D. Ensign has a B.A. from Western Washington University (1970), Bellingham, Wash. He has been on staff with Campus Crusade for Christ and the Narramore Christian Foundation, and is currently the associate manager of the Mt. Blanco Fossil Museum, Crosbyton, Texas.

Speaking of Science

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gins, "British researchers are deeply uneasy about the high-level failure to stem the new spread of creationist ideas."

Why is science trying to stem the tide of ideas? Whatever happened to the intellectual marketplace? How ironic that *Current Biology* and its related journals *Cell, Molecular Cell, Structure, Neuron,* and others, which are all goggle-eyed at the unfolding complexity in the cell, are so adamantly opposed to any hint of belief in design or a Creator.

In this attack piece, M. Gross commits the usual straw-man and fear-mongering tactics to marginalize the critics of Darwinism. What are they so afraid of? Let's get all the ideas out there on the table. Their hostility is a cover for a weak position.

Gross, M. 2002. Red Head: US-style creationism spreads to Europe [News focus]. *Current Biology* 12(8):R265–R266.

Darwin in the Stars

Survival of the fittest seems to be the law in galaxies as well as on earth, claims Space.Com. The article reports on computer simulations by Matthew Bate that show the bigger stars grabbing up all the planet-making material, leaving brown dwarfs like unfit wimps to straggle alone through space. Meanwhile, Nature Science Update claims stars are promiscuous and spend much of their time having affairs and love triangles.

We think science reporters need to stop imputing human vices to inanimate objects. Maybe they think the only way to get the MTV generation to pay attention to science is to get these big balls of hydrogen doing professional wrestling or having lurid affairs. Whatever they mean, neither of these stories appears (1) empirically justified or (2) helpful to evolution. Meanwhile, stars need to practice altruism and abstinence.

Britt, R.R. 2002. Darwinian star formation weeds out wimps. *Space.Com* 24 April, 2002. www.space.com/scienceastronomy/astronomy/stellar_chaos_020424.html

Ball, P. 2002. Stars are promiscuous. *Nature Science Update* 29 April, 2002. www.nature.com/nsu/020429/020429-1.html

For Such a Worm (or Fruit Fly?) as I

Scientists at Penn State Eberly College of Science think we are more closely related to fruit flies than roundworms. They base this conclusion on comparison of 100 genes from three completely-sequenced genomes. This contradicts a five-year-old hypothesis based on an earlier, less-detailed study that made worms a closer ancestor, they claim. They believe this finding can impact medicine, evolutionary biology, astrobiology, or any other field concerned with inheritance of traits. They argue that it is also important for textbooks to present the right family tree, "because it has an effect on how crucial events in the development of animals are understood by future generations of scientists."

But team leader S. Blair Hedges cautions, "We could be completely wrong. I prefer to view our result as the best supported, based on the weight of the evidence, rather than as a proven fact. It is always better to keep an open mind about these things, not to become married to one hy-

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POSITIONS AVAILABLE
VAN ANDEL CREATION RESEARCH CENTER

The Creation Research Society (CRS) represents more than 600 member scientists from around the world, who "evaluate science in a Biblical framework." For nearly forty years it has published a scholarly journal that challenges evolutionary theory.

The Research Center operated by CRS is located in a rapidly-growing community in scenic north-central Arizona. The nearly-new facilities are modestly-equipped and debt-free, providing research space for up to five full-time scientists. Nominations and inquiries are invited for two positions: ***Director*** and ***Assistant to the Director***.

Dedication to full inspiration of Scripture and to faith in Jesus Christ as Lord and Savior is essential. Applicants should be committed to a young-earth creationist position and to a worldwide, catastrophic Noahic flood. Strong skills in interpersonal relations, writing and public speaking are required.

DIRECTOR

The ideal candidate for Director will have an earned science Ph.D., be involved in an active research program, develop the research staff and provide general oversight to all aspects of the operation of the Center. The position requires a self starter, working with limited direct supervision.

ASSISTANT TO THE DIRECTOR

The Assistant to the Director will be a staff position, assisting and reporting to the Director. This individual should have demonstrated business capability. The position involves providing recommendations on all business aspects of the Research Center's operation. It also includes public relations, fund raising, speaking at the popular level, writing press releases, and acting as the public information officer. Considerable travel may be required.

FOR INFORMATION

If you have any questions, or wish additional information, please contact:

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Creation Calendar

Note: Items in "Creation Calendar" are for information only; the listing of an event does not necessarily imply endorsement by the Creation Research Society.

June 21-23
Ozark Stream Float Trip
Family Creation Safari
CSA for Mid-America (Kansas City Area)
Contact: Tom Willis (816)618-3610, csahq@juno.com

June 30 - July 5
Twin Peaks Family Science Adventure
Fun-filled vacation for families, near Collbran, CO
Sponsored by Alpha Omega Institute, Grand Junction, CO
Contact: Andrea Korow (970)523-9943, www.discovercreation.org

July 20
Kansas Univ. Natural History Museum
Family Creation Safari, 9:00 am - 4:00 pm
CSA for Mid-America (Kansas City Area)
Contact: Tom Willis (816)618-3610, csahq@juno.com

July 28 - August 2
Redcloud Family Mountain Adventure #1
Fun-filled vacation for families, near Lake City, CO
Sponsored by Alpha Omega Institute, Grand Junction, CO
Contact: Andrea Korow (970)523-9943, www.discovercreation.org

August 4 - 9
Redcloud Family Mountain Adventure #2
Fun-filled vacation for families, near Lake City, CO
Sponsored by Alpha Omega Institute, Grand Junction, CO
Contact: Andrea Korow (970)523-9943, www.discovercreation.org

August 17
Fossils and Geology of Kansas City
Family Creation Safari, 9:00 am - 4:00 pm
CSA for Mid-America (Kansas City Area)
Contact: Tom Willis (816)618-3610, csahq@juno.com

August 18 - 24
Grand Canyon Raft Trip (7 day, 187 river miles)
Sponsored by Canyon Ministries (Phoenix) and
Design Science Association (Portland)
A creationist view of the canyon's geology / biology will be provided.
Contact: Keith Swenson (503)665-9563, kswenson@mindspring.com

August 30 - September 2
Southeast Missouri / Johnson Shut-ins
Family Creation Safari, 9:00 am - 4:00 pm
CSA for Mid-America (Kansas City Area)
Contact: Tom Willis (816)618-3610, csahq@juno.com

October 19
KATY Bike Trail
Family Creation Safari, 9:00 am - 6:00 pm
CSA for Mid-America (Kansas City Area)
Contact: Tom Willis (816)618-3610, csahq@juno.com

December 7
Squaw Creek Refuge
Family Creation Safari, 9:00 am - 5:00 pm
CSA for Mid-America (Kansas City Area)
Contact: Tom Willis (816)618-3610, csahq@juno.com

Speaking of Science

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pothesis or another, and to let the data speak for themselves."

That's great advice, if they would follow it. They don't seem to realize the circular reasoning embedded in their methodology. They compared "slowest-evolving" and "fastest-evolving" genes as part of the analysis, for instance, which of course assumes evolution rather than proving it. This team needs to be made aware of how many other genetic comparisons have produced controversial and counter-intuitive results. In actuality, this team just reverted to an old hypothesis which is sure to be championed again by others.

Hedges was surprised by the "rapid abandonment" of the older, long-standing hypothesis and acceptance of the new one, "without the intense scrutiny that is typical in science." We would say that intense scrutiny is rare in evolutionary studies. They accept evolution as a given, without ever considering alternatives. The result is conflicting stories about the unobservable past that merely assume evolution rather than prove it.

Which of these dubious tales should be put into the textbooks, to influence future generations of scientists? "To let the data speak for themselves" requires the courage to doubt one's presuppositions.

Anonymous. 2002. Gene study determines how humans are related to fruit flies and nematode worms. The Penn State Univ. 22 April, 2002. www.science.psu.edu/alert/Hedges4-2002.htm

Editor's note: All S.O.S. (Speaking of Science) items in this issue are kindly provided by David Coppedge. Additional commentaries and reviews of news items by David can be seen at: www.creationsafaris.com/crevnews.htm.

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