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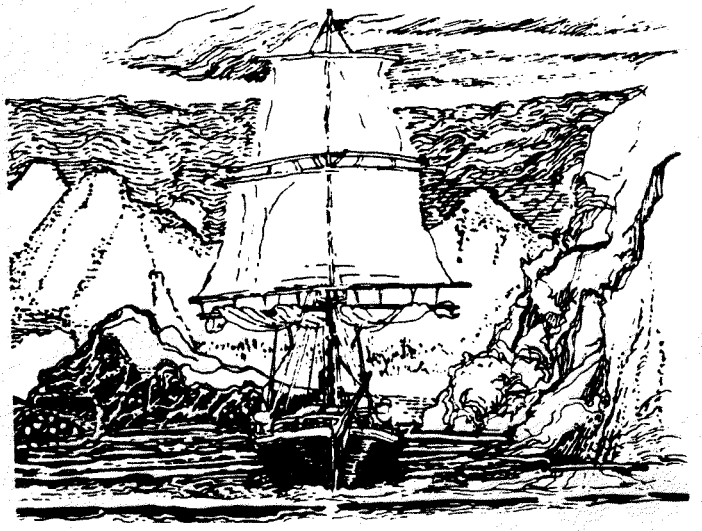

Darwin's Ark

Issue 35 **Winter 1994**

Articles

About this issue . . .

This issue, going to press around Christmas time 1994, addresses diverse issues. This is fairly common, of course—on principle, we try to encompass a wide range of topics in *Creation/Evolution.* Our lead article is an understated bombshell—Dan Larhammar demonstrates that one of the "scientific" creationists' new superstars, Dimitrii Kuznetsov, may have feet of clay: His principal creationist publication in the "real world" of scientific journals is apparently less than it seems—its references which validate the methodology which purportedly leads to an antievolutionist conclusion . . . may not exist! And the article's interpretations are extremely suspect, in any case.

We also have the pleasure of reprinting a classic poem by Philip Appleman, "Darwin's Ark," which lampoons antievolutionism. Appleman is (or should be) known to readers as a premier editor of Darwin and a Victorian cultural scholar, as well—a poet who understands science, and vice versa. His contribution is welcome indeed!

"Should evolutionists debate creationists?" Eugenie Scott tries to answer this deceptively simple question; I might note that some creationists agree that the public "shows" are often unenlightening.

It's exciting that more evolution research is under way now than in many years, but it is sad to note that "the opposition" has neither died down nor changed its worries, goals and tactics. Basically, antievolutionists, at least in Western culture, seem to fear and oppose the materialism and naturalism of science and equate the teaching about topics such as evolution with an advocacy of atheism or even immorality. Perhaps needless to say, this perplexes evolutionists who consider themselves as moral as anyone else! Our review of a new book on "Darwin's finches" is really a review of an extraordinary longterm research project in the Galápagos Islands which is in dramatic contrast with creationist "research"—Princeton scholars have dug in on the islands, observing and measuring changes over the years and decades rather than clipping miscellaneous quotations here and there to develop a polemic, and they show that evolution is

continued on inside back cover

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Creation/*Evolution*

Volume 14 • No. 2 • Winter 1994

The journal of evolution and science education which explores aspects of evolution and antievolutionism

Contents

Severe Flaws in a Scientific Study by D. Kuznetsov Criticizing Evolution

Dan Larhammar

It is virtually a truism in science that, in Th. Dobzhansky's words, "Nothing in biology makes sense except in the light of evolution." Progress in molecular genetics over the past several years has provided overwhelming independent support for evolution and has helped clarify evolutionary processes. No genetic evidence has been found that argues against evolution as a phenomenon. A few creationist books have tried to interpret molecular data differently, but have only revealed their own fundamental misunderstandings (cf., Michael Denton's *Evolution: A Theory in Crisis* 1985).

I am aware of only a single report in modern times in an established scientific journal that has claimed molecular data argue against evolution. The article was published in the *International Journal of Neuroscience* in 1989 (49:43-59) by Dmitrii A. Kuznetsov (then working in Moscow, later associated with the Institute for Creation Research in the US, and now reportedly working in Russia again). The article apparently went unnoticed by scholars for a long time because this type of work is not within the regular scope of that journal; Dr. Kuznetsov's star has risen in creationist circles, meanwhile, because he holds an acknowledged doctorate and was winner of a Lenin Prize in the old Soviet Union, making his intellectual embrace of "scientific" creationism particularly dramatic to Western creationists. I was recently made aware of Kuznetsov's article by a Swedish creationist. Because I found severe flaws in Kuznetsov's methodology and discovered that many of the references he cited in his article appear to be nonexistent, I contacted the editor of the *International Journal of Neuroscience*, who

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offered to publish my critique (Larhammar 1994). I summarize here Kuznetsov's study and describe the main flaws in his work.

Kuznetsov's article was published under the complex title, "*In vitro* studies of interactions between frequent and unique mRNAs and cytoplasmic factors from brain tissue of several species of wild timber voles of Northern Eurasia, *Clethrionomys glareolus, Clethrionomys frater and Clethrionomys gapperi*: A new criticism to a modern molecular-genetic concept of biological evolution." Briefly, he studied the go-between or so-called messenger RNA (or mRNA) molecules that convert the information of the genes into functional proteins. He isolated such mRNA from three species of voles and used this to produce protein in test tubes. Surprisingly, each vole species was found to have a substance that blocked the production of protein from the other two species' mRNA, but it did not block its own mRNA. Remarkably, this inhibiting substance did not prevent protein synthesis from mRNAs of two distantly related species, namely rabbits and humans. Kuznetsov called his substance an "antievolutionary factor" that would serve to maintain constancy of species. He interpreted his results as "a new criticism to a modern molecular-genetic concept of biological evolution" that could be used to support "the general creationist concept on the problems of the origin of boundless multitudes of different and harmoniously functioning forms of life."

The experimental approach used by Kuznetsov is extraordinary and obscure (for technical details see my 1994 critique). None of his experiments were documented qualitatively; the report contains only tables and numbers, and the numerical results indicate experimental precision that is beyond normal accuracy for such assays. This could indicate that some of the results were fabricated.

Kuznetsov disregarded that mRNA sequence variability between species displays a continuous spectrum from some highly similar molecules to some other, widely divergent molecules. In fact, a single mRNA molecule may be highly conserved in one part but dramatically divergent in others. Furthermore, Kuznetsov ignored the fact that one feature is shared by almost all mRNA molecules—the so-called poly(A) tail. Finally, the complex vole mRNA samples (many different molecules) were compared with individual mRNA molecules from distantly related species (rabbits and humans). Thus, it is exceedingly unlikely that an "antievolutionary factor" would be able to recognize and block mRNA molecules from a closely related species but not from distantly related species.

One of the procedures that Kuznetsov used was to cited as a technique published by researchers in "*Uppsala University Research Reports*" in 1974; this is the university where I work, and no such journal has been heard of here, and no persons with the names he cites could be traced. Other important aspects of his methodology were referenced to four other scientific journals. None of these journals could be found, not even in the internationally used

library indices called Medline and CASSI (*Chemical Abstracts Service Source Index*). Two of the methodological references were purportedly written by Kuznetsov himself, but these journals were also impossible to find. Remarkably, these two references were absent from Kuznetsov's own list of publications distributed by a Swedish creationist before the Russian's recent visit to Sweden. Finally, an article ascribed to Holger Hyden, a member of the Editorial Board of the *International Journal of Neuroscience*, is unknown to professor Hyden himself (personal communication). The Scandinavian journal where the article was said by Kuznetsov to have been published does not exist. The purported article, as well as several others in the list of references, had illogical titles with grammatical errors. Taken together, this strongly suggests that many of the references were fabricated by Kuznetsov.

In conclusion, Kuznetsov's obscure experimental approach, qualitatively undocumented results and incomplete evaluation undermine all his conclusions. All key methodological references seem to be non-existent. Thus, Kuznetsov's critique of evolution has no scientific basis whatever. That his antievolutionary article was simply a bad joke is unlikely, because he does indeed include it in his list of scientific publications, and creationists at the ICR (and worldwide) take his work seriously.

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Larhammar, Dan. 1994. Lack of Experimental Support for Kuznetsov's Criticism of Biological Evolution. *International Journal of Neuroscience* 77:199-201.

Note: To make sure he was not overlooking unindexed titles, Professor Larhammar enlisted the assistance of a number of people in Europe and America in his futile search for the Kuznetsov references in question, including NCSE's Richard Trott, Eugenie Scott, and John Cole, among others. The manuscript was sent to both C/E *and* Skeptical Inquirer Magazine, *which accepted it first and graciously has allowed NCSE to publish a very slightly modified version here. It will appear in the March/April 1995 SI 1(2) as "Severe Flaws in Scientific Study Criticizing Evolution."* C/E

Attacking Geocentrism, or Ignorance Marries Sophistry at the Institute for Creation Research

Lawrence S. Lerner

Nearly everyone, from professional astronomer to third-grader, is comfortable with a solar system in which Earth is one of nine planets (and a variety of smaller bodies) that revolve around the sun. But for the young-earthers of the Institute for Creation Research (ICR), heliocentrism is a goad in the hands of tormentors that prick them mercilessly both from left and from right. ICR's central dogma holds that the Bible is inerrant on scientific matters as it is on all others. They therefore insist that the sciences of cosmology, geology, biology, archaeology, and historical linguistics must all conform perfectly to the brief account given at the very beginning of the Bible, through *Genesis* 11:9—the part that runs quickly through the six days of creation, the fall of Adam, Noah's flood, and the Tower of Babel. But the Bible is at least as explicit, and certainly more repetitive, in asserting that the universe is centered on the Earth. Consequently, scientists and other critics often take some amusement in pointing out that consistent biblical literalism requires young-earth creationists to be geocentrists as well, both positions making equally silly science. From the other side, some of ICR's fellow biblical literalists frame the very same point seriously, as a grave doctrinal demand undergirded by implications of heresy. (Gerardus Bouw and his Tychonian Society are the main protagonists in this morality play.) Thus one side makes the young-earthers look ridiculous; the other side warns them of looming hellfire.

ICR must escape from this gauntlet. In the July 1994 issue of ICR's "semitechnical" periodical *Impact*, Gerald Aardsma, one of ICR's younger Quixotes and the holder of a doctorate in physics, sallied forth against this diune threat. Armed with the lance of sophistry and the shield of ignorance,

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he tilted at the windmill of geocentrism. His response is a remarkable combination of scientific-historical error and sophistical logic, funny enough to warrant a little discussion.

First, as to error. Aardsma asserts that, despite many efforts, no one was ever able to "prove that heliocentricity was true and geocentricity was false," right up until the early 1900's. Leaving aside for the moment the fact that scientists, unlike creationists, spend their time describing nature and not philosophizing over truth and falsehood, Aardsma's assertion is wrong. In 1729, James Bradley confirmed the predicted aberration of starlight. This is the apparent shift of stellar positions over the course of a year due to the motion of the earth; it is analogous to the way in which a passenger in a moving car sees the path of vertically falling raindrops as oblique. In 1838, moreover, Friedrich Wilheim Bessel observed the tiny but long-predicted stellar parallax and used the observation to measure the distance to several stars. Parallax is the apparent shift of the position of a comparatively nearby star seen against a background of distant stars, due to the change in our viewpoint as the Earth moves through its orbit. You can obtain the same effect on a much smaller scale by using first one eye and then the other to look at a nearby object against a background. Centuries before Bessel, Copernicus's critics had cited the apparent absence of stellar parallax as a definitive argument against heliocentrism. But they could neither detect the parallax with their crude instruments nor imagine the vastness of a Universe that would result in a parallax so small as to require better s. Ironically, we will soon see Aardsma trapping himself in a fallacy of the very same kind.

As elegant and beautiful as Bradley's and Bessel's contributions were, no one in the scientific community was surprised in the slightest by the results; they were seen as satisfying confirmations rather than crucial, long-awaited "proofs" of what everybody had expected on the basis of an enormous amount and variety of indirect evidence. One is reminded of Einstein's reply to a reporter who asked him how he would have felt if a 1919 experimental test of general relativity had turned out negative: "Then," he said, "I would have felt sorry for dear God."

So much for ignorance, although there are more displays of it in Aardsma's article. The sophistry is more fun, and the wedding of the two is delightful. Aardsma cites the negative result of the Michelson-Morley experiment (1887) as a failure to demonstrate the "motion of the earth through space." The phrase in quotes is ambiguous at best, but it is not what the Michelson-Morley experiment was about at all. The experiment is often used in explaining Einstein's theory of special relativity, but neither special nor general relativity (both of which play the role of red herrings in the Aardsma article) really bears on the critical choice between helio-and geocentrism. Aardsma makes a neat little finesse by following his hand-waving mention of Einsteinian relativity with the statement, "Thus, the failure of the Michelson-Morley experiment . . . is understood by modern science in terms of

relativity rather than geocentricity." True indeed, but about as relevant as the statement, "Babe Ruth's fame is understood by modern sportswriters in terms of his record in baseball rather than football." The Michelson-Morley experiment was not designed as a test of geocentricity, and no scientist has ever seen it as such. The issue is purely one of Newtonian physics.

Newton's laws of motion are expressed in the simplest way from the point of view of an observer who is himself not being accelerated—an observer who is in what physicists call an inertial frame. For purposes of studying the motion of the solar system, an observer located on the sun is in such a frame. Other non-inertial observers can also apply Newton's laws to analyze the same motion, but their task is much more complicated. They must include so-called fictitious forces in their analyses, and the results are much less transparent. Such is the situation of an observer on the earth who sees the sun, moon and planets wheeling around him in curves of bewildering complexity. That is precisely why we imagine ourselves as located on the sun when we study celestial mechanics, as the science of the motion of the solar system is called. Kepler would never have discovered his famous three laws of planetary motion if he had not done the same. Indeed, Kepler's laws, which were crucial to Newton's development of physics, have no meaning in a geocentric frame. Aardsma's article clearly indicates his awareness of these points: "This tremendous progress in understanding resulted in almost universal acceptance of heliocentricity and rejection of geocentricity." But Aardsma misses the implications, very possibly because he does not understand—or rejects—what the scientific community mean by the words true and false. As a matter of fact, geocentric scientists had become rare decades before Newton's 1687 synthesis of the laws of physics and Kepler's laws, precisely because scientific consensus is established very differently than religious dogma.

There is a simple reason for the clarity and explanatory power of the heliocentric view: The major force governing the motions of the solar system is the gravitational attraction of the sun. There are other gravitational forces as well, but they are best treated as perturbations on the main system.

At a deeper level, general relativity does assure us that the distinction between gravitational and fictitious forces dissolves when we consider the curvature of space in the vicinity of gravitating bodies. But this deep analysis is superfluous for all but one tiny aspect of celestial mechanics—the famous precession of the perihelion of Mercury. (And even there, the relativistic effect is handled as a small perturbation on the Newtonian picture.) I know of no physicist or astronomer who has ever wasted time in analyzing planetary motions from a geocentric viewpoint using general relativistic methods. These powerful methods are used where they are really needed, as, for example, in the study of black holes or gravitational lenses (both of which present daunting, fundamental difficulties to the young-earth creationist).

Ironically, just as Copernicus's critics argued that their failure to observe stellar parallax demonstrated the geocentricity of the Universe, Aardsma supports the "Biblical doctrine of the uniqueness of Earth" with the assertion that no one has yet discovered life elsewhere in the Universe. We have already seen the precariousness of such assertions.

The *Impact* article gives us a glance into the marriage of the clumsy groom, Ignorance, with the quick-handed bride, Sophistry, chez ICR. Ignorance cooks up a false picture of the logical relationships among geocentrism, heliocentrism, and Einsteinian relativity. Then Sophistry tries to smooth over the mess and make it appear palatable.

Aardsma reveals the real purpose of his exegesis much more clearly in the second half of his article, which he devotes mainly to a theological discourse on the difference in the ways the Bible treats the creation of the Universe and its form. Presumably he feels that he owes his religionist critics on the right as much as he has served his scientist critics on the left. While I personally find his theology naive and unconvincing, that has no more to do with the point of my article than Einsteinian relativity has to do with his. At least he and I can agree on one of the statements he makes: "The generally overlooked lesson here is that scientific theories do not provide a very secure basis from which to interpret Scripture." I would go beyond Aardsma in arguing that the reverse is equally true.

Ed: Aardsma left the ICR in Fall 1994 amidst reports that he was not adequately committed to their "young Earth" dogma. C/E

Study Nature, Not Books

Arthur M. Clark

In the library at the Marine Biological Laboratory there is a sign "Study Nature Not Books, L. Agassiz." This is certainly a bizarre message to be housed in our library. It could have been placed here only by someone with a devious mind and a ghoulish sense of humor. I remember that this sign once hung in our Main Lobby. How it got there and from whence it came, I do not know. What does the message mean, within what context; and what provoked such a statement? Did Agassiz say this?

Louis Agassiz (1807-1873) was both a European and an American scientist. During his life in Europe he studied fossil fishes and glaciers. His work on fossil fishes was a major contribution to paleontology. His research on glaciers established the existence of the "Ice Age." These publications earned him recognition as a creative scientist. In 1847, Agassiz was appointed a professor at Harvard University. He became the foremost person in the development of science education in the United States. He founded the American Association for the Advancement of Science and the National Academy of Sciences. He was highly regarded as a public lecturer. In the preamble of his will he described himself as "Louis Agassiz, Teacher." He regarded as his greatest work, "I have taught men to observe" (Cooper, 1945). The academic ancestry of many American biologists goes back to Louis Agassiz.

Agassiz thought of himself as a naturalist. He was interested in observing plants, animals, mountains, glaciers in the field. He held a reverence for the world around him and looked upon nature as a Divine Creation. Agassiz was a deist, but he did not embrace a particular sectarian religious persuasion. Books were important, but he thought that it was more meaningful to study living things in their natural habitat. "No one could deny the objective validity of a fish skeleton, carefully prepared and accurately described. " A physical fact is as sacred as a moral principle." To see the Creator through nature was different than to see Him through the Bible. Louis Agassiz in this sense was a religious person.

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The *Origin of Species* was published in 1859 by Charles Darwin. Louis Agassiz became the leading American opponent to the Theory of Evolution. It is a lesson in the acceptance of scientific ideas that these men, both of high personal and scientific integrity, could study the same data and arrive at different interpretations. Agassiz thought that the concept of Evolution was conjectural and that it may not be the best conjecture in the present state (1860) of our knowledge. Agassiz insisted that ancient and modern species bore no genetic relationship to one another and that there were no transitional types. However, other biologists considered the work by Agassiz to be evidence in favor of Evolution. New ideas are not immediately accepted by the scientific community, nor do they stand out like neon lights.

From his study of glaciers, Agassiz concluded that there had been an age during which large land masses were covered with ice. Glacial movement was responsible for modern geological configurations. He considered the Deity to be responsible for the Ice Age. Glaciers were "God's great plough." The ice age was a catastrophe that destroyed species and was a barrier between past and present species. Mammals such as elephants, lions, and bears had lived in a tropical climate. The intense winter and the glaciers lasted for ages and embalmed these mammals, and so they could not reproduce. There is a complete break between generations. There could be no transitional types. The species living today may resemble those buried in the past, but this resemblance is not a proof that they are genetically related. He thought that there were as many as 20 separate catastrophes and creations on earth with each creation characterized by distinct types of organisms. The glacial theory to him was further proof of the fixity of species.

The concept that glaciers were a geologic force disturbed the convictions of believers in the Great Flood as *the* geologic force. Agassiz, however, challenged the view that nature could be explained by biblical assumptions. "The essence of the Creative Power was to be discovered in the book of nature itself, not in the Bible."

Agassiz accepted the principle of special creation, but believed in a multiple origin for the different races of mankind. All varieties were members of the same species, but each variety arose in a different place on earth. Negroes, for example, had a distinct origin from whites, and their ancestry could not be traced to the sons of Noah. The Clergy of fundamentalist conviction objected to this reinterpretation of the Bible. Agassiz, however, insisted that the naturalists had to describe the facts as they knew them, without reference to religious conviction or prejudice. All animals had not been created in a single place (the Garden of Eden). Animals had been created all over the world, each in its own ecological niche. Cactus plants were created in the desert and polar bears in the far north. *Genesis* referred only to those animals placed in the Garden of Eden by the Creator. It was therefore impossible to believe with the literal interpretation of the Bible that all animals had been created in a single place. Agassiz thought

that a creation could have occurred before the time of *Genesis* (Lurie, 1960, 1970).

Louis Agassiz was opposed to the idea of Evolution. His field work led him to a belief in the fixity of species and in Special Creation by a Creator who made a purposeful Universe. Many clergy were heartened by this battle by such a distinguished scientist. Agassiz was looked up to as "The Prince of Naturalists." On the other hand, his work on glaciers and on multiple origins was heretical to revealed religion. His views on the origin of the black variety of people gave support to racist views at the time of the Civil War. Agassiz did not look upon the Bible as a book of science. He considered parts of the Bible to be inaccurate in its scientific aspects.

Louis Agassiz had a view of the origin of species that was different from that of Charles Darwin. His view was different also from that of the biblical literalists. Perhaps no one sees the world as it is. Each of us looks at the world through our own cultural lenses. When I see "Study Nature, Not Books" through my own cultural lenses, I think of how many times this has been said. I lament that we never seem to learn this. One would think that a history did not exist. It is a hard lesson to teach.

- The conflict between science and theology was dramatized for us in the life of Galileo (1564-1642). His personal battle with religious authority in the 17th Century is a lesson in our changing perceptions of nature and in the struggle to present a scientific point of view.

  When theological objections to the Copernican system were raised, Galileo responded that theological interference on scientific questions was inadmissible. Galileo thought that neither the Bible nor nature could speak falsely. The investigation of nature, however, was the province of the scientist, while the reconciliation of scientific facts with the language of the Bible was that of the theologian.

  Even though he was forbidden to discuss Copernicanism he nevertheless defended the position of the Church. The Church acted not out of ignorance nor antagonism to scientific ideas, but out of concern for spiritual welfare alone. Galileo, indeed had composed a treatise in defense of the Church. This treatise was accepted by a pope three centuries later as theologically sound (Drake, 1970).

  In 1984 Pope John Paul II took steps to acknowledge that the Church had erred in condemning Galileo. "It is only through humble and assiduous study that the Church learns to dissociate the essentials of faith from the scientific systems of a given age. The Bible tells us how to go to heaven but now how the heavens go."
- The frustration in dealing with this influence of theology upon the development of science was expressed by Robert Hooke (1635-1702), the discoverer of the cell. "Tis a vain thing to make experiments and collect observations, if when we have them, we may not make use of

them; if we must not believe our senses, if we may not judge a thing by trials and sensible proofs—but must remain tied up to the opinions we have received from others . . . "(Greene, 1959).

- James Hutton (1726-1797), whose view of the history of the earth was contrary to Scripture, denied the Mosaic account of creation. He maintained that it was not the duty of religion to provide an explanation of natural history. He regarded the objectives of revealed religion and natural philosophy as essentially different and saw no reason for conflict.

  To Hutton it was evident that the Earth was made for man. Once it is understood how the Earth operates, people will see order in a plan that is worthy of Divine wisdom rather than the work of chance or absolute disorder and confusion.

  Hutton acknowledged the existence of God whom he defined as a Being with perfect knowledge and absolute wisdom. He considered nature as subordinate to God. God is infinite and unchangeable, but nature is limited and changing. Hutton was a Deist, not an atheist. He was nevertheless accused of impiety (Baron, 1970).
- Thomas Henry Huxley (1825-1895) defended the theory of Evolution against the criticism of the Anglican Church. He was called "Darwin's Bulldog." Huxley considered freedom of thought to be an essential element in scientific investigation. He approached new scientific ideas as a skeptic. The term "agnosticism," which he coined, implied no belief. Agnosticism was an attitude and "the fundamental axiom of modern science." Do not accept conclusions that are not clearly demonstrable!

  Huxley had a high regard for the Bible as a defense of freedom and liberty. It was the Magna Carta of the poor and oppressed "insofar as it supported the concept of righteousness." He nevertheless became involved in controversy on the authority of *Genesis*. Huxley applied the method of agnosticism to evaluate religious evidence. He, further, regarded matters of morality to be independent of religion and theology (Williams, 1970).

Whoever said "Study Nature, Not Books" or why becomes less important than the lesson we each want to draw from this motto. We may think of Professor Agassiz at the Anderson School on Penikese telling his students "Close your textbook. We will go out in the field and study some living starfish rather than a bunch of photographs." Or we may think of Agassiz as responding to criticism from biblical literalists, "the essence of the Creative Power is to be discovered in the book of nature itself, not in the Bible. Agassiz refers to both "books" and "BOOKS."

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Darwin's Ark

Philip Appleman

Queasy again, and feeling
as wintry as Methuselah,
Darwin begins to drowse, and thinks,
as he always does, of animals, all
those animals, and remembers
his leafy days at Cambridge, chasing beetles
and cramming for the Ministry: the Testament
in Greek, the classy proofs
of God's design—and in that jungle
of memories, he drifts off, and dreams
that he is Noah, seed of Methuselah, already
six hundred years old, more than a little tired
from all that virtuous living—and then (just
his luck) a finger out of the clouds
pokes down at him, and a voice
like a celestial sergeant commands:
"Make thee an ark of gopher wood . . . "
The details follow, in that same
platoon-leader's voice: the boat shall be
four hundred fifty feet long,
seventy-five feet wide, three decks,
one window, one door.

And then
the voice tells him why.

His sons, Shem, Ham, and Japheth, just
cannot handle this news:
"He's going to drown them *all*?" Japheth whispers,
"Every last woman and child? But why?"

Philip Appleman is a longtime editor of Darwin at W.W. Norton, a science writer and editor, poet, and charter NCSE member. The collection of poems, **Darwin's Ark,** is published by Indiana University Press.

Noah's mind isn't what it used to be; lately
it strays like a lost lamb: "Uh—
wickedness, I believe
that's what He said—yes, wickedness."
Too vague for Japheth: "But wicked *how?* I mean,
what are the charges, exactly?"
The old brow wrinkles again: "Evil, that's
what He said. Corruption. Violence."
"*Violence?* What do you call
this killer flood—this pogrom—this Final
Solution of His? He's going to deep-six
the lot of them, just
for making a few mistakes? For being—*human*?"
Now Japheth was really riled; being the youngest,
he still had a lot of drinking buddies out there—
Enos and Jared, and raunchy Adah
and his pretty young neighbor,
Zillah—together they'd put away
many a goatskin of red wine
under the big desert stars. Besides,
being a kid, a mere ninety years old,
he still enjoyed stumping his father
with embarrassing questions: "Listen,
Dad, I thought you said He
was omniscient—well, then,
wouldn't He have foreseen all this? And if He did,
then why did He make us the way we are,
in the first place? Just think of all this
useless trouble, the waste,
the genocide!"

"Ours not to reason why," says Shem (the first-born,
and something of a prig), "Ours but to build the ark."
"And that's another thing," Japheth scowls,
"what *is* an ark, exactly? I mean,
we're desert people, right?—nomads,
living out here in this miserable dry scrub
with our smelly goats and camels—
I never saw a boat in my life."
"Well, I saw one once," Noah quavers,
"But I don't remember it very well,
that was four hundred years ago—
or was it five, let's see . . . "
"Concentrate, Dad," says Ham,

always the practical one, "Look,
it can't be that hard, an ordinary boat,
we'll mock one up, no problem—a keel,
that's it, you begin with a keel of gopher wood,
and the rest is easy: ribs, then planks,
pitch, decking—listen,
just give me a crew of hard-hats, say a hundred
of those wretched condemned sinners out there,
and I'll handle it."

So finally they had themselves an ark,
and God says, "OK, Noah,
get the animals—clean beasts, seven of a kind,
unclean, just two, but make sure
they're male and female, you got that straight?
Now hurry it up, I'm itching to get
the drowning started."
Noah had thought that this
would be the easy part, but Japheth,
of course, knows better: "Dad,
did you say *every* animal?"
"Every animal," Noah repeats,
quoting Authority: "'Every living thing
of all flesh'—fowl,
cattle, creeping things, the works.
Plus food enough for a year."

Well, just imagine: you're out there
in that abominable desert, and all of a sudden
you're supposed to come up with two elephants.
Or is it more? "Shem—Shem, is the elephant
a clean or an unclean animal—
if it's clean, that means seven of them,
and the ark is in trouble. And how
about rhinos? hippos? An d what do we do
about the dinosaurs? How do we get a brontosaurus
up the gangplank?" Japheth, of course,
loved raising problems that Noah
hadn't thought of at all: "Pandas—kids
love pandas, we can't let them drown,
but how do we get two of them here
in a hurry, all the way from China?
And, oh, by the way, Dad,
how are we going to keep the lions

away from the lambs?"
Let's face it, it was a nightmare:
the apes and monkeys were bad enough—
gibbons, orangutans, gorillas, chimps,
howler monkeys, spider monkeys, squirrel monkeys,
capuchins, mandrills, baboons, marmosets—
just think of poor Ham, after all of his angst
and sweat, getting the ark assembled, and then
having to schlep off to the Congo, the Amazon,
to bring 'em back alive, all those tricky
long-tailed leapers, up in the jungle greenery.

And Shem, dutiful Shem, in charge
of the other mammals—the giraffes,
the horses, zebras, quaggas, tapirs, bison,
the pumas, bears, raccoons, weasels,
skunks, mink, badgers, otters, hyenas,
the rats, mice, squirrels, gophers, beavers,
porcupines, rabbits, hares, bats,
sloths, anteaters, moles, shrews—thousands
of species of mammals.

And Japheth out there on the cliffs and treetops
trying to snare the birds: the eagles,
condors, hawks, buzzards, vultures, and every
winged beauty in the Field Guides, and bring them back,
chattering, twittering, fluttering around
on the top deck—thousands on thousands
of hyperkinetic birds.

Two by two
they come strolling through:
antelope, buffalo, camel, dog,
egret, ferret, gopher, frog,
quail and bunny, sheep and goose,
turtle, nuthatch, ostrich, moose,
ibex, jackal, kiwi, lark,
two by two they board the ark.

Well, it's pretty clear, isn't it,
that we've got a space problem here: a boat
only four hundred fifty feet long, already buzzing
and bleating and squeaking and mooing
and grunting and mewing and hissing and cooing

and trumpeting and growling and roaring and snarling
and chirping and peeping and clucking and croaking—
and the crocodiles aren't back from the Nile
yet, or the iguanas from the islands,
or the kangaroos and koalas, or
the pythons or boas or cotton-mouth moccasins
or the thirty different species of rattlesnake
or the tortoises, salamanders, centipedes, toads . . .

It took some doing, all that,
but Ham came back with them,
and wouldn't you know,
it's Japheth who opens up, so the speak,
the can of worms: "Worms, Dad! There are thirty-two
thousand species of worms—who's
going digging for *them?* And oh, yes—
how about the insects?"
"Insects!" Shem, old Goody-Two-Shoes, rebels
at last. "Dad, do we have to save *insects*?" Noah,
faithful servant, quotes the Word:
"every living thing." But Dad, the cockroaches?"
Noah has all the best instincts
of a minor bureaucrat: he
is only following orders; the roaches
go aboard.

But it turns out, the insects almost
break up the team, because
this is not just anybody's dream,
this is Darwin's dream, so of course
Japheth knows too much. "Look, Dad,
we've got dragonflies, damselflies, locusts, and aphids,
grasshoppers, mantises, crickets, and termites . . .
Wait a minute—termites?
You're going to save termites—in a wooden boat?"
But Japheth knows that arguing with Noah
is like driving a nail into chicken soup—he shrugs
and ticks away at his clipboard:
"We've got lice, beetles, God knows
(pardon the expression) how many beetles;
we've go bedbugs, cooties, gnats, and midges,
horseflies, sawflies, bottleflies, fireflies,
we've go ants, bees, wasps, hornets—
can you imagine what it's going to be like

locked in with *them* for a whole year?
But listen, Dad, we haven't scratched the surface—
there are nine hundred thousand species
of insects out there, did you happen to know that
when you took this job?
Even if we unload all the other animals,
the insects alone will sink the ark!"

Ah, but the ark was not floating on fact,
it was floating in faith: that is to say,
on fiction—and in fiction, the insects
went aboard, all nine hundred thousand
buzzing, stinging, chittering, biting species
and a year's supply
of hay for the elephants, a year's bananas
for the monkeys—"OK," Japheth says,
"But you still haven't answered my question—
what will the meat-eaters eat?"
"We'll cross that bridge when we come to it,"
Noah replies, in history's
least appropriate trope. "Come on,
all aboard; it's starting
to sprinkle."

The east wind, full of broth,
bullies the bay windows, and Darwin
stirs in his sleep, losing the ark
for a moment, seeing Brazil again,
the rain forests, the insects, blue-
green, vermilion, saffron—all
those beautiful insects . . .

Well, the fountains of the great deep
were broken up, and the windows of heaven opened,
and the rain was upon the earth
forty days and forty nights,
and the ark was lifted up
and went upon the face of the waters,
and the floundering began outside, the running
for the hills. Noah knew it was happening,
and so did Shem and ham, snug
as a bug on A deck; but
it was hard-boiled Japheth who howled and keened
for Enos and Jared, still out there

somewhere, and Adah and beautiful Zillah,
so he was the first to break and run
for the one small window; and yes,
there it was, just the way fear
had been painting it on his eyelids ever since
that divine command: the fighting
for high ground, crazed beasts goring
and gnashing, serpents dangling from trees.
Then Shem and Ham and finally Noah
and the four nameless wives
couldn't resist; they ran for the window
and watched their friends and neighbors
hugging in love and panic until
they all went under. Japheth caught
one final glimpse, and of course it had to be Zillah,
holding her baby over her head
till the water rolled over her
and she sank, and the baby
sank, splashing a little, and then
there was silence upon the waters,
and God was well pleased.
They all turned away from the window, Noah
and his boys, and their weeping wives,
and no one in the ark would look
at anyone else for many days.

So, for a solid year that strange menagerie
lived in the ark, the sixteen thousand hungry birds
lusting for the eighteen hundred thousand insects,
and the twelve thousand snakes and lizards
nipping at the seven thousand mammals,
and everyone slipping and sliding around
on the sixty-four thousand worms
and the one hundred thousand spiders—
and Noah driving everyone buggy, repeating
every morning, as if he'd just thought of it:
"Well, we're all in the same boat."

(Oh, in case you're wondering, Noah
conveniently
forgot about the dinosaurs:
even in miracles, enough
is enough.)

It was a long, long year. Imagine,
if you will, the trouble
for those washed-out men and their bedraggled wives,
feeding the gerbils and hamsters, cleaning
the thousands of cages, keeping the jaguars
away from the gazelles, the grizzlies away
from the cottontails—everything aboard, after all,
was an endangered species.
And imagine those seven clean elk,
clashing antlers at mating time,
and imagine Noah, with his brittle bones, trying
to dodge all those rattlers and copperheads
and vipers and cobras and scorpions and
black widows and tarantulas; and imagine—oh, imagine
cleaning up after the elephants
for a whole year, swabbing those
unspeakable decks . . .

But enough—
our sleeper is stirring.

Darwin starts out of his bad dream, sweating,
and lies there thinking of Noah.
Darwin knows all about death, and extinction, and so
he understands
the sinking heart of poor old Noah,
after the waters subsided,
and the dove fluttered off and never returned,
and the gangplank slid to Ararat,
and the animals scampered out to the muddy,
corpse-ridden earth—Noah,
burning a lamb on his altar
under that relentless rainbow, remembering
that he rescued the spiders and roaches, but
he let Enoch and Jubal
and Cainan and Lamech and
their wives and innocent children
go to a soggy grave—and Darwin knows
that Noah knows, in his tired bones,
that now he will have to be fruitful once more,
and multiply, and replenish the earth
with a pure new race of people who
would never, never sin again,
for if they did,

all that killing would be
for nothing, a terrible
embarrassment to God. An Noah knows
that just like his grandpa, Methuselah,
he will be obliged to live
with his strangling memories
for another three hundred years.

Ed: Reprinted with permission of the author from a delightful and thought-provoking book (pardon the mini-review!), Darwin's Ark: Poems by Philip Appleman, *1984. Bloomington, IN:Indiana University Press.* C/E

Debates and the Globetrotters

Eugenie C. Scott

During the last six or eight months, I have received more calls about debates between creationists and evolutionists than I have encountered for a couple of years, it seems. I do not know what has inspired this latest outbreak, but I am not sure it is doing much to improve science education.

Why do I say this? Sure, there are examples of "good" debates where a well-prepared evolution supporter got the best of a creationist, but I can tell you after many years in this business that they are few and far between. Most of the time a well-meaning evolutionist accepts a debate challenge (usually "to defend good science" or for some other worthy goal), reads a bunch of creationist literature, makes up a lecture explaining Darwinian gradualism, and can't figure out why at the end of the debate so many individuals are clustered around his opponent, congratulating him on having done such a good job of routing evolution—and why his friends are too busy to go out for a beer after the debate.

The worse situation is that he and his friends typically think he did just fine and remain ignorant of the fact that the majority of the audience left the auditorium convinced that evolution was "a theory in crisis."

What usually happens in these debates? Usually they take place at the invitation of the other side, and usually they take place in a religious setting or minimally under religious sponsorship. That's the first problem. The audience that is most anxious to come, and that will be recruited the most heavily, is the one that supports the creationist. In the comparatively rare situation where the debate is held on a college campus, the supporters of good science and evolution are invariably in the minority in the audience, whereas the creationist supporters seem to exercise every effort to turn out their crowd. Don't be surprised to see church busses from many local communities lined up outside the debate hall. In some cases, the sponsors advertise only among the faithful, posting up only a handful of flyers on campus. Guess who comes?

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A second problem is that the evolutionist debater has an uphill battle from the start. Evolution is a complex set of ideas that isn't easily explained in the sound-bite razzle-dazzle of the debate format. Evolution applies to astronomy, physics, chemistry, biochemistry, anthropology, biology, geology—you name the field, and evolution will relate to it, like as not. Most audiences have an abysmal understanding of basic science. How are you going to bring an audience up to par? The goal of a debate (I assume) is to teach the audience something about evolution and the nature of science. This is *possible* in a debate format, but it is difficult to do well, because it is not easy to do quickly. For example, consider that your opponent will offer as proof that evolution did not occur because Stephen Jay Gould has said that the fossil record does not support gradual evolution. A good debating strategy: he is citing a famous evolutionist source, which gives him credibility. Plus he is confusing Gould's statement about the rate of evolutionary change with an unmade conclusion about whether evolution occurs. Plus he is operating from the creationist enthusiasm for authority ("If famous scientist X says it, it has to be true.") Gould, like any scientist, can be wrong on any point. We don't accept "famous scientist X's" conclusions just because of the fame of the maker, but because of the quality of the argument.

How long does it take to straighten out your audience on this matter? The creationist has made a simple declarative sentence, and you have to deal with not an easily-grasped factual error, but a logical error and a methodological error, which will take you far longer to explain. As I was writing this, a community college teacher called to tell me she had trouble convincing her students they were made out of smaller parts! Now, maybe not all audiences are at such a level that they don't even accept cell theory, but the fact that your opponent just has to say, "It didn't happen" (i.e., "there are no transitional forms," "radiometric dating doesn't work," etc.) means you have a bunch more talking to do from the get-go.

Creationist debaters (at least the nationally-prominent ones) are masters at presenting these half-truth *non sequiturs* that the audience misunderstands as relevant points. These can be verydifficult to counter in a debate, unless you have a lot of time. And you never have enough time to deal with even a fraction of the half-truths or plain erroneous statements that creationists can come out with. Even if you deal with a handful of the unscientific nonsense spewed out by your opponent, your audience is left with the "Yeah, but . . . ," syndrome: "Well, maybe there are intermediate forms, and the creationist was wrong about radiometric dating, YEAH, BUT why didn't that evolutionist answer the question about polonium halos (or some other argument)?" The evolutionist debater is never going to be able to counter all of the misinformation that a creationist can put out in a lengthy debate format. And the way these things work is that suspicion is sowed in the minds of the audience, no matter what.

The title of this article brings up a third point. Have you ever seen the Harlem Globetrotters basketball team play? Years ago (maybe even now for all I know) they used to play against a team called the "Washington Federals" or something like that. It was great fun to see the Globetrotters dribble basketballs around these guys, through their legs, bounce balls off each other and generally goof around making the poor Federals look like dopes. I think the Federals were probably a pick-up team from the area, comprised of OK ball-players, maybe on the sub-semi-pro level.

What was sort of interesting was that the Federals did occasionally get off some good shots. They weren't total stumblebums. But nobody paid any attention to the good shots of the Federals.

In a creation/evolution debate, the audience is there to hear their champion, and most of them are there for the other side's champion. They're there to root for their Globetrotters (an apt term, given the Institute for Creation Research's travel schedule), and who cares if the evolutionist gets off a good shot or two? The function of the evolutionist in such a setting is to be beat up on and thus inspire the troops.

And however well the evolutionist thinks he may have done, the probability is that he was just fodder to inspire the local fans. I have been invited on many occasions to debate, and have always refused. The purpose of a debate is to rouse the local troops, to stir them to action, and inspire them to go forth and support the teaching of creationism. Why should we help?

Before you accept a debate, consider if what you are about to do will harm the cause more than promote it. Many scientists justify the debate by saying, "creationists will claim that scientists are afraid to debate them." So what? Who are they going to make the claim to—their own supporters?

If the alternative is to show that scientists are not afraid of creationists by having some poor scientist get beat up on thedebating stage, are we better off? Let's face it—some scientists do it out of a sense of ego. "I'm really going to make mincemeat out of that creationist," they think. Well, are you such a good debater that you can guarantee that people in the audience aren't going to go off after your debate and make life miserable for the local science teacher? "Gee, Mrs. Brown, I went to this neat debate the other day. You'd be surprised at how weak evolution is. Are you going to teach it this year?" Want to lay odds on Mrs. Brown teaching evolution again? Is your ego more important than students learning evolution? Think about it.

My recommendation: above all else, do no harm.

I have no objection, by the way, to appearing on radio and TV with creationists, and have done so many times. In this format, it is possible to have some sort of point-counterpoint which is (though it seems odd to say it) not possible in a formal debate format. On the radio, I have been able to stop Gish, et al., and say, "Wait a minute, if X is so, then wouldn't you expect Y?" or something similar, and show that their "model" is faulty. But in a

debate, the evolutionist has to shut up while the creationist gallops along, spewing out nonsense with every paragraph.

Now, there are ways to have a formal debate that actually teaches the audience something about science, or evolution, and that has the potential to expose creation science for the junk it is. This is to have a narrowly-focused exchange in which the debaters deal with a limited number of topics. Instead of the "Gish Gallop" format of most debates where the creationist is allowed to run on for 45 minutes or an hour, spewing forth torrents of error that the evolutionist hasn't a prayer of refuting in the format of a debate, the debaters have limited topics and limited time. For example, the creationist has 10 minutes to discuss a topic on which creationists and evolutionists disagree (intermediate forms, the nature of science [with or without the supernatural], the 2nd law of thermodynamics disproves evolution, the inadequacy of mutation and selection to produce new "kinds," etc.). The evolutionist then has a 5 minute rebuttal, followed by a two minute reprise from the creationist. Next, the evolutionist takes 10 minutes to discuss an agreed-upon issue, with the creationist taking the next five minutes, and the 2 minute follow-up. With this format, the audience is given digestible bits of information and is not overwhelmed by a barrage of impossible-to-answer detail. The evolutionist at least has a fighting chance to teach something about science and evolution.

Of course, whenever the ICR has been presented this option, they have almost always refused to debate. Which in itself suggests the utility of using this approach! I think they recognize that they have a lot to lose in any other than the "Gish Gallop" format. Tough luck.

If, after all of this, you still think you want to debate a creationist, then let me give you some suggestions. First, don't bother defending evolution. Evolution is state of the art science, taught at every decent college and university in this country, including church-based schools such as Brigham Young, Notre Dame, and Baylor. So why should you defend it? Tell your audience that there is plenty of information on evolution in the library, in university courses, and in scores of science journals. Creation "science" is the new kid on the block. Let's see first if it fits the criteria of science, and second, if its claims and predictions stand up to scrutiny.

And then show the audience how creation science is a bust. Don't bother trying to explain something as complicated as evolution, although during your rebuttal you can straighten the audience out on the creationist's stupider claims. But hit hard at flood geology, the impossibility of all organisms being descended from the Ark survivors (some real problems in genetics here, folks), hit them on the young age of the Earth, quote Morris on Satan causing craters on the moon (in a sort of artillery battle with angels), and all the other odd stuff the creationists don't want people to know they think. Remember—it's a *performance*.

I have other suggestions, but I won't waste time here. Call NCSE if you are going to debate or if you hear of someone going to debate. Get the word out that these practices do not improve the public understanding of science or evolution. But if it is impossible to avoid, call NCSE, 1-800-290-6006. C/E

Comments

On Hodgson and Hodgson

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The article by Hodgson and Hodgson (*C/E* 34) was disturbing for at least two reasons. First, the number of students (81%) who think that creationism should be taught alongside evolution, in spite of the fact that 67% "believe" in evolution, illustrates the success that creationists have had in pushing the concept that "both scientific views" must be presented in the interest of fairness or objectivity. (Since the creationists insist that they are not trying to introduce a specific religion into the schools, it is not clear why the origin-of-life myth of one ancient Middle Eastern society should be taught to the exclusion of the poetic origin-of-life stories of many other groups, such as native North American nations; fairness and objectivity are narrowly defined in their argument.)

The second cause for concern lies in the questionnaire itself and is perhaps more significant. The one question that relates to understanding of a scientific concept (rather than to the attitudes that are the main subject of their exercise) can only be termed scientifically illiterate. Question 6 asks which of five statements "best agrees with your impression of the Modern Theory of Evolution." The choices are: A. The phrase "Survival of the Fittest." B. Evolution occurred because different individuals left different numbers of offspring. C. Man evolved from either the gorilla or chimpanzee in Africa. D. Evolution involved a purposeful striving towards "higher" forms (that is, a steady progress from microbes to man). E. Evolution occurred because the strong eventually eliminated the weak.

The authors consider B the correct answer. It is evident, however, that none of these answers would be acceptable to students who understand...evolution, and that they were forced to choose among unsatisfactory alternatives. Their choices therefore supply no information as to the understanding of evolution.

Pre-reproductive mortality is very high in most species, and the number of young produced may be hundreds or thousands of times larger than the number who eventually live to reproduce. In a population of genetically identical clones, different individuals would have different numbers of offspring. Evolution would not, however, occur. In such a population there would be no selection and hence no evolution. Differences in numbers of progeny does not cause evolution.

Chance is by far the most important determinant of which individuals survive to "leave more progeny." Evolutionary change depends on superposition of nonrandom statistical probabilities (based upon heritable differences) on that mass random mortality.

Evolution depends on:

a) Differences exist among individual members of a population.
b) Some of those differences affect the likelihood of successful reproduction.
c) These differences are inherited (to various degrees).

Given these facts of the biological world, evolution is inevitable. In the absence of all of them there would still be large random differences in the number of progeny produced by individuals in a population (with zero being by far the most common number in most species). Such differences would not, as answer B implies, cause evolutionary changes to occur.

If forced to choose among the five invalid answers available, I would probably have chosen answer A, "Survival of the Fittest," like 32% of the students surveyed. This is an unfortunate and misleading phrase, but it does at least imply differences in survival (and hence inferentially in reproduction) on the basis of differences in individual characteristics. That is an important aspect of evolution. Mere difference between individuals in production of progeny is inevitable by chance alone and has no relevance whatever to mutation, variation, or heritability, and no necessary relevance to selection.

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In their survey, and in their analysis of student attitudes and perceptions, Hodgson and Hodgson have made a very significant error. They failed to distinguish between creation belief and creation "science." Not only are these two utterly different from each other, but understanding the difference is critically important in our efforts to teach evolution in the classroom.

Every good teacher knows that it is nearly impossible to reach students and to alter or expand their perceptions unless one first touches base with the students' current state of knowledge. From there, if we are good at our jobs, we may be able to guide the student to deeper understanding and to correct the misconceptions that they bring with them into our classes. Teaching and learning flourish in an atmosphere of mutual respect, and they fail in an atmosphere of arrogance and contempt.

The majority of Americans hold some sort of belief in God and creation. A minority adhere to the absolute fundamentalist claims of creation "science." By lumping those together, we alienate ourselves from a majority of our students and set ourselves up for failure. To set evolutionary theory in a context that acknowledges the prevailing belief system of our times is simply realistic and true. To present evolutionary theory in a vacuum, as though creation belief is nonexistent or irrelevant, is dishonest and self-defeating. A student can simply reject the whole thing, quite rationally, on the basis that he "knows something" the instructor not only does not know but refuses even to acknowledge as relevant to the discussion. The only way to get through the barrier is to deal with both in a rational way and to discuss reasons for choosing to trust science, religion, or both as sources of specific kinds of information about the world around us. The contradictions are real, and they must be addressed, and it must be done with respect.

When one asks survey questions about "creationism" in general, or discusses teaching strategies regarding "creationism" and evolution, without distinguishing between creation belief and creation "science," one should not be surprised or shocked or disappointed to find that many people prefer that the overwhelmingly predominant beliefs of our culture should be included in any discussion of evolutionary theory. That is valid, and I strongly support that position. I use that approach in my teaching, and with much greater success than I ever had using the arrogant approach. I present creation *belief* and evolutionary *theory* as it developed within the social context of that belief. However, I never call them both "theories," because in a biology class I use the word "theory" in its scientific definition and only evolution qualifies as a scientific theory. To refer to "creation theory" and "evolutionary theory" in the same breath is to confound two utterly different things under one name. This only creates confusion.

Creation "science" is another issue altogether. It is a fraud, a hoax, a system of illogic and unreason presented as if it were science. If I mention it at all, it is only to expose it. I do think it is important to teach students (*and* instructors!) the distinction between creation belief and creation "science." It is also important to clarify the significance of belief systems in our evaluation of "truth" generally. It is easy to demolish creation "science" from within the frame of reference of science, but that only works if an individual *believes* that science (physical evidence and the power of human reason to evaluate it) is a valid investigative tool. There is no point arguing about it with someone who lacks that belief, to whom truth is subjective.

If we make a few of these distinctions and philosophical positions clear at the outset (Strahler's *Understanding Science* has been very helpful to me in this regard), we leave even the most alienated students a place to stand while listening to us, a piece of their own chosen ground which we may not like or agree with but which they certainly have a right to occupy if they wish. This strategy reduces the level of hostility and keeps people communicating.

I have found that very few students are willing to reject science altogether, and so they end up absorbing at least some information about and understanding of evolutionary theory. That's a start.

Ed: These are representative of several comments received on this article. I should note that I discussed some of these matters with the authors in advance of acceptance for publication; I agreed with their contention that replicating a well-known earlier survey by Peter Fuerst (despite possible flaws) had comparative and continuitive value. Having tried it myself, I know that survey research always has to tread a squiggly line between maintaining the consistency of replication and "trying to get it right this time." C/E

Reviews

The Beak of the Finch.
by Jonathan Weiner, 1994. Alfred A. Knopf, NY, 332 pp. $25.

Reviewed by Kent Harker, editor, BASIS, San Francisco

Science writer Jonathan Weiner has composed a marvelous book. Stephen Gould fans will not fail to recognize a bit of Gould's style in Weiner's title. Gould features a prominent evolutionary characteristic of his subject animal, e.g., *The Panda's Thumb* and *The Flamingo's Smile*. Weiner puts his own spin with a prepositional phrase instead of the possessive. I think Weiner wants to make the association for those who have read Gould so we will believe that here too is the same caliber of writing. His strategy worked on me. Weiner tells a story. He pens a delightful prose while he spoons great dollops of information like whipped cream on the pie.

The book is about evolution; the story is about Peter and Rosemary Grant and the Galápagos finches. (Weiner dispels some myths about "Darwin's finches": Darwin was a creationist then, so he was unmoved by the finches. He collected, Noahlike, "thirty-one finches, representing nine kinds" without even noting what island they came from, and he makes little more than passing remarks about them in his notes. He was more interested in the mockingbirds.) The Grants, both Princeton evolutionary biologists, are not well-known outside academic circles. This state of affairs disturbs me when I see the notoriety and fortune lavished on ephemeral sports and entertainment idols. The Grants of the world should be our real icons. It is some comfort that their peers hold them in the highest regard; the staff at the Darwin Research Station on Santa Cruz claim that "Only God and Peter Grant can recognize Darwin's finches." The Princeton duo's observation teams became known as "the Finch Unit."

Creationists at the Institute for Creation Research sit in their armchairs sifting the writings of research scientists looking for something to cite, usually out of context, and they call it research. (When creationists get a copy of Weiner's book they will have a field day: almost every page has something that will look juicy out of context.) Only devoted scientists like the Grants would go to a lava-domed speck, a few inhospitable minutes of degree from the equator, in the Galápagos Islands called Daphne Major. A tour of the perimeter takes about an hour. There is no beach—indeed, the surf has

actually undercut the guano-painted dome so access is possible only at high tide, then at one spot called "The Welcome Mat." There is nothing humanly edible and there is no water. It is almost all sweat, dirt, discomfort and tedium. This is real science. Only rare and dedicated folks like the Grants and their graduate-student protégés would spend twenty years in detailed observation of thirteen species of finches under conditions like these.

Many times, depending on the size of the population, the Grants or their graduate students could recognize every finch on Daphne Major by sight. Pleasures must have been few under those austere conditions; Weiner conveys the simple joy the Grants experienced when they finally netted two males that had eluded them for many months. Each bird is carefully weighed, measured—especially every aspect of the beak—and tagged, and a blood sample taken. The picture would not be complete without dietary and climatic information, so seed type and distribution, territorial boundaries, mean temperature and moisture were all carefully monitored and noted. Since mating would show the results of any change, which couples, the number of eggs and how many of the hatchlings fledged were noted with particular care. Science is about data collection and observation, and the Grants are daunting in their rigor. Back in their Princeton labs, surrounded by computers, reference books and anxious colleagues, the second phase of the scientific puzzle begins: interpreting the data to formulate theories and make predictions. This is the core of the information in this part of the book, and it is exciting.

Creationists decry the historical nature of evolutionary biology. By its very name, evolution implies great time. Those who do not understand science and scientific methods want only to recognize laboratory results. There *are* evolutionary examples (hybridization), but creationists object that they are man-made, not involving natural selection, and that they do not result in speciation. What we need is a giant laboratory with an isolated, highly variable colony in which environmental conditions are rapidly changing. Voilà the Galápagos.

Finch variability in the Galápagos is extraordinary. By contrast, sparrows (finch relatives) on the remote island of Mandarte, B.C. are predictably homogeneous. It is a rare individual—four in ten thousand—with a beak ten percent from the mean. The same variation in cactus finches is four in a *hundred.* On Daphne Major " . . . the probability of finding a 10 percent deviation is one in three." The script is ready. This evolutionary drama is intense, but the intensity is the kind that goes on in a chess game: it is under the surface, and only through knowledge of the game and close observation can one appreciate that intensity.

Darwin carried and admired William Payley's book. Using Payley's celebrated design argument, Darwin reasoned that since living things have "contrivances more elaborate than watches—then even the slightest variations must make a difference. . . . " The Grants took this as their cue for the conduct of their research, concentrating on the slightest variability in beak

size. They needed one more element for the experimental protocol: an environmental change. That change came in a devastating 1977 drought that eliminated about 90% of the finch population on Daphne Major. Evolutionary change was wrought observable, measurable, wholesale. In 1983 another climatic event occurred, a rare El Niño-caused flood, the wettest season on record. Only because the Finch Unit was there would we have an inkling of what happened. "Species of animals and plants look constant to us, but in reality each generation is a sort of palimpsest, a canvas that is painted over and over by the hand of natural selection, each time a little differently." The details are fascinating.

Nature is more than red in tooth and claw. In a simple, pastoral setting as finches cracking seed pods She is harsh and demanding on a daily, hourly basis, exacting the ultimate penalty for the individual's inability to meet the demands of a situation. To see the drama requires excruciating attention to detail. She chisels and hones her charges, selecting the "best" characteristic. She is as fickle as she is tyrannical: what works today might be neutral or even lethal later. Perhaps the biggest surprise in the book—I won't open the bag for tabby to escape—relates to just how closely we must watch nature to see even a significant evolutionary change. Another, somewhat surprising element is the degree to which sexual selection works in tandem with natural selection. The fossil record is a snapshot in time that misses entirely what happens right under our noses. Darwin honestly admitted the problem of how evolutionary inventions get started in *Origin of the Species*. Where Darwin—and most of us—made a mistake was that the process need not be as gradual as Darwin imagined. The origin of species and origin of adaptations are tightly linked. After research like the Grant's, others will study ongoing microevolution more closely.

I left the book with a deeper appreciation for and understanding of Darwin and his work. Professors Peter and Rosemary stand on Darwin's shoulders, vindicating his ideas where he would not have imagined. Weiner's book is a welcome tribute to the Grants and to the *hard* science of evolutionary biology. Another evolutionary biologist, John Endler, who watches guppies with the same rigor as the Grants watch finches observes that "We have a serious public-relations problem. People don't realize this is real science." Weiner shows that we need make no concessions to creationists on hard scientific grounds. "There is now simple experimental confirmation of [adaptations and speciation]. The experiment was published the same year as [Phillip] Johnson's book, [in] 1991."

This book is must reading. The plum in this treasure trove is that it is also very well written.

The Creation Hypothesis.
Edited by J. P. Moreland, 1994. InterVarsity Press, Downers Grove, IL, 335 pp. $12.99 paperback.

Reviewed by Arthur M. Shapiro, Center for Population Biology, University of California, Davis.

> *We don't know enough about the unknown to know it is unknowable.—G.K. Chesterton.*
>
> *Whereof one cannot speak, thereof one must be silent.*
> *—L. Wittgenstein.*

I suppose I should confess up front that some of my best friends are Christians. I can't share their beliefs, but at times I find myself envying them for having a philosophy that seems to bring them so much comfort. Life is harder, as some wag put it, with no invisible means of support.

I make this confession because this review is bound to provoke nasty letters from true-believer atheists, accusing me of being "soft on Christianity." Some of my readers, as I know from previous experience, derive glee not from a conviction that the advance of science means the retreat of ignorance, but from a sense that the power of science provides the means to eradicate superstition—by which they mean religion—once and for all. The two are different. The true-believer atheist cannot comprehend the notion, recently and repeatedly and eloquently articulated by Czech President Václav Havel, that postmodern civilization faces a profound crisis of values. Havel says—and I think he is right—that the decline of traditional religion in the West—and the demise of its substitute, Marxism—has left a hole in the social fabric that science cannot hope to fill. (Science itself recognizes that it is not normative; that there is no causal route from *is* to *ought to be*). Havel says our most urgent task is to reinvent a source for humane values, or see them slip away. The editor and contributors to *The Creation Hypothesis* appreciate the problem. Their solution is to inform science with religion. Their very ambitious project is to create an alternate paradigm of *theistic science* to compete with the standard way of doing science, which ignores (and from their perspective, thereby negates) God. This is not a silly idea. Whether it is doable is unclear, but apparently the attempt is to be made.

Most working scientists are not philosophically sophisticated. Laymen interested in science not uncommonly are convinced adherents of a particular philosophical school—typically either Positivism or Popperian Neopositivism/Falsificationism—and tend to be aghast on learning that what they view as the final word is seen by the professionals as passé. To read this book may

be profoundly disturbing to such folks, most of whom are unaware of the claimed death of the "Demarcation Problem"—the delimiting of science from non-science. Many of my colleagues and correspondents depend for sustenance on Karl Popper's criterion of falsifiability, and the few who have read Paul Feyerabend's paean to anarchy or any of the self-serving postmodernist critiques of scientific objectivity reject them peremptorily as absurd. But it is a fact that many of the pros have given up on finding a universal criterion for defining science, and are content to view science as one more fuzzy set. The legal implications of this are perhaps frightening, but it will take a while for this level of sophistication to reach the courtroom. (In the meanwhile, anti-creationist litigators had better read up on the demarcation problem and get their witnesses lined up.)

The point here is that there is no a priori reason why there could not be such a thing as "theistic science." The question is, what would such a science be like? The contributors to *The Creation Hypothesis* envision science proceeding from the prior assumption of intelligent design of the universe and life. This assumption in turn is to generate testable hypotheses about the material world.

There is a very fundamental problem with this. The hypothesis of design itself cannot be tested, although the robustness of predictions derived from it will tend to influence one's perception of whether or not design is probable. What is testable is a potentially immense set of hypotheses deriving from *what we think about the Designer.* All theologians know that the properties of the Deity are so beyond our own as to be unapproachable, indescribable, ineffable—certainly incapable of being limited or defined by our meager imaginations. All we can know of such a God is what He chooses to reveal to us. When we test hypotheses derived from the assumption of intelligent design, we assume that we are capable of knowing or at least guessing intelligently the intent and properties of the Designer. If we deduce from the Scriptures that God would have a preference for D-amino acids, a quick check of the biosphere would tell us we got that property of the Designer wrong. How would that affect the future development of our science? There is obviously a temptation to construct hypotheses with a high probability of supporting our theological positions. Perhaps hypotheses derived from traditional Christian Scripture should be tested only by Hindus, and so on.

The authors of *The Creation Hypothesis* allow for aspects of theistic science that traditional non-theistic practitioners may find amusing or appalling, but which within the theist's logical structure are not at all disturbing. Thus on page 63 (Moreland) we read: "Creationists and evolutionists do not need to attempt to solve a problem, say a gap in the fossil record, in precisely the same way, nor do they need to employ the same types of solutions or rank various epistemic virtues identically in their solutions. Creationists may elevate the virtue 'solves theological or philosophical internal and external conceptual problems' above the virtue 'offers solutions yielding empirically

fruitful lines of new research.' There is nothing unscientific about this at all, and it is question-begging to claim that a criterion of empirical fruitfulness set by one research program should be most important for a rival program and that if it is not, the rival is not even science. . . . " And: (p. 64) ". . . certain phenomena like the origin of life and gaps in the fossil record are not problems in need of solution for creationism, beyond an appeal to the primary causal agency of God." Moreland argues that a theory which explains a problem by Divine agency, which is unexplainable on material grounds, is preferable because it *does solve the problem.*

In another chapter, Stephen C. Meyer argues that critics of a theistic perspective cannot have it both ways: they cannot claim on the one hand that intelligent design is untestable, and on the other that observations of the natural world (e.g., imperfections in apparent design—the panda's thumb argument) tend to refute it. As we have seen, this is true—but understanding the layered structure of inference from design removes this as an objection.

While *The Creation Hypothesis* strives to distance itself from the "God of the gaps," it never quite succeeds. Everywhere, one finds recourse to the argument that materialism has failed to solve such and such a problem, therefore it appears intractable unless we posit Divine agency. The pitfalls of such reasoning are obvious and need not be belabored. At the same time it is not necessary to caricature *us*; in reasonably objective fashion the chapters that recapitulate the intellectual histories of difficult, unsolved problems (origin of life, cybernetics, macroevolution, origin of language) demonstrate how regularly we have prematurely proclaimed victory on each and every front. A certain humility on our part seems called for. At the least, we should be candid in admitting that if we consider material solutions to these problems inevitable, that is a matter of faith on our part. We can point with pride to tremendous advances in the past, but we of all people should know the limitations of inductive generalization.

If the basic premise of this book will leave readers gesticulating, various details may leave them fuming. Thus Moreland (p. 18 ff.) makes heavy use of what he calls the "kalam argument" for the existence of God. He never tells us what the odd word "kalam" means or how the argument has been criticized. Admittedly, by recourse to material cited in the footnotes one can find this out; but since most readers, including most Christians, are unlikely to be familiar with Muslim scholasticism, why not just spell it out? The chapter by Kurt Wise on macroevolution will rankle, because Wise, a former student of Stephen J. Gould, obviously is capable of defining "nested hierarchy" correctly. What he actually does (on pp. 217-221) is to muddle the notion thoroughly, thereby seemingly vitiating its power as an argument for the truth of phylogeny. On p. 220 he says: "Humans have designed a large number of different types of teaspoons. Some are made of stainless steel, some of silver. Some have monograms on them, others do not . . . Yet they are all classifiable as teaspoons. And though there are many types of tablespoons, many types of soup spoons

and many types of serving spoons, all . . . can be classified together as spoons. The wide variety of spoons can be classified with the wide variety of forks and the wide variety of knives as silverware; and the silverware can be classified with plates, bowls and cups as tableware . . . [which can be] classified with furniture and appliances as housewares, and so on. *Humans, without so intending, create objects that are distributed in character space in a nested hierarchy of form.*" (Italics mine.) This "nested hierarchy," insofar as it relies on arbitrary phenotypic characters and a classification based on imputed function, illustrates nothing useful or interesting about the logic of phylogeny reconstruction. The objects could be classified equally persuasively by materials or size or weight or color or country of manufacture or . . . surely a former Gould student is being disingenuous here.

Nonetheless, most of the book is scientifically accurate (whatever one thinks of some interpretations of the data), and its historical sketches, while sometime spotty, are not bad at all. The Appendix, consisting of mostly shopworn quotations, seems to be more of a debater's aid than anything else.

Should you read this book? Many Christians—thoughtful, intelligent Christians, not just Bible-thumping yahoos—feel that they have been intellectually marginalized by materialistic science at least since 1859. They're mad, and they're unwilling to take it any more. In the 62 years since the physiologist John Scott Haldane published *Materialism*—an inquiry into the adequacy of scientific materialism to explain everything—we have pushed the frontiers of materialistic science very far, yet our philosophical underpinnings are in decline. Positivism and Marxism are dead, falsificationism is a tottering zombie, and for the deeply committed theist whose conviction is intact, the materialist's faith in his way of looking at the world appears increasingly quixotic, if not untenable. We are, for the theist, reduced to justifying what we do on the sole ground that it seems to have worked very well.

I can see *Science* in the year 2000 running a major feature article on the spread of theistic science as a parallel scientific culture. I can see interviews with the leading figures in history and philosophy of science about how and why this happened. For the moment, the authors of *The Creation Hypothesis* are realistically defensive. They know their way of looking at the world will not be generally accepted and that they will be restricted for a while to their own journals. They also know that they will be under intense pressure to demonstrate respectability by weeding out crackpots, kooks and purveyors of young-earth snake oil. If they are successful, the day will come when the editorial board of *Science* will convene in emergency session to decide what to do about a paper which is of the highest quality and utterly unexceptionable, of great and broad interest, *and* which proceeds from the prior assumption of intelligent design. For a preview of that crisis, you *should* read this book. Of course, if you are smug enough to think "theistic science" is an oxymoron, you won't.

Darwinism.
by Peter J. Bowler, 1993. Twayne Publishers (Maxwell Macmillan International), NY, 118 pp. $30 hardcover.

Reviewed by Andrew J. Petto, Associate Director, Center for Biology Education, University of Wisconsin, Madison

"Social Darwinism is neither Darwinist, nor very social. Discuss!" So might Linda Richards, Mike Meyers' *Saturday Night Live* hostess of "CoffeeTalk," express the thrust of Peter Bowler's *Darwinism.*

A highly respected historian of science, Bowler explores the social construction and reconstruction of Darwinism in the 19th and 20th Centuries. He argues that much of the controversy surrounding evolutionary theory in both centuries centers on the moral implications of the various conclusions drawn about the process by which evolution occurs. However, Bowler attributes the greater part of this conflict to hindsight on the part both of religious fundamentalists and post-Modern Synthesis biologists: "The war between science and religion is something of a myth. It is an artifact of hindsight, a distorted image produced by applying modern values to a past situation (p. 36)." *Darwinism* deconstructs the prevailing myth of a prolonged and bitter feud between religion and science reaching back into the Enlightenment in which secular materialism triumphed finally over supernaturalism. Bowler argues that this myth persists precisely because it serves the nonscientific agendas of modern scientists and modern religious fundamentalists. The "Darwinism" that both these factions evoke is a Darwinism reconstructed to provide an almost epic tale of the struggle between science and religion. In *Darwinism*, Bowler shows that the historical and cultural environment of the late 19th and early 20th Centuries were replete with social and political agendas that their proponents thought well served by references to evolution. Whether extolling "Darwinism" for its supposed insight into human progress or condemning it for its base materialism and purposeless suffering, these proponents thought nothing of attaching a Darwinian label to the various manifestations of good or evil that they perceived around them.

> The early form of "Darwinism" was not presented as a purely materialistic philosophy that destroyed all moral values, and when we examine various kinds of "social Darwinism" more closely, we can see that in many cases the biological theories for social arguments were actually non-Darwinian in origin (p. 57).

Moreover, Bowler concludes in this work that the enduring value of Darwin's work for modern biology is not a function of his making evolution the center of his biological studies. After all, there were many evolutionary theories in circulation before, during, and after Darwin's time, and at least two or three were more widely accepted than Darwin's formulation. Instead, Bowler argues that the staying power and central role that is reserved for Darwin in biology today is due to his ability to describe and think about issues in biology that are still central to the way biologists view the world today.

> More than any other Victorian evolutionist, Darwin asked the kind of questions about how apes and humans diverged that a modern paleontologist would find significant. Some of his answers, too, were much closer to modern thinking than those offered by his contemporaries . . . (p. 101)."

Darwinism is a careful exploration of the historical, cultural, and scientific contexts that have shaped the evolution of our understanding in the last century. The book is organized into an introductory chapter that acts as an overview of the book. Three topical chapters follow that explore the use of Darwin's ideas and concepts of evolution in science, the religious and moral discourse that surrounded evolutionary ideas, and social theories that emerged from evolutionary and progressivist thinking. The final chapter is a reprise of the main ideas in Darwin's two major works that are relevant to this discussion, *On the Origin of Species . . . and The Descent of Man.* The entire book is very readable and engaging. Bowler's interweaving of historical and scientific material is extremely effective, and the noted bibliographic material provide some intriguing new resources for those who are familiar with, but do not specialize in the history of the science of this period. The main disappointment is the final chapter which seems either out of place or incomplete. Since Darwin was not able to observe and discuss most of the reconstructions that his work was called upon to support, the reader is left wanting a better connection between the final chapter, which is largely descriptive, and the previous ones, which are rich in historical context and analysis. As it is, the book seems to lack a concluding chapter.

However, *Darwinism* is a great resource, because it does not conclude merely with the deconstruction of the historical mythologies that have projected onto Darwinism from the perspective of post-Modern Synthesis biologists and religious fundamentalists. Bowler points out clearly that, despite the prevailing mythologies, Darwinism was not a political movement wedded to liberal progressivism and secular materialism. Rather, it was a new vision of the way that nature produced biological variation and how that variation contributed to adaptation and became the material on which natural selection could work. These are the Darwinian ideas that are still with us in the biological sciences, even though they may be said to have evolved in the last century and a half.

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The Bell Curve
by Richard J. Herrinstein and Charles Murray, 1994. Free Press, NY, 845 pp. NP.

Reviewed by Jonathan Marks,
Dept. of Anthropology, Yale University

The Bell Curve has gotten so much publicity for its ostensibly scientific views of social issues, you'd think it was written by O. J. Simpson. Why, you ask, review it here? As I will try to show, it exhibits many features in common with contemporary "scientific creationism," and the comparison may be very revealing.

Most fundamentally, *The Bell Curve* has the look of a scientific document without actually being one. It resembles a legal brief far more than a scientific treatise. For the latter, one expects that data will be marshalled, explanations will be examined and rejected for informed readers, and the authors will give reasons for accepting their own explanation. In *The Bell Curve*, as alternative explanations for data are parodied and rejected out-of-hand, it rapidly becomes clear that the authors don't have the slightest interest in making a scholarly case. Rather, they are starting with a conclusion and working backwards.

The book's central theme is remarkably simple-minded. Standardized tests measure the gross amount of some kind of innate brain force—for the sake of argument, "Intelligence." People who do better in school, and stay longer in school, have more of it, since they do better on these tests.

Thus one can rank the average college professor above the average carpenter; or the average Korean-American high-schooler over the average African-American high-schooler.

The authors are quite clearly enamored of the particular kind of intelligence exemplified by book-l'arnin'. Presumably they have never actually witnessed a college professor try and build something; or a roomful of them try to organize and govern themselves.

Word on the streets—or at least in the *New York Review of Books*—is that Herrnstein brought the crass hereditarian views of behavior and education (which he has been arguing at least since the XYY days) to the collaboration,

and Murray brought the conservative social platform. Together they have produced a work that is condescending (even "dummied-down"), insensitive, and anti-intellectual—and all with the good name of biology in the background.

They are careful to sprinkle the tome with normative ideas, for example, that acculturation has considerably narrowed long-held calculations of differences in innate intellectual potential. But they fail to acknowledge that the central concept of interest—innate intellectual potential—is itself a strictly metaphysical entity, and not actually subject to scientific perception, analysis, and discourse. One may wish to study it, but innate intellectual potential is only accessible through performance on tests, and performance is not a reliable indicator of ability. Thus, arguing about differences in ability from an observation of differences in performance is very similar to arguing about the nature of God as revealed through His evolutionary workings—ultimately, a sterile endeavor from the standpoint of contemporary science.

The authors rely on casual or "commonsense" observations and inferences: that, for example, carpentry is less intellectually demanding than molecular genetics, and consequently molecular geneticists tend to be smarter than carpenters. One should, I think always be leery of commonsense arguments in defense of presumptively scientific propositions: they should recall ideas like "you can see that obviously the sun goes around the earth, " how can anything so small you can't even see it possibly make you sick?" and most relevantly, "you can see that obviously cows don't change into whales."

They note that the ideas they are promoting have been buried by mainstream science, ostensibly as part of a liberal conspiracy—not terribly unlike the conspiracy to keep creationism out of the science classroom, come to think of it. We have long "known" that achievement, class, IQ, good citizenship, and "race" are all correlated in America. That the observation of consistent differences implies a constitutional basis for those differences has been recognized as spurious since 1912 when Franz Boas demonstrated that immigration results in physical alterations. That IQ measures organic "intelligence" and is thus an independent variable in those corellations, is also old and spurious. What's new is a wealth of graphs of derivative variables designed to overwhelm readers, rather than convince them.

The central contrast of the book is between two models, what Galton called nature and nurture. Obviously if nurture is wrong, then nature must be right—a line of reasoning that is also presumably familiar to readers of this journal. The contrast takes its starkest form as the authors acknowledge that controlling social variables dramatically reduces measured average differences in IQs between groups. However, they argue, there is invariably a small residual left—which must be attributable to constitutional differences. A more open-minded scientific interpretation would be that there are simply other, more subtle variables you haven't controlled for.

What has the authors particularly fearful is the disproportionate proliferation of the lower classes, which was precisely the social nightmare that stimulated the eugenics movement. Since disproportional reproduction is what we mean by biological fitness, this would imply that the lower classes are more fit than the upper classes, which of course couldn't be right. Given that the upper classes were obviously constitutionally superior to the lower, it followed that the proliferation of the lower classes represented a subversion of the laws of nature, a reversal of the evolutionary heritage of the fittest reproducing, that had given our subspecies dominion over the planet.

Demographically, as Herrnstein and Murray note, upward mobility consistently leads to a decrease in birth rate: as women become better educated, they identify and adopt a wider spectrum of life options. Consequently, the long-term solution to the problem perceived by both generations of hereditarians is to reduce the barriers to upward mobility, and give people both the desire and the means to control their reproduction. And the short-term solution is to cultivate the next generation of intellectuals from lower classes.

Unless, of course, you "know" already that the lower classes are largely incapable of producing intellectuals.

It's a funny thing, though, about the intellectual properties of social groups. One has to be struck, after all, by the progress made by Ashkenazi Jews in metaphysical hereditarian thought. They are presently the cognitive crème de la crème to Herrnstein and Murray. But to John Knox, author of *The Races of Man* (1850), they were something less: "the real Jew has no ear for music as a race, no love of science or literature; . . . he invents nothing, pursues no inquiry." What a difference a century-and-a-half makes!

Obviously circumstances for the Ashkenazim have changed far more radically than their the gene pool. Which brings us to the most bizarre—well, the most asinine—assertion of the *The Bell Curve*, as it seeks to distance itself from its inglorious predecessors. Back in the old days, they argue, America wasn't a meritocracy, as a WASP elite of cognitive usurpers dominated the country's higher functions and kept smart poor people out (though somehow the country survived anyway). Now, however, we are a meritocracy, in which people do have equal opportunities and access. (Just look at the Asians and Jews entering Harvard, they note.) This new meritocracy is, of course, thanks to social reforms. So they've done their job, and they can stop now. It's hard to know whether to laugh, cry, or just groan when encountering thoughts like this. I'd sure like to know if Mr. Murray really thinks that the changes we have made in a meritocratic direction have been because government got off people's backs, or got on people's backs.

Finally, *The Bell Curve*, like scientific creationism, uses scientific terms in the service of antiquated arguments, out of kilter with the discourse of the scence invoked. Here the arguments are ostensibly about genetics, but there is no reference to contemporary genetic evdence: blots, gels, photomicro-

graphs. Rather, there is merely the observation of consistent differences, and the assertion that those differences are constitutional.

The arguments are independent of the science of genetics, and could have been made as easily in 1894 as in 1994. In fact, they were. C/E

About this issue . . . *continued from inside front cover*

a clearcut and ongoing process. (Critics complain that their chronicler has made unwarranted leaps to conclusions about human behavior at the end of his book, but this detracts nothing from the Grants' accomplishments nor their chronicler's compelling account.) Finally, we have an evolutionist's critique of the controversial best-seller, *The Bell Curve*. Does some IQ interpretation parallel "scientific" creationism?

Where on Earth is any creationist writing with the majesty and insight of a Darwin or that of so many latter-day evolutionists? Can anyone cite elegant, moving, creationist writing from, say, this century? I suppose it does not disprove their case, *ex nihilo*, but modern creationist writings strike me as almost uniformly drab—-either hair-splitting, tendentious or simplistic!

In the next issue or two, we hope to focus a bit more on specific topics such as mammal evolution without ignoring our unique position as effectively the only journal dealing with pro-evolutionism while confronting antievolutionism. Suggestions of topics or themes are strongly invited!

John R. Cole

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