



Dialogue

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THE BIG SPLASH

by Margaret Helder

Have you heard the sad story of the dinosaurs that succumbed to a watery catastrophe? Most young people in our province have heard the story of the *Centrosaurus* herd in Dinosaur Provincial Park. No doubt it would take quite some force to sweep huge, four-footed horned dinosaurs off their feet. The *Centrosaurus* dinosaurs of Alberta were only moderately large compared to some other horned designs such as *Triceratops*. *Centrosaurus*, for their part, were about 5 m (16 ft) long and perhaps 2.5 m (8 ft) tall. But they were certainly chunky and heavy. Nevertheless something terrible happened to this herd consisting of thousands of animals. Not only were there vigorous adults, but also juveniles (not quite mature) and even elderly, less agile animals. We know that something terrible happened to them all because the bones of thousands of their carcasses ended up smashed together, buried almost up to the present day. (The bone bed was discovered in 1978). This fact, that the bones were smashed together and buried by sediments carried along in raging torrents of water, causes one to wonder about the nature of the flood that overtook these hapless dinosaurs. The interesting thing is that similar tragic events

overtook other even larger horned dinosaurs in western North America.

There is no doubt that *Pachyrhinosaurus* had stranger looking faces than *Centrosaurus*, or even *Triceratops*. While not quite as big as the famous three horned dinosaur, Pachyrhinos were nevertheless pretty impressive. They were about 7 m (23 ft) long and 3 m (10 ft) tall. Typically their skulls, with associated neck frill, might be as long as 1.8 m (6 ft). Indeed the term “ceratopsian” means “horn face.” Not only were these skulls massive, but the bone swept out to the side and up behind to form an elaborate and decorated frill. Pachyrhinos also boasted horns (like those on Viking helmets) and a weird bump on their snouts which may have supported a rhinoceros type projection. While *Triceratops* at 9 m, were the longest and heaviest of the group, Pachyrhinos, for their part, may have reached a not insubstantial 8000 kg or 17,500 lbs. These were big heavy brutes -- not easily pushed around, one might imagine. Nevertheless there

are some spectacular pachyrhino bone beds. A small bed had been found near Lethbridge in the 1970s. Its significance was mainly to establish a “southern” edge to the range of these creatures. Then in 1974 an incredibly rich Pachyrhino bone bed was found 45 km southwest of Grande Prairie in northern Alberta. As with the *Centrosaurus* event, a large herd appears to have been overtaken by a flash flood. The age range of the victims was even broader than in Dinosaur Provincial Park. Not only were there full-grown adults and juveniles, but also very young animals. The broad spectrum of victims ranging from very small to very large, indicates that this was a herd doing the normal things grazing animals do -- rather than a collection of victims which died over a long period of time from old age and predation. In the latter case only the bones of the very old and the very young would be present. Apparently in the case of the Pachyrhinos however, the victims met sudden death when fast moving water engulfed them in enough sand and gravel to bury their bones permanently. Thus buried, they eventually became fossils.

The scope of the flood that overcame the Pachyrhinos of Grand Prairie pales however in comparison with the bed of their bones on Alaska’s North Slope. The quarry with Pachyrhino bones was actually found in 1994. This desolate and cold part



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NOT GOING ANYWHERE!

In former generations, some misguided human biologists used to speculate that the various human races were in process of becoming increasingly different. This process, termed “divergence,” is an important component of evolution theory. The idea is that our world population is composed of more or less isolated groups or races of individuals who are quite similar to each other but significantly different from individuals of another race or ethnic background. Since the theory also, of course, includes the idea that our human population has been around at least one million or more years, it would then seem reasonable to assume that humanity had had lots of time to “diverge,” for the races to become more and more different from each other. Of course, if humans have only been around a short time, then racial differences might be merely superficial, more skin deep rather than significant and the human population might not really have “diverged” at all.

This indeed is what scientists investigating genetic differences have found. An American study published in the December 20/02 issue of *Science*, has found astonishingly small differences between human populations in all major regions of the world. These researchers already knew that only in 0.1% of the human

genetic code (genome) are there any differences at all to be found between individuals or populations. Nevertheless this team set out to find out where most of this tiny amount of variation was concentrated. They conducted a huge study. It involved analysis of 1056 individuals from 52 different populations worldwide. The scientists looked at 377 specific sites in the DNA on various chromosomes other than the sex determining X and Y chromosomes. On average, for each site under consideration, there were about 12 variations possible in the standard code sequence. The team put all their results in a huge computer to see if the variations were clumped according to population. Were individuals within populations more like each other and more different from individuals in other populations? (This would constitute divergence.) The surprise was that only 3-5 % of the variation was from differences between populations. The vast bulk of the differences, about 95 - 97%, was located within each and every population. Thus Specimen A (call him Bill), might be more different from Specimen B, his next door neighbour (call him Sam), than he is from specimen Z, (call him Leung), from across the ocean. The various populations are not going anywhere, specifically they are not diverging in an evolutionary sense. For those of us who realize that we are all descended from Noah’s offspring only a few thousand years ago, this is no big surprise.



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Twenty is Plenty

by M. J. Masters

Many of us may not realize it yet, but in recent years there has been a dramatic shift in thinking about nature on the part of some cell biologists. Indeed even traditional biotechnology is nothing compared to these new frontiers. In the past, over the millennia, people have wondered about nature and increasingly have applied themselves to finding out how it worked. Once we had some insights, not surprisingly, attempts were made to manipulate nature for mankind's benefit. Thus we have progressed beyond plant and animal breeding to the insertion of specific pieces of genetic information into target organisms. Some observers have questioned the ethics of these approaches, but the objectives were mainly practical, not philosophically driven.

Since the turn of the new millennium however, accounts have appeared of an entirely new approach to living organisms. Certain scientists, consciously it seems, have set out to upset the created order with a view (they hope) to drive evolution into entirely new and unanticipated directions. The worrying aspect of these studies is not the mythical prospect for "evolution" but the lack of respect for the created order of nature. In view of the existence of a universal genetic code (DNA) directing the life activities of all living cells, some scientists consider it a challenge to change and expand that universal code! Similarly, all living cells make use only of twenty amino acids (out of many other possible choices) in the construction of the proteins that provide the structure and functions of life. Despite this universal condition in nature, these scientists have set out to modify living creatures so that they contain novel or new amino



acids. The end objective of all this is to produce organisms with entirely new characteristics. On this issue one commentator asks rhetorically: "if the constraints of the genetic code are indeed history, what constraints remain?" (*Economist* February 16/02 p. 74) That indeed is the question. If these scientists do not even respect the universal condition of all living organisms, will they respect anything at all? In that they are ignoring the handiwork of the Creator, what could possibly restrict the activities of these people?

Many of the scientists involved in these new techniques are based at the Scripps Research Institute in La Jolla, California. The immediate situation facing these researchers is that there is almost no scope for adding code for new amino acids to the DNA molecule. The four nucleotide bases (in combinations of three) have the capacity to code for 64 molecules. We calculate that number from four taken to the third power or four times four, for a total of sixty four. While there are only twenty amino acids, most are coded by more than one triplet combination (three nucleotides). This redundancy reduces the possibility that a single error will result in the wrong amino acid being inserted into a protein. In this way 61

of the 64 possible triplets are already used for the twenty natural amino acids. That leaves only three codons and these signal "stop" for the building of a protein. Rather than churning out endlessly larger molecules, the building of each protein ends at a stop codon.

One American team chose to use a stop codon to code for a new amino acid. This was no easy strategy. To do this they had to produce a new transfer RNA molecule (tRNA). The blue print for a protein is like a succession of key holes strung together and called messenger RNA. What is needed to carry out the instructions on the blue print is something like vertical bricks (tRNA) with a key on the upper end and an amino acid on the lower surface. As the key fits into the appropriate slot of the blue print, the amino acid (on the lower side of the brick) below joins itself to a preceding amino acid in a developing sequence which lies parallel to the blue print chain above. Thus to insert their unnatural amino acid into the protein chain, the Americans formed a tRNA which matched, on the one end, the stop codon already there in the blue print. On the other end (of the brick) they attached their novel amino acid. Thus everywhere this stop codon appeared in the blue print, the novel amino acid was inserted by means of the new tRNA. The Americans were able to do this with living cells of the bacterium *Escherichia coli* (*E. coli*). At first, the scientists had to supply the new amino acid to these cells. Eventually however, by more traditional bioengineering techniques, they spliced into the organisms three new genes from a *Streptomyces* bacterium. In this way they enabled the *E. coli* cells to manufacture the new amino acid.

This whole process indeed "took some doing." Nothing about the process could be called spontaneous or even technically easy. Nevertheless these bacteria look perfectly ordinary. Lead scientist Ryan Mehl claims that the whole process indicates that evolution could have achieved this

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DEJA VUE AGAIN!

by Moxie

The genius of the English language, many people say, is that it freely borrows from other languages. For example, the term “deja vue” is French and it means “already seen.” We might more readily say “been there, done that!” Another equivalent expression is “nothing new under the sun.” Indeed some things are just so-o-o-o predictable. Among current events, none seems more aptly connected to the term *deja vue* than the resistance of established scientists to criticism, any criticism, of their views.

Our image of science, of course, involves the objective examination of data. Are there competing views? By all means let’s look at the evidence. However, in their December 2002 opinion piece, the editors of *Scientific American* define science as “conclusions vetted by the professional community.” In this context “vetted” means declared acceptable. It seems reasonable to ask how this definition connects with consideration of evidence. If science merely represents agreement among influential practitioners of the discipline, then there is a lot less to talk about. In the same way as they used to say it was hard to fight city hall (entrenched political interests), it similarly seems hard to fight entrenched scientific dogma.

The case of Danish environmentalist Bjorn Lomborg is a case in point.

His examination of environmental issues drew little attention in North America until it was published in English in 2001 under the title *The Skeptical Environmentalist*. The book is 515 pages long and has an incredible number of footnotes. One might have imagined that the book’s optimistic conclusions about our environment would be cause for joy. This was true enough as far as the general public were concerned, but most professional environmentalists were not pleased. Dr. Lomborg’s new book appeared like a threat to their ability to attract research funding, jobs and the attention of government officials.

The environmentalist lobby thus set out to defend their turf and an “extraordinarily bitter row” (Anthony Browne Mar 10/02 *The Observer*) followed. Highly critical reviews of the Lomborg book soon appeared in many influential scientific journals. The most bitter attack of all was in *Scientific American*, which in the January 02 issue devoted eleven pages to the Danish book. Four months later, this magazine allowed Dr. Lomborg a one page reply which was itself followed by a lengthy re-rebuttal by editor in chief John Rennie.

According to environment correspondent Anthony Browne of *The Observer*, this controversy was not really about the state of the world’s environment but rather concerned “the very nature of belief and the way we perceive the world around us.” (Sunday Mar 10/02).

The fight, in short, was not over data but over the very nature of science.

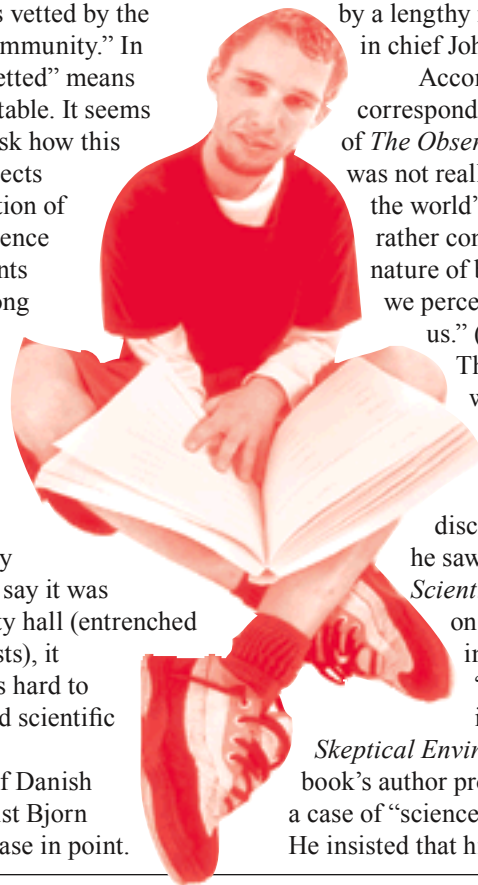
Dr. Lomborg indeed discovered this when he saw the title of the *Scientific American* attack on his book. The title in the magazine was “Science defends itself against *The Skeptical Environmentalist*.” The book’s author protested that this is not a case of “science” against anything. He insisted that his book was factually

based and thus scientific. Indeed Dr. Lomborg made a point of clearly stating the data and his sources so that everyone could check them as well. Therefore, he insisted “there is no need to defend science from my book -- any possible defeat of science was never the issue. The discussion is whether the statements in my book are correct or not. The need to make it sound like a battle of science *against* my book seems entirely to misplace and bias the focus.” (Lomborg’s Jan. 4/02 reply to *Scientific American*). Rather than science against his book, insisted the Dane, it was actually alarmist environmentalism against *The Skeptical Environmentalist*.

The various critiques of his book, Dr. Lomborg declared, were long on name calling and short on substance. Concerning a critique by World Resources Institute and the World Wildlife Fund, the Danish academic remarked “The fact that they with this long critique could not manage to make any serious charges against my facts seems telling. If I am so wrong, one would imagine that it should be a fairly simple job to debunk me. That they have been completely unable to do so actually seems to strengthen my argument.”

As far as *Scientific American* is concerned, John Rennie in his re-rebuttal to Bjorn Lomborg’s published remarks, admits that some have also called the *Scientific American* remarks “weak in substance.” Editor Rennie however claims strength in numbers. Other important journals did the same thing, he says, and no one would imagine they would try to get away with weak arguments, would they? Thus he remarks “Our pieces echo criticisms that have been made in reviews published by *Nature*, *Science*, *American Scientist*, and a wide variety of other scientific sources -- not venues where insubstantial criticisms would hold up.” (May 2002 p. 15)

If this controversy is not over environmental specifics, then what is the whole fuss about? Why the bitter confrontation over a single book? The fact is that the vested interests are very angry at Dr. Lomborg’s threat to their



credibility. This Danish academic insisted that the establishment conclusions could be reexamined in the light of the data. As he declared in his detailed rebuttal to *Scientific American*: "And this is exactly my point -- we should take the *science* of these people seriously, but we should not uncritically adopt their *evaluation* of the problems." The acknowledged experts however did not want to be subject to such scrutiny. John Rennie concludes his re-rebuttal of Dr. Lomborg with a vigorous defense of the authoritarian position: "By sowing distrust of the environmental science community with his rhetoric, Lomborg has done a severe disservice not only to those scientists but also to the public he has misinformed." (*Scientific American* May 2002 p. 15)

The crux of the matter is that the Danish academic thought he could discuss the current state of the environment in terms of the actual data. He is, after all, highly trained in statistics. However when this man was offered only one page in which to defend himself against the *Scientific American* attacks, he responded by placing a detailed rebuttal on his web page. Under threat of legal action however, he was forced to remove this document from the internet. Soon however, Patrick Moore, one of the founders of Greenpeace and a man who has since changed his views, placed Dr. Lomborg's defense on his own website. This strategy of threatening legal action, ostensibly for breach of copyright in the quoting of specific attacks, has been frequently used during the last several years to stifle replies. It has happened to creation model supporters, to intelligent design supporters and others. Dr. Lomborg thought a reasonable discussion of the evidence was possible, but he was wrong.

Following these events, some scientists complained to the Danish Research Agency that Dr. Lomborg had displayed "scientific dishonesty" in his book. Following a six month review by a Danish committee, this group released a 16 page booklet, which declared that the Lomborg

book falls "within the concept of scientific dishonesty." The report referred for support to the critique of Lomborg's book published in *Scientific American*. This latter journal's document may lack specifics and a detailed rebuttal may be available, but it is the establishment position that counts. Peter Raven of the Missouri Botanic Garden, commenting on all this, insisted that Lomborg's position should not be considered as 'science' and that the new booklet should bring the Dane's credibility to a halt. (*National Post* Friday Jan. 10/03 p. A16)

We thus see that the *Scientific American* article has been taken as the standard against which to measure Dr. Lomborg. This is very interesting since Stephen Schneider, the first authority in *Scientific American* to deal with the Lomborg book, was himself quoted in the journal *Discover* in October 1989 on the subject of integrity in science. What he said was this: "... we need to get some broadbased support, to capture the public's imagination. That, of course, entails getting loads of media coverage. So we have to offer up scary scenarios, make simplified, dramatic statements, and make little mention of any doubts we might have." This is not a very high standard of integrity against which to measure other people.

Thus establishment scientists have done their best to defend their science against attacks on their credibility. Discussion of the data was entirely irrelevant to the case. Indeed, the December 2002 editorial in *Scientific American* declared that people such as global warming skeptics or creationists, who try to exploit

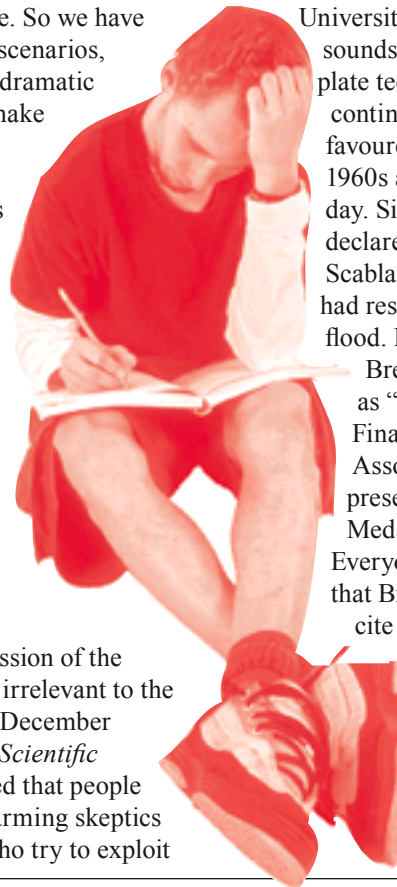
"holes" (problem areas) in science, are pushing a self-serving agenda. All they achieve is to make education of the public by establishment scientists that much more difficult. Anyone is free to disagree with the establishment's view of science, but such dissenters are not reasonable, so say the editors of this journal. The responsible position (they insist) is to make do with authoritarian science whatever its imperfections.

The idea that science merely represents the agreed interpretation of the majority of influential scientists, no doubt seems unlikely to many people despite the misadventures of Bjorn Lomborg. During the past century however a number of cases have occurred where the scientific community has fiercely reacted against contrary views. Alfred Wegener, for example, proposed a version of continental drift which American geologists vigorously rejected at a meeting in 1926. Wegener's ideas were labeled "pseudoscience", "superficial" and "manipulation of objective facts." (Claude Allegre. 1988. *The Behavior of the Earth*. Harvard University Press. p. 18, 19). It all

sounds so familiar. Interestingly plate tectonics (a version of continental drift) became the favoured paradigm in the late 1960s and remains so to this day. Similarly J. Harlen Bretz declared that the Channeled Scablands of Washington State had resulted from a catastrophic flood. From 1923 to 1963 Dr.

Bretz's views were described as "heresy" by his colleagues. Finally in 1979 the Geological Association of America presented him with the Penrose Medal, their highest award. Everyone had finally decided that Bretz was right. One could cite numerous other cases

where establishment scientists have declared that those who disagreed with them were pseudoscientists, dishonest or incompetent. The



intent was always to avoid substantive examination of the issues.

It is apparent that discussion of the evidence is irrelevant when science is defined as the majority view. Dr. Lomborg could not win because the establishment controls all the rewards associated with the practice of this discipline. Even many who disagree with the establishment position will keep quiet in order not to attract unfavourable attention to themselves. When *Scientific American* (in the title of the December 2002 editorial), declares "In Science We Trust" they actually are advocating empty reverence for those in influential positions. We, on the other hand, insist on thinking for ourselves. So do not feel threatened by big name scientists who say nasty things about creationists or those supporting other minority positions. Name calling or *ad hominem* attack (Latin term meaning "against the man") is an old strategy. In the end it will become apparent how wrong those name callers are. In the meantime why not read a good book today (we have plenty to recommend) -- or even Dr. Lomborg's discussion of the environment (if you like really big books)!

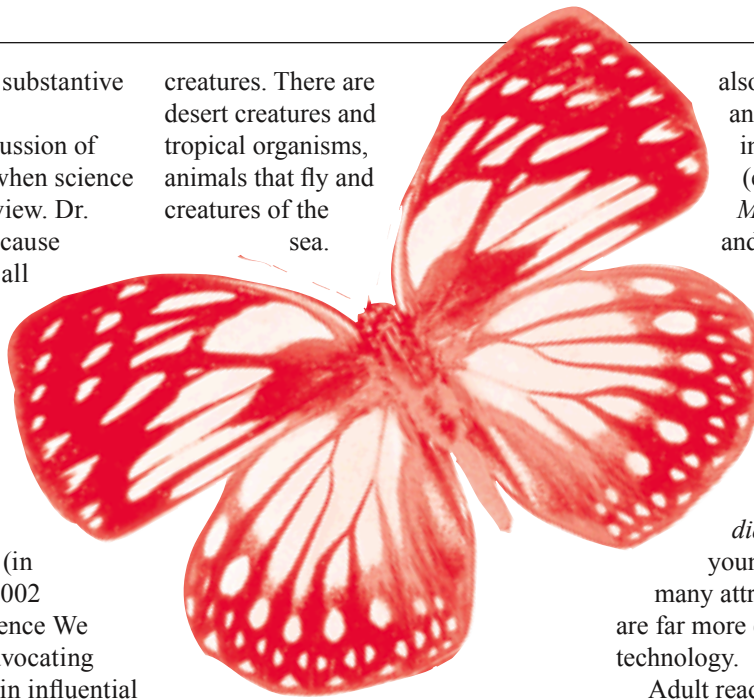
FAQ

(Frequently Asked Question)

Why is design such an important concept to teach?

In some aspects nature is like a beautiful gem. In it we see finesse and beauty and amazing variety. In other ways however, nature is like the most intricate machine imaginable. Therein we see plan and purpose, and astonishing complexity. All these features cause us to turn our attention to the Creator who made all things. Who can fail to be impressed with the variety of colours, shapes and sizes and ecological roles of the various living

creatures. There are desert creatures and tropical organisms, animals that fly and creatures of the sea.



Not only are there many, many different kinds of plant and animal, but there are even plenty of variations on a single theme. Thus young people enjoy such books as *Dinosaurs by Design* (which describes considerable diversity on the dinosaur theme) or *Special Wonders of our Feathered Friends* (including birds of different appearances and roles in the ecosystem). Other books which describe biodiversity include *Special Wonders of the Sea*. (All the above books cost \$18.50) Then there is the cheaper (at \$6.00 each) sticker book series *God Created Insects*, *God Created Dinosaurs*, as well as *God Created Sea Life*, and *Plants, Animals, and People*. Each of these titles costs \$6.00.

In addition to the biodiversity theme, there are organisms which are not only wonderful to observe, but which also display behaviour patterns which are astonishingly fine tuned to their lifestyles. Since these creatures all have extremely small brains, none could have learned these behaviours on their own. These skills, be they social or not, were programmed (designed) for these organisms. The social insects are particularly good examples of this. Thus the children's book *Hummy and the Wax Castle* (\$7.25) is very popular. The book *If Animals Could Talk* (\$7.99) for somewhat older readers,

also describes interesting animal survival skills. Some insects such as butterflies (eg. *Life and Adventures of Monica Monarch* [\$17.99] and *Bomby the Bombardier Beetle* [\$6.25]) exhibit extremely precise biology either in development or in protection against being eaten. Another "design" book for young people is *Nature did it First*. This title for young readers points out how many attributes of living organisms are far more efficient than man's best technology.

Adult readers also appreciate design. Even the tiniest living cell is full of spectacular molecular machines which operate with great precision. If a single component is missing or shaped incorrectly, the cell cannot function. Some people say that the cell is an all-or-nothing system. It has to be perfect or it will not survive. Others tell us that the cell is "irreducibly complex." The technical title *Darwin's Black Box* (\$18.00) explores this theme. On a larger scale, as we look at organ systems and even entire bodies, we still see plenty of evidence of design. The human body is particularly worthy of our attention. Two books explore this theme: *Body by Design* and *The Human Body: and Intelligent Design* (both \$18.00)

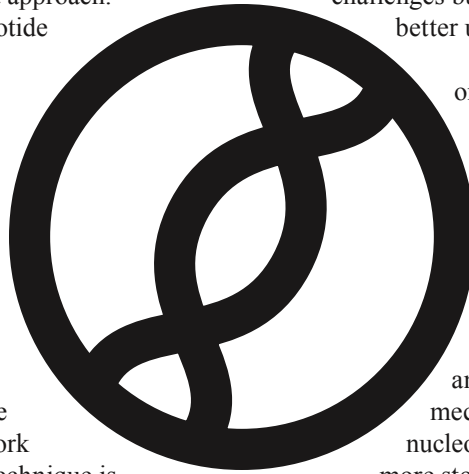
Our association offers a cornucopia of wonderful titles on the design theme. It is possible to discuss this phenomenon under the themes of specified complexity, all-or-nothing systems or wise contrivance (manufacture). In addition, the video *Unlocking the Mystery of Life* (\$18.50) explores some of these themes with great success. There is material available for every taste and every reading level. There are definite benefits to be gained from exploration of such an issue. When we observe design, not only will we accord respect to the Creator, but we will also treat His Creation with respect too.

Twenty is Plenty - continued from page 3

result. Why it did not, he has no idea.

The above technique obviously has very limited potential as all 64 codons are actually in use already. Japanese scientists chose a more difficult approach. They set out to build a pair of new nucleotide bases. Whereas all organisms have four nucleotide bases, the combinations of which allow for 64 triplets, a new organism with six nucleotide bases would have instead the possibility for 216 triplet combinations (six times six times six). This would allow for an awful lot more amino acids! With such modified DNA, the Japanese (and also Americans) have managed to produce new proteins from a suitable soup of chemicals in a test tube. Nevertheless the process is extremely difficult to make work even in a test tube. Moreover when the technique is tried with living cells, they promptly die. The scientists however are optimistic that progress is being made toward success with living cells.

Despite the technical difficulty of these projects, the scientists involved believe that they have demonstrated the potential of evolution to yield astonishing new organisms



and products. On the contrary of course, they have yet again demonstrated the irreducible complexity of the living cell. A simple change in the genetic code yields nothing until numerous other metabolic machines in the cell are also modified. The secular scientists may ponder these new challenges but it is the creation based scientist who better understands the situation.

While secular scientists wonder why only four nucleotide bases are used to code for the proteins so necessary to the living cell, creation based Werner Gitt suggests that this choice is optimal from an engineering standpoint (see *In the Beginning was Information* p. 94). Dr. Gitt declares that this choice allows for the most compact nucleus in the cell and for the most efficient implementing mechanism. Indeed a larger number of nucleotides would not only require much more storage space, but the potential for copying errors would also be much greater. Indeed the elegant simplicity of the genetic code and the associated restricted choices for the amino acids in cellular proteins -- both testify to the work of the Designer. Thus we do not fear future "evolution" from this research, but we do fear the "anything goes" attitude which drives these projects.

The Big Splash

- Continued from page 1

of the world is extremely difficult to access however. As a result, active digging did not take place until the summer of 2002. It was then that the palaeontologists found eight skeletons of vigorous adults in an area not quite fifty feet square. When you consider that these animals were each over twenty feet long, that is a lot of bones in that area! The scientists suspect that a huge bed of Pachyrhino bones lies at this site. Their preliminary conclusion is that these animals died in a catastrophic event such as a flood.

The Pachyrhino bone bed becomes all the more interesting however when we realize that this is part of the Colville River bone bed on Alaska's North Slope. The entire bone bed extends 200 km along the river's left bank. The first dinosaur bones in the area were discovered in 1967 in the Liscomb bed. It was not until 1985 however that anyone realized that the bones were from dinosaurs rather

than bison. Some of the bones were unfossilized, which caused scientists to think they were of relatively recent origin and it never occurred to them that dinosaur bones could last to the present in an unfossilized state. Of course if the dinosaurs died only thousands of years ago, rather than millions, this would be more readily understood.

Thus the Pachyrhinos succumbed to raging flood waters. In this connection, some scientists talk about the case of 10,000 caribou that drowned in a flooded river in northern Quebec in 1985. Apparently the whole herd panicked and animals in the rear of the column were the ones which pushed the leaders into the dangerously rising torrent. Thus the flood did not need to be too extensive. Caribou are however much less sturdy on their feet than Pachyrhinos would have been. Also none of these caribou bones will be fossilized because they were not deeply buried in water borne muck. The scale of the watery disaster that overtook the Pachyrhinos, on the other

hand, was such that it not only drowned these animals, but it also engulfed their carcasses in enough sediment to permanently bury these large animals. How many floods have we seen recently that could do that? Don't forget that the Colville River bone bed is 200 km long and includes the remains not only of Pachyrhinos, but also large duckbill dinosaurs including *Edmontosaurus*, carnivorous dinosaurs, more dainty *Troodon* relatives and various tiny rodent-like creatures. Since small animals decay much faster, these require even faster permanent burial for preservation than do large animals. That was some flood!

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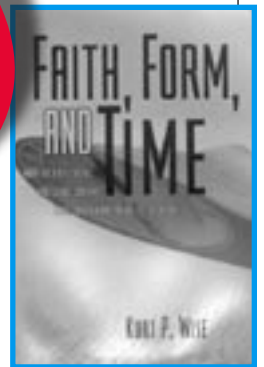
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